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UNIVERSITY OF SOUTHAMPTON

Faculty of Environmental and Life Sciences

School of Health Sciences

**An interdisciplinary approach to pressure ulcer prevention in the community setting:
Exploring the barriers and facilitators for implementation.**

by

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Thesis for the degree of Doctor of Philosophy

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UNIVERSITY OF SOUTHAMPTON

ABSTRACT

SCHOOL OF HEALTH SCIENCES

AN INTERDISCIPLINARY APPROACH TO PRESSURE ULCER PREVENTION IN THE COMMUNITY SETTING: EXPLORING THE BARRIERS AND FACILITATORS FOR IMPLEMENTATION

Paul David Clarkson

Pressure ulcers (PUs) are a burden to individuals' physical, mental and social wellbeing (Spilsbury et al. 2007), with a financial impact for individuals, healthcare organisations and society (Gorecki et al. 2009; Demarré et al. 2015b). A team-based approach towards their prevention has long been promoted as best practice, yet little is known about its application or efficacy in practice (Gottrup et al. 2001; Cramp et al. 2004; Bergquist-Beringer and Makosky Daley 2011; NICE 2014).

The aim of the thesis was to explore the knowledge, attitudes and perceptions of healthcare staff in order to understand barriers and facilitators to interdisciplinary PU prevention. A sequential mixed methods design was adopted to achieve this aim, with questionnaires, focus groups and interviews conducted with health care staff from a community NHS Trust. The results of these questionnaires were used to inform focus groups and interview discussions with nurses/healthcare assistants (HCAs), allied health professionals (AHPs), non-caseholding clinicians and tissue viability nurses (TVNs). These data were coded and matched to determinants of behavioural change using two taxonomies, which subsequently established a series of techniques for use within an interdisciplinary intervention (Abraham and Michie 2008; de Bruin et al. 2009; EPOC 2015).

The integrated quantitative and qualitative results established the following determinants of behaviour change: knowledge, attitude, awareness, social influence, organisational factors and structural factors. Participants demonstrated a high level of knowledge in relation to 'aetiology and development', but poor knowledge of 'preventive measures', with nurses and AHPs displaying the same levels of knowledge overall. However, nurses

were found to have a more positive attitude and a greater personal competency to PU prevention than the pooled data for AHPs. Nevertheless, when divided by profession occupational therapists and HCAs reported a more positive attitude than nurses. While participants demonstrated strong awareness of the impact of PUs, there was a limited understanding of the role that different professional groups could play in prevention. Furthermore, there was some variability in the responses from a variety of professions over whether PUs were preventable in high risk groups. Consequently, it was reported that in some areas the focus of practice had changed from prevention to ensuring that if a PU did occur it would be classified as unavoidable. Organisational and structural barriers to achieving prevention included insufficient time and staffing; while for team-based practice, participants described the impact on communication of nursing and AHP teams working from different locations. The importance of effective leadership and education were identified as facilitators to achieving an interdisciplinary approach to PU prevention.

An interdisciplinary training programme was developed and feasibility tested with one community team based on the previous results and a framework of the characteristics of a good interdisciplinary team (Nancarrow et al. 2013). The content and format of the programme was considered acceptable, however the tools used to measure the programme's effectiveness lacked sensitivity to detect a meaningful difference. The programme focused on the individual and team-based determinants of practice, however, achieving an interdisciplinary approach to PU prevention requires the integration of other practice determinants. These include process, organisational and contextual factors (Reeves et al. 2010).

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List of accompanying materials

All data supporting this study are openly available from the University of Southampton repository at <https://doi.org/10.5258/SOTON/D1152>

Author's Declaration

I declare that this is entirely my own work, and that I have not knowingly
copied (plagiarised) the work of others

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Title of thesis: An interdisciplinary approach to pressure ulcer prevention in the community
setting: Exploring the barriers and facilitators for implementation.

I declare that this thesis and the work presented in it is my own and has been generated by me as
the result of my own original research.

I confirm that:

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3. Where I have consulted the published work of others, this is always clearly attributed;
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what was done by others and what I have contributed myself;
7. Parts of this work have been published as:
 1. An interprofessional approach to pressure ulcer prevention: A knowledge and attitudes
evaluation *Journal of Multidisciplinary Healthcare* <https://doi.org/10.2147/JMDH.S195366>

Signature:

Date:

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List of abbreviations

AHCPR – Agency for Healthcare Policy and Research

AHPs – Allied Health Professionals/Professions

AITCS – Assessment of Interdisciplinary Team Collaboration Scale

AMED – Allied and Complementary Medicine Database

AN – Associate Nurse

APTA – American Physical Therapy Association

APWCA – American Professional Wound Care Association

APUP – Attitudes to Pressure Ulcer Prevention questionnaire

AWMA – Australian Wound Management Association

B.C. – Before Christ

BMJ – British Medical Journal

CASP – Critical Appraisal Skills Programme

CI – Confidence Interval

CINAHL – The Cumulative Index to Nursing and Allied Health Literature

CQUIN – The Commissioning for Quality and Innovation Payments Framework

CVI – Content Validity Index

DFU – Diabetic Foot Ulcer

D.F. – Degrees of Freedom

DH – Department of Health

DHSC – Department of Health and Social Care

EN – Enrolled Nurse

EPUAP – European Pressure Ulcer Advisory Panel

EPOC – Effective Practice and Organisation of Care taxonomy

FoHS – Faculty of Health Sciences, University of Southampton

GP – General Practitioner

HCA – Healthcare Assistant

HCPC – Health and Care Professions Council

ICC – Intraclass Correlation Coefficient

IDT – Interdisciplinary Team

IQR – Interquartile Range

IRAS – Integrated Research Application System

JCAHO – Joint Commission on Accreditation of Healthcare Organisations

PUKAT – Pressure Ulcer Knowledge Assessment Tool

MDRPU – Medical Device Related Pressure Ulcer

MDT – Multidisciplinary Team

mmHg - Millimetres of Mercury

MRC – Medical Research Council

MS – Multiple Sclerosis

NA – Nursing Assistant

NHS – National Health Service

NICE – National Institute for Health and Care Excellence

NPSA – National Patient Safety Agency

NPUAP – National Pressure Ulcer Advisory Panel

OECD – Organisation for Economic Cooperation and Development

ONS – Office for National Statistics

OR – Odds Ratio

OT – Occupational Therapy/Therapist

PEDro – Physiotherapy Evidence Database

POD – Podiatrist

POVA – Protection of Vulnerable Adult

PT – Physiotherapy/Physiotherapist

PU – Pressure Ulcer

PubMed – US National Library of Medicine / National Institutes of Health

PUKT – Pressure Ulcer Knowledge Tool

QoL – Quality of Life

RA – Rehabilitation Assistant

RCN – Royal College of Nursing

RN – Registered Nurse

SCI – Spinal Cord Injury

SD – Standard Deviation

SIRI – Serious Incident Requiring Investigation

SN – Senior Nurse

SPSS – Statistical Package for the Social Sciences

TVN – Tissue Viability Nurse

TVS – Tissue Viability Society

UK – United Kingdom

US – United States of America

X² - Chi Square Statistic

Key definitions

Pressure ulcer

'Localised injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear' (NPUAP et al 2014).

Multidisciplinary

The inclusion of multiple healthcare professionals working on the same project, but "independently or in parallel" to one another (D'Amour et al 2005, p120, Siegler & Whitney 1994, Schofield & Amodeo 1999).

Interdisciplinary

The integration of practice across both registered and unregistered healthcare staff to meet the increasingly complex needs of changing patient demographics (Satin 1994; D'Amour et al. 2005; Nancarrow et al. 2013).

Chapter 1: Background

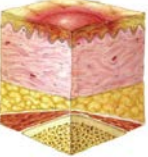
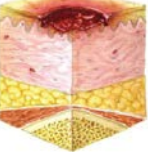

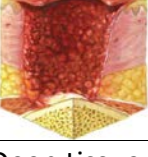
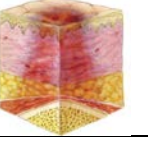
To understand a multidisciplinary/interdisciplinary approach to pressure ulcer prevention, it is first important to explore the challenges associated with pressure ulcers (PUs).

Therefore, this chapter will define a PU, provide some historical background and discuss the burden of PUs for individuals and healthcare organisations. In addition, preventive measures will be discussed, with risk factors for PU development linked to the role of multidisciplinary team members. This chapter, therefore, provides some context and rationale to the aims of this thesis.

The prevention and treatment of pressure ulcers has been traditionally considered to be the role of the nurse. However, the present thesis addresses the clinical condition from the perspective of a physiotherapist, to match the educational training and clinical experience of the author.

1.1 Definition of pressure ulcer

A pressure ulcer (PU), also known as bed sore, pressure sore, pressure injury or decubitus ulcer, represents 'localised injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear' (NPUAP et al. 2014a). The most common sites for PUs are on the sacrum and heels (Vanderwee et al. 2007; Gallagher et al. 2008; Moore et al. 2011; Moore and Cowman 2012), although they can occur in any location, particularly adjacent to bony prominences. PUs are classified into four-categories internationally (NPUAP et al. 2014a), while unclassified and deep tissue injury were introduced as additional categories by the National Pressure Ulcer Advisory Panel (NPUAP) and adopted in some areas. Two additional types of pressure ulcers have recently been described by the NPUAP, including medical device related and mucosal membrane pressure injury (NPUAP 2016a) (Figure 1).

<p>Category 1</p> 	<p>“Intact skin with non-blanchable redness of a localised area usually over a bony prominence. Darkly pigmented skin may not have visible blanching; its colour may differ from the surrounding area”.</p>
<p>Category 2</p> 	<p>“Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serum filled blister”.</p>
<p>Category 3</p> 	<p>“Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscle are not exposed. Slough may be present but does not obscure the depth of tissue loss. May include undermining and tunnelling”.</p>
<p>Category 4</p> 	<p>“Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Often includes undermining and tunnelling”.</p>
<p>Deep tissue injury</p> 	<p>“Purple or maroon localised area of discoloured intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or shear. The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer or cooler as compared to adjacent tissue”.</p>

<p>Medical device related pressure injury</p>	<p>Pressure injury as a result of devices applied for diagnostic or therapeutic purposes. Injury usually matches the shape of the device.</p>
<p>Mucosal membrane</p>	<p>Pressure injury occurring to the mucosal membranes where a medical device has been in place.</p>

Figure 1: Definitions of category 1-4, and deep tissue injury classifications. Images and text-based descriptions from International PU guidelines (NPUAP et al 2014a). Descriptions of medical device related and mucosal membrane pressure injuries adapted from NPUAP (2016a, b)

1.2 Historical perspectives of pressure ulcers

Pressure ulcers do not represent a new problem in healthcare. Indeed, Hippocrates described a pressure related wound developed as a consequence of paraplegia with bladder and bowel dysfunction around 400 B.C (Adams 1939), while evidence of PUs has been identified in Egyptian mummies originating from more than 5000 years ago (Agrawal and Chauhan 2012). While prolonged mechanical load is now established to be a

primary risk factor for the development of a PU (Coleman et al. 2014), this was not always the case. As an example, in the 19th century, Jean-Martin Charcot subscribed to a 'neurotrophic theory', suggesting causation was due to damage to the central nervous system. The term 'decubitus ominusus' was therefore used due to the proximity of death soon after the observation of eschar at the sacrum or buttocks (Levine 2005). More recently there has been an increased understanding of the aetiological factors associated with PU formation. In 1946, Valentine suggested pressure, friction, moisture, nutritional deficiency and debilitating disease, as well as "wrinkled sheets and an ill-kept bed", as contributing factors in PU development (p. 44). However, increasing research into the biomechanics of skin and the underlying soft tissues has led to a more specific understanding of the mechanisms of tissue breakdown. One example of this has been a greater understanding of the relationship between the magnitude and duration of mechanical loading. Using a series of animal models, various authors have identified an inverse relationship between magnitude and duration of load suggesting that tissue breakdown will occur more rapidly with higher loads (Kosiak 1961; Dinsdale 1974; Daniel et al. 1982; Bouten et al. 1999; Bouten et al. 2003). Reswick and Rogers (1976) further described this relationship with humans in terms of a pressure-time curve, although more recent work has indicated that if the pressure or resulting deformations are sufficiently high, damage can occur over very short time period i.e. orders of minutes, represented by a sigmoid curve of tissue deformation and time (Gefen 2009).

Pressure ulcers have been reported to develop either superficially or from deep tissues adjacent to bony prominences. The former is generally thought to occur as a result of prolonged pressure in conjunction with frictional and shear forces (Dinsdale 1974), while deep tissue injury can be caused by sustained tissue compression alone (Kosiak 1961; Daniel et al. 1982; Salcido et al. 1994).

Pathophysiological mechanisms considered to be critical in tissue breakdown include:

- localised ischaemia (Kosiak 1961; Dinsdale 1974; Daniel et al. 1982),
- cell deformation (Ryan 1990; Bouten et al. 1999),
- impairment of interstitial fluid, lymphatic drainage (Miller and Seale 1981; Reddy et al. 1981; Barbenel 1991),

- injury associated with the reperfusion phase following load removal (Herrman et al. 1999; Peirce et al. 2000).

Bouten et al. (2003) suggested that it was probable that each of these factors contributes to the formation of a PU, although the importance of each factor will depend on both the magnitude and timing pre- and post-skin loading. In addition, individual characteristics will certainly influence the mechanisms. Indeed, a number of conceptual frameworks have been proposed (Braden and Bergstrom 1987; Defloor 1999; Benoit and Mion 2012; Coleman et al. 2014). As an example, Coleman and colleagues (2014) separated risk factors into mechanical boundary conditions and the susceptibility and tolerance of the tissue sites of the individual (Figure 2). These authors also identified both direct and indirect causal factors in the development of a pressure ulcer.

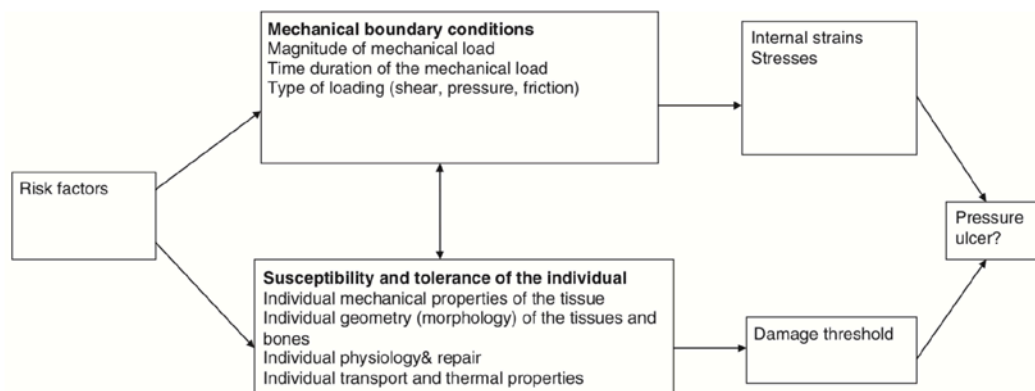


Figure 2: Risk factors that influence the susceptibility of an individual to acquire a pressure ulcer.

Reproduced with permission (Coleman et al 2014)

1.3 Prevalence

Prevalence rates from published literature between 2000-2012 are shown in Table 1 and represent a wide range, both within and across clinical settings, in various countries.

Setting or Population	Prevalence rates
Acute care	0% - 46%
Critical care	13.1% - 45.5%
Aged care	4.1% - 32.2%
Paediatric care	0.47% - 72.5%
Community care	6.8% - 22%

Table 1: Prevalence rates from 2000-2012 reproduced from International PU guidelines (NPUAP et al 2014a). Community care prevalence rates from separate literature published between 2000-2012 (Individual community prevalence studies shown separately in the reference list)

Direct comparison of prevalence rates between studies is difficult for a number of reasons. In particular, data from studies conducted before 1975 use a different categorising system to that proposed by Shea (1975) and then adapted in consensus statements by the NPUAP in 1989 and European Pressure Ulcer Advisory Panel (EPUAP) in 1999 (NPUAP 1989; EPUAP 1999). In addition, many studies do not report category one PUs within their prevalence figures, described as non-blanching erythema (NPUAP et al. 2014a). Some of the reasons for this include the ambiguity of defining a category one PU and the fact that this level is often considered to be reversible. Nevertheless, without their inclusion, direct comparison is impossible, unless data has been presented in individual categories. Category one PUs are generally regarded as the most prevalent of all PUs (Vanderwee et al. 2007; Gunningberg et al. 2013a), therefore their non-inclusion in reported prevalence figures may underestimate the overall problem. In addition, the NPUAP recently recognised medical devices as a potential cause of PU development (NPUAP 2016a) (Figure 1). Indeed, Black and colleagues (2010) have reported that one third of all hospital-acquired PUs were associated with medical devices in a number of US medical centres. By contrast, in the UK, the number of medical device related PUs are generally reported as part of a wound audit and are typically under-reported (Smith et al. 2016).

Direct comparison between studies is further complicated by the changing nature of the population demographics and settings in which care is delivered. As an example, it is well established that the incidence of PUs is higher within the elderly population (Gunningberg

et al. 2013a) and that the rates of those over 65-years of age have increased from under 9% in 1960 to 15% in 2010 across countries within the Organisation for Economic Cooperation and Development (OECD 2015). As a result, one would expect the PU prevalence rate to also increase, but this has not been shown in the acute care setting. Goldberg (2012) and VanGilder et al (2008a, b, 2009) even report a declining trend in PUs (Figure 3). An explanation for this may be that care is increasingly being provided in the community setting. Indeed, data for healthcare spending across OECD countries and recent healthcare policy reports demonstrate an increasing focus on community healthcare delivery (Edwards 2014; OECD 2015) (Figure 4).

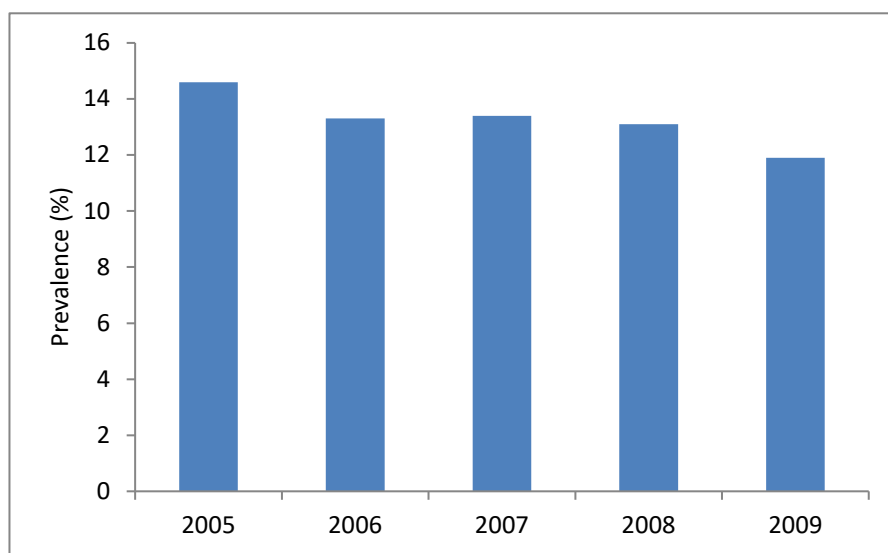


Figure 3: Decline in acute sector prevalence in the US from 2005-2009 (VanGilder et al. 2008a; Vangilder et al. 2008b; VanGilder et al. 2009)

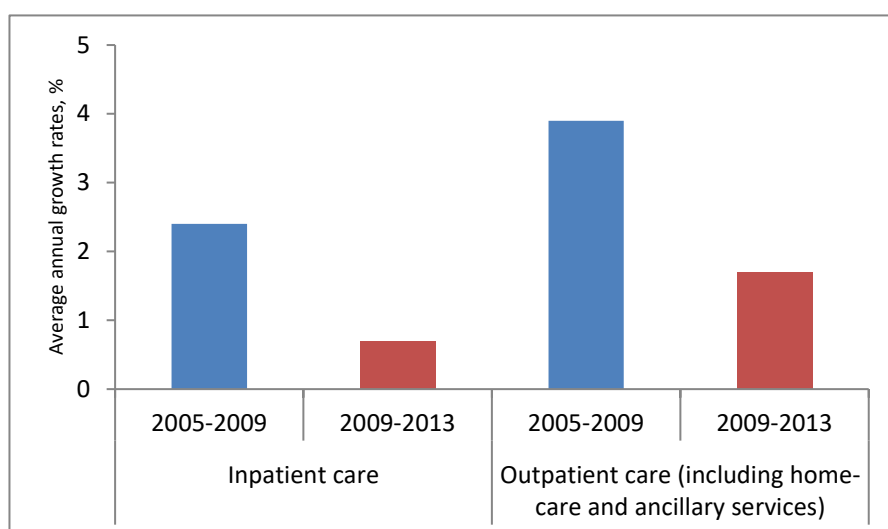


Figure 4: Growth rates of healthcare spending, OECD average, 2005-2013

Consequently, the decrease in acute care prevalence may be counterbalanced by an increase in prevalence in the community. However, limitations in research into pressure ulcers in the community prohibits confirmation of this correlation. This is due to a lack of consensus over how to measure prevalence and disagreement over what constitutes a community setting (Inman and Firth 1998; Stevenson et al. 2013).

In the UK, a variety of approaches exist between healthcare providers when calculating prevalence rates in the community, which is demonstrated in two recent studies. Hopkins and Worboys (2015) undertook a wound audit in an inner city borough of London and identified a PU prevalence rate of 13% over a one week period. However, this study did not differentiate moisture lesions from category 2 PUs, therefore calling into question the PU prevalence figure reported. A similar figure of 11% was reported by Stevenson et al. (2013) in an urban environment in the North of England. However, this study defined a community setting differently with the inclusion of rehabilitation and palliative care facilities in their figures, making direct comparison problematic. Despite this absence of comparable data in the community, an increasing focus on community healthcare provision coupled with an ageing population, will likely lead to increases in community PU prevalence.

1.4 Burden of pressure ulcers

PUs represent a major burden to populations worldwide and have been attributed with the highest disability index in comparison to other dermatological conditions (Hay et al. 2014). This study used data collected between 1990 - 2010, across 187 countries, with PUs representing 8.6 and 8.3 disability adjusted life years lost per 100,000 for men and women, respectively, across Western Europe. The corresponding values estimated in North America were 16.0 and 15.5, representing a two-fold increase across high income populations. At an individual level, PUs have been shown to have a detrimental effect on quality of life (QoL) impacting on emotional, physical, mental and social wellbeing (Spilsbury et al. 2007). PUs are also associated with pain, experienced in combination with fear, isolation and anxiety associated with wound healing (Langemo et al. 2000; Fox 2002; Hopkins et al. 2006; Spilsbury et al. 2007; Moore and Cowman 2009). While pain was reported to be the main health-related QoL concern for patients, the financial impact on

those individuals who develop a PU was also highlighted. This included an inability to work, treatment costs and poor living circumstances (Gorecki et al. 2009).

The economic costs associated with treating PUs have been estimated to range between €121.44 million and €2.59 billion within European and North American countries (Demarré et al. 2015b). In the UK, the total cost of managing wounds of all types, when adjusted for comorbidities was estimated to range between £4.5 and 5.1 billion per annum (Guest et al. 2015). This financial and resource burden will only increase due to an ever ageing population (ONS 2016) unless effective preventive measures are adopted (Dealey et al. 2012; NPUAP et al. 2014a). Indeed, it has been suggested that treatment costs associated with both individuals and healthcare organisations are considerably higher than the costs associated with prevention (VanGilder et al. 2008a; Padula et al. 2011).

1.5 Prevention of pressure ulcers

In a seminal series of papers, Hibbs (1988a, b, c) hypothesized that 95% of all pressure ulcers are preventable. This estimate was never tested empirically, but has since been cited as fact and used as the basis for targets and policy (Downie et al. 2013). Such policies include those developed by the UK Department of Health recommending a 95% reduction in all avoidable, and therefore preventable, hospital and community-acquired pressure ulcers (NPSA 2010; DH 2011) (Table 2). The US National Pressure Ulcer Advisory Panel attempted to establish consensus on whether PUs were avoidable or unavoidable in nature (Black et al. 2011). They concluded that most, but not all PUs are avoidable, although they were unwilling to define a percentage considered to be preventable. More recently various authors have suggested that most PUs could be considered preventable and predictable (Bredesen et al. 2015; Hoviattalab et al. 2015).

Table 2: UK Department of Health criteria for avoidable and unavoidable pressure ulcers (NPSA 2010, DH 2011)

Avoidable criteria	“Avoidable” means that the person receiving care developed a pressure ulcer and the provider of care did not do one of the following: evaluate the person’s clinical condition and pressure ulcer risk factors; plan and implement interventions that are consistent with the persons needs and goals, and recognised standards of practice; monitor and evaluate the impact of the interventions; or revise the interventions as appropriate.”
Unavoidable criteria	“Unavoidable” means that the person receiving care developed a pressure ulcer even though the provider of the care had evaluated the person’s clinical condition and pressure ulcer risk factors; planned and implemented interventions that are consistent with the persons needs and goals; and recognised standards of practice; monitored and evaluated the impact of the interventions; and revised the approaches as appropriate; or the individual person refused to adhere to prevention strategies in spite of education of the consequences of non-adherence”

Risk assessment is described as the first fundamental step in the pathway of prevention (Moore et al. 2015). However, the type of risk assessment used is a subject of much contention with debate over the use of particular tools and/or clinical judgement (Defloor and Grypdonck 2004; Balzer et al. 2007; Anthony et al. 2008; Moore et al. 2013; Moore et al. 2015). This is partly due to the variation in sensitivity and specificity of risk assessment tools, such as the Braden, Norton and Waterlow scales (Norton et al. 1962; Waterlow 1985; Braden and Bergstrom 1987; Pancorbo-Hidalgo et al. 2006; Park et al. 2016). While risk assessment scales enable a structured approach for evaluation of risk factors for PU development, a combined approach with clinical judgement has been advocated as best practice to identify patients at risk (Balzer et al. 2007; Anthony et al. 2008; Johansen et al. 2014; Moore and Cowman 2014).

Subsequent interventions for PU prevention include skin inspection and care, repositioning and pressure-relieving advice, prescription of appropriate support surfaces, nutritional advice and posture management (NPUAP et al. 2014a). Responsibility for implementing these interventions has historically been focused on nurses (Samuriwo 2012). However, a multidisciplinary approach has been suggested as important to achieve effective holistic prevention (Gottrup et al. 2001; Cramp et al. 2004; APWCA 2008; Bergquist-Beringer and Makosky Daley 2011; Houghton et al. 2013; AWMA et al. 2014; NICE 2014). While knowledge and attitudes have been explored with some professional

groups outside of nursing, including doctors, healthcare assistants and some allied health professionals (Ch. 2), role definition in this area is less well established.

Allied health professionals including physiotherapists (PT), occupational therapists (OT) and podiatrists, offer professional expertise that may assist in the prevention of PUs. Indeed, in the US, Canada and Australia there is active involvement from these professions in treatment and prevention of PUs (McCulloch 1998; APWCA 2008; APTA 2010; Houghton et al. 2013; AWMA et al. 2014), whereas the practice in the UK is more sporadic and often limited to specific settings (Coggrave and Rose 2003; Guihan et al. 2009; Worsley et al. 2016). Table 3 details the association between expertise of these professional groups and the risk factors for PU formation as defined by Coleman and colleagues (2014).

In the community setting, the involvement of patients and carers working in partnership with healthcare professionals as part of the multidisciplinary team is also important. This is particularly necessary as community-based healthcare professionals are unlikely to see their patients on a daily basis. Therefore, to achieve effective continuity of care, both patients and carers are required to become active participants in their own preventive care plan (Bergquist-Beringer and Makosky Daley 2011).

Table 3: Multidisciplinary roles outside of nursing and their associations with risk factors for pressure ulcer development from Coleman et al 2014

Profession	Expertise	Professional role	PU risk factor
Physiotherapy	Mobility Equipment provision Postural support Medical devices Exercise prescription Movement analysis and rehabilitation Biomechanics Ergonomics	“Maintaining and restoring maximum movement and functional ability” (WCPT 2014) “Be able to change their practice as needed to take account of new developments or changing contexts” (HCPC 2013a)	Immobility Magnitude, time duration of load, pressure friction and shear Poor perfusion
Occupational Therapy	Equipment provision Assistive technology Activities of daily living Splinting Postural management	“Helping people of all ages overcome the effects of disability...” “Advice on approaching a task differently, using equipment or assistive	Immobility Magnitude, time duration of load, pressure friction and shear Poor perfusion

	Supporting and protecting joints Environmental impact on function Medical devices	technology, adapting living or working environment..." (COT 2011)	
Podiatry	Diabetes management Orthotics Dermatological assessment Biomechanics Mobility Supporting and protecting joints Movement analysis and rehabilitation	"Podiatrists prevent and correct deformity, keep people mobile and active, relieve pain and treat infections" (SCP 2008)	Immobility Magnitude, time duration of load, pressure, friction and shear Poor sensory perception and response Poor perfusion Diabetes Skin status
General Practitioner	Extensive general medical knowledge	"Core commitment to generalism that is manifest in...patient centredness and holism" (The King's Fund 2011)	Identifying medical conditions as risk factors for PU development, such as diabetes, circulatory conditions
Healthcare assistant	Often considered to be closest member of staff to the patient, partly through the provision of intimate care, HCAs have the potential to detect changes in patient condition and respond to enable appropriate prevention		Skin status Changes in patient condition
Dietician	Nutrition Diabetes management Complex conditions management	"Be able to change their practice as needed to take account of new developments or changing contexts" (Health & Care Professions Council, Standards of proficiency 2013) Knowledge of social and behavioural sciences (BDA 2014)	Poor perfusion Diabetes Low albumin
Prosthetists & Orthotists	Mobility Equipment provision Medical devices Splinting	"Prevent and facilitate the healing of ulcers" (BAPO 2017)	Diabetes Immobility Magnitude, time duration of load,

	Biomechanics Amputee rehabilitation Diabetes management	“Understand biomechanical principles and the appropriate application of forces to the human body following prescription and supply of a prosthesis or orthosis in a manner which makes the application of such forces safe and effective in an episode of treatment” (HCPC 2013b)	pressure, friction and shear Poor perfusion Poor sensory perception and response
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1.6 Summary

The burden of PUs on individuals, healthcare organisations and society is considerable, yet most are considered to be predictable and preventable through risk assessment combined with preventive action. A multidisciplinary approach is suggested to be fundamental for achieving effective prevention across settings. This approach may be particularly beneficial in the community, given the increasing political will for healthcare to be delivered at home. It is, therefore, necessary to explore the current scientific basis for PU-related practice in relation to the multidisciplinary team and the community setting.

Chapter 2: Literature review

While an MDT approach to PU prevention has been promoted as best practice through a number of clinical guidelines, it is important to establish the evidence base for such recommendations. This review will explore the knowledge and attitudes of different professional roles within the MDT to PU prevention and treatment. Knowledge is important to establish appropriate preventative methods for at-risk patients, while attitude has been significantly correlated with the application of these preventative methods (Beeckman et al. 2011). This review will also seek to clarify the role of different healthcare staff for PU prevention and treatment to establish a greater understanding of professional boundaries. Finally, the review will explore previous literature on a team-based approach to PU prevention and treatment. The aims of the search are therefore to answer the following questions:

1. What is the level of knowledge and attitudes of different professional roles (See inclusion criteria) to pressure ulcer prevention and treatment?
2. What is the evidence base for professional roles in pressure ulcer prevention/treatment?
3. What is the evidence for a multidisciplinary approach to pressure ulcer prevention?

2.1 Search strategy

An integrative approach to reviewing the literature was chosen as it enables the integration of results from different studies, using different methodologies, to provide a comprehensive account of an issue (Broome 1993). It has been suggested as an appropriate method for reviewing new or developing areas (Torraco 2016) and permits the inclusion of a variety of research designs (Souza et al. 2010). A scoping exercise, conducted in 2016, highlighted the need for such a comprehensive approach for this topic area and clarified the necessary search terms to achieve in-depth results. A limited number of randomised controlled trials (RCTs) prohibiting a systematic review of this research design. Indeed, the majority of the research in this field utilised an observational design, typically with a single or mixed methods design

(qualitative and/or quantitative), appropriate for the integrative approach. This approach has also been advocated as suitable for reviewing nursing literature (Evans and Pearson 2001), and given the link between nursing and pressure ulcers, can also be considered appropriate for this topic area.

A comprehensive search strategy was developed across the major databases, including CINAHL, MEDLINE, AMED, PEDro, OTSeeker, PubMed, Cochrane Library, the latter included as part of the CINAHL search. In order to answer the questions and achieve an exhaustive set of results general search terms were used and connected with Boolean operators (AND, OR). Two searches were conducted to answer the research questions. This included healthcare professional AND pressure ulcer to explore questions 1 and 2, and multidisciplinary AND pressure ulcer to explore question 3. Synonyms of these terms were informed by the early scoping searches and are presented in the wider search strategy in Appendix A. The PEDro database was unable to accommodate Boolean search terms, therefore the term 'pressure ulcer' was used alone.

The inclusion criteria for the literature review were as follows:

- Related to pressure ulcers
- All study methodologies
- All study settings
- Published literature only
- 1995 – 2017

- Nurses, healthcare assistants, physiotherapists, occupational therapists, podiatrists, dieticians, doctors involved in PU prevention or treatment
- Studies that explore the role, knowledge and attitudes of different professional groups in PU prevention/treatment (Questions 1 and 2)

OR,

- Studies that explore a team-based approach to PU prevention (Question 3)

The exclusion criteria were as follows:

- Non-English language
- Paediatric/Children's services settings
- Studies exploring end of life/palliative care

The professions identified in the inclusion criteria best reflect the composition of a community healthcare team and were also identified previously in a scoping exercise. No study was excluded based on methodology unless serious issues were identified that impacted the validity of the findings, consistent with an integrative approach (Grant and Booth 2009; Booth et al. 2016). All settings were included due to the limited number of community-based studies identified previously. Studies with a focus on prevention and/or treatment were included due to the limited quantity of research identified previously on prevention alone. The search date was set at 1995 onwards as this represented the earliest PU knowledge assessment tool identified in the scoping exercise. Studies that explored paediatric/children's services and end of life/palliative care were excluded as these represent a more specialist care provision with the related healthcare staff often working exclusively with these patients, rather than more generically in the community.

Once the searches were conducted a process of title review, abstract review and then full-text review with critical appraisal was undertaken. Further hand searching was undertaken using the reference lists of randomised controlled trial and cohort studies from 2012-2017. The comprehensive findings are summarised in Figure 5. Methodological review was undertaken with guidance from the critical appraisal skills programme tools (CASP 2013), with results shown in Appendix B. A total of eighty studies were included in the review.

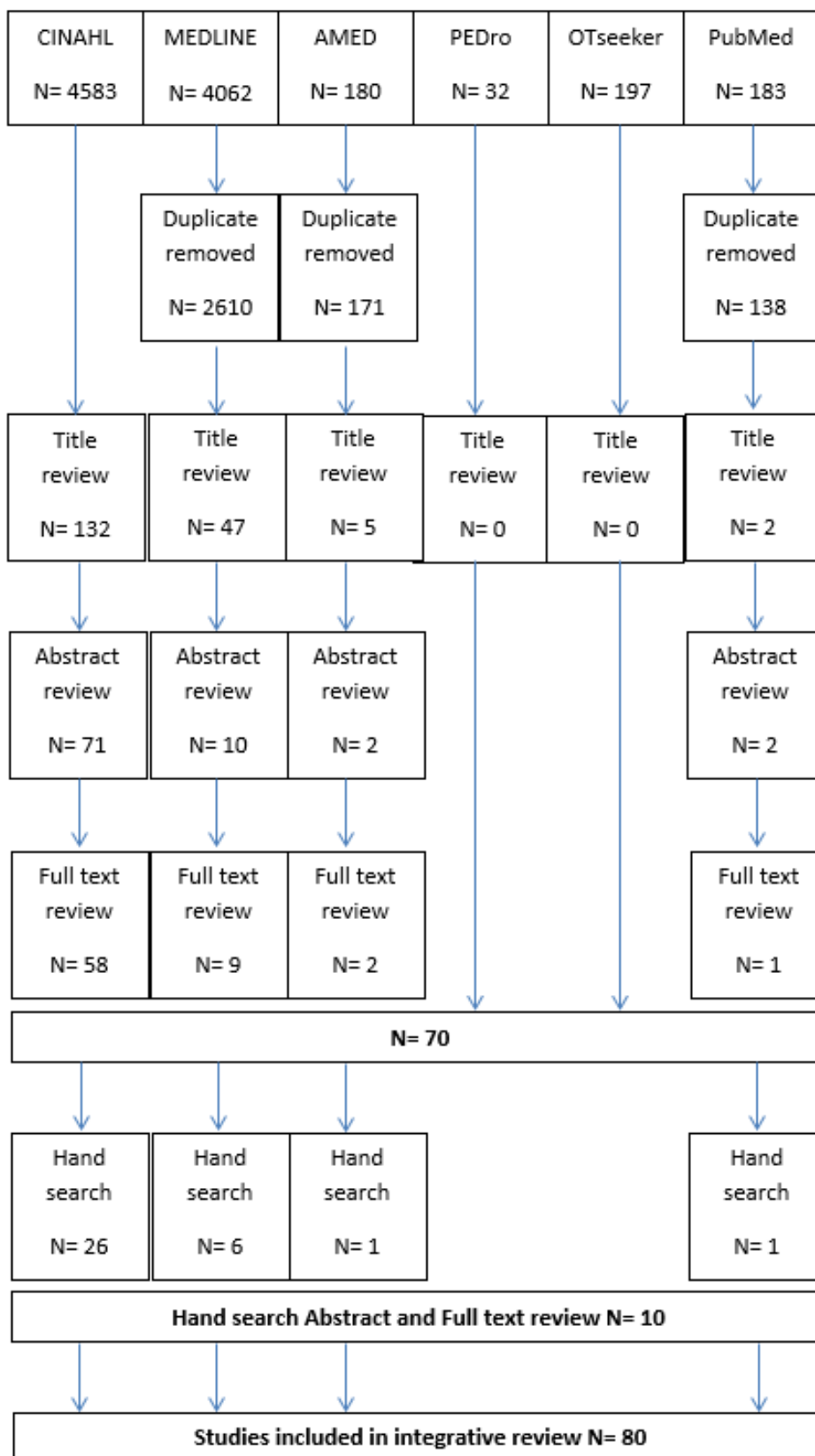


Figure 5: Literature search result flow chart

2.2 Knowledge of pressure ulcers

The studies exploring the knowledge of healthcare staff have been divided into four categories based on the tool used. These include:

- The pressure ulcer knowledge test (PUKT) (Pieper and Mott 1995)
- Adapted versions of the pressure ulcer knowledge test
- The pressure ulcer knowledge assessment tool (PUKAT) (Beeckman et al. 2010b)
- Individual knowledge tools developed by various authors

2.2.1 The PU Knowledge Tool (Pieper & Mott 1995)

The PUKT was developed based on PU prediction and prevention guidelines from 1992 (AHCPR 1992), with content validity established to be “appropriate”. The tool is separated into three categories, namely, prevention, staging and wound description with associated sub-scores. The PUKT has been used by nine studies to explore knowledge, with the staffing group, setting and overall scores for each summarised in Table 4. These studies covered a broad range of settings including critical care, medical, surgical, neurological, long term care, community care and rehabilitation. Overall, nine of the studies demonstrated a range of knowledge scores between 69% and 79% with nurses, doctors and OTs. However, the most recent study reported an overall lower score of 51% (Galvão et al. 2017). Although studies were conducted in a variety of settings and countries, nurses’ knowledge was demonstrated to be the most variable (51% to 79%), while nursing assistants knowledge ranged from 63% to 74%. Doctors were only included in two of the studies with scores ranging between 69% and 79%. OTs and PTs were included in one Saudi Arabian study only, with scores of 72% and 59%, respectively.

Table 4: Results of studies that used the The PU Knowledge Tool (Pieper and Mott 1995) n=9

Author	Participants (n)	Overall score (%)
Pieper and Mott (1995)	Registered hospital nurses (N=228)	Mean 72% (SD: 4.5)
Pieper and Mattern (1997)	Critical care nurses (N=75)	Mean 71% (SD: 4.5)
Zulkowski and Ayello (2005)	Rural nurses (N=184) Urban nurses (N=57)	Mean 77% Mean 75% (SD not reported)
Smith and Waugh (2009)	Registered hospital nurses (N=96)	Mean 73% (SD: 4.00)
Miyazaki et al. (2010)	Registered hospital nurses (N=136) Nursing assistants (N=250)	Mean 79% (SD: 9.8%) Mean 74% (SD: 8.3%)
Levine et al. (2012)	Doctors from a medical centre (N=22)	Mean 69% (SD: 9)
Ilesanmi et al. (2012)	Hospital nurses (N=111)	70% scored <59% 30% scored 59% - 79%
Kaddourah et al. (2016)	Team in rehabilitation hospital (N=105) Doctors (N=7) Nurses (N=65) OT (N=19) PT (N=14)	Mean 72% (SD: 4.8) Mean 79% Mean 75% Mean 72% Mean 59% (SD not reported for professions)
Galvão et al. (2017)	Registered hospital nurses (N=14) Nursing aides/technicians (N=26)	Mean 51% (SD: 9.7) Mean 63% (SD: 8.0)

The range of possible scores for the PU Knowledge Tool is 0 – 47

2.2.2 Adapted versions of the PUKT

Twelve further studies have developed their own knowledge tools based on varying degrees of content from the PUKT (Table 5). Eleven of the studies included a variety of nursing staff, including student nurses and registered nurses, while one study was undertaken with critical care physicians. Due to the variability in the tools used, direct comparisons are problematic, although overall associations can be explored. Two of the larger studies reported positive associations between knowledge and nursing level ($p < 0.001$) (Goodridge et al. 1998; Lawrence et al. 2015). Four studies listed in Table 5 with **, used the same tool developed by Iranmanesh and colleagues (2011), with nurses from different clinical areas in Iran. Knowledge scores ranged from 54% - 70%, with nurses based in orthopaedics demonstrating the greatest level of knowledge.

*Table 5: Results of studies that used adapted versions of the PUKT (n=12). The range of possible scores for each instrument is shown underneath the author's name in each row. ** refers to the use of the same version of the tool.*

Author	Participants (n)	Overall score (%)
Goodridge et al. (1998) Range: 0 - 24	Registered nurses Licensed practice nurses Healthcare assistants from 13 healthcare agencies (n=1450)	Mean 72% (SD: 2.18) Mean 67% (SD: 1.96) Mean 61% (SD: 2.64)
Larcher Caliri et al. (2003) Range: 0 - 46	Student nurses (n=83)	Mean 68% (SD: 4.19)
Chianca et al. (2010) Range: 0 - 41	Registered hospital nurses (n=106)	Mean 64% (SD: 4.93)
Iranmanesh et al. (2011) Range: 0 - 41 **	Critical care nurses (n=126)	Mean 54% (SD not reported)
Iranmanesh et al. (2013) Range: 0 - 41 **	Orthopaedic nurses (n=57)	Mean 70% (SD not reported)
Cox et al. (2013)	Critical care doctors (n=56)	Mean 75%

Range: 0 - 24		
Rafiei et al. (2014) Range: 0 - 41 **	Trauma nurses (n=159)	Mean 65% (SD not reported)
Rafiei et al. (2015) Range: 0 - 41 **	Student nurses (n=133)	Mean 67% (SD not reported)
Lawrence et al. (2015) Range: 0 - 49	Cumulative score Assistant nurses (n=90) Enrolled nurses (n=90) Registered nurses (n=363) Clinical nurses (n=196) Clinical nurse consultant/manager/ researcher/educator/practitioner (n=88) from acute, community, primary care	Mean 79% (SD: 5.7) Mean 76% Mean 78% Mean 79% Mean 80% Mean 80% (SD not reported for individual professions)
Rodrigues et al. (2016) Range: 0 - 41	Registered hospital nurses (n=32) Nursing aides/technicians (n=37)	Mean 76% Mean 76% (SD not reported)
Miller et al. (2017) Range: 0 - 72	Critical care nurses (n=32)	Mean 72% (SD: 5.97)
Gul et al. (2017) Range: 0 - 49	Registered hospital nurses (n=308)	Mean 61% (SD: 6.7)

2.2.3 PU Knowledge Assessment Tool (Beeckman et al 2010b)

The PU knowledge assessment tool (PUKAT) was developed by Beeckman and colleagues (2010b) with face and content validity established (CVI: 0.78-1.00). Internal consistency was also demonstrated to be acceptable (Cronbach's α : 0.77) and stability reported as excellent (ICC: 0.88). The tool is divided into six themes, including aetiology and development (6-items), classification and observation (5-items), risk assessment (2-items), nutrition (1-item), preventive measures to reduce the amount (7-items) and duration (5-items) of pressure/shear. The PUKAT has been used by seven studies, with the results summarised in Table 6. While mostly used to explore the knowledge of nurses and nursing assistants, the PUKAT has also been used with OTs and PTs. The authors of the PUKAT established an arbitrary mean satisfactory level of knowledge (>60%), which was achieved by student nurses in one study (Gunningberg et al. 2013b) and OTs/PTs in another (Worsley et al. 2016). Six of the seven studies reported that 'preventive

measures to reduce the amount of pressure/shear' was amongst the lowest scoring subscales of the PUKAT (26.8%→47.5%) (†).

Table 6: Results of studies that used the PU knowledge assessment tool (Beeckman et al 2010b)

Author	Participants (n)	Overall score (%)
Beeckman et al (2011) (†)	Staff hospital nurses (n=476) Senior nurses (n=25) Tissue viability nurses (n=52)	Mean 49% Mean 54% Mean 58% SD not reported
Demarré et al (2012) (†)	Nursing home nurses (n=54) Nursing assistants (n=91)	Mean 29% (SD: 8.8) Mean 28% (SD: 8.9)
Cullen-Gill & Moore (2013)	4 th year student nurses (n=46)	Mean 59% SD: 2.756)
Gunningberg et al (2013b) (†)	Registered hospital nurses (n=196) Assistant nurses (n=97) Student nurses (n=122)	Mean 59% (SD: 11.9) Mean 55% (SD: 12.7) Mean 61% (SD: 11.8)
Qaddumi and Khawaldeh (2014) (†)	Registered hospital nurses (n=194)	Mean 42% (SD: 2.3)
Simonetti et al (2015) (†)	1 st , 2 nd , 3 rd year student nurses (n=742)	Mean 51% (SD not reported)
Worsley et al (2016) (†)	Hospital OTs and PTs (n=9)	Median 69% (IQR: 58% – 75%)

The range of possible scores for the PUKAT is 0 – 26

2.2.4 Individual knowledge tools developed by authors

Twenty studies explored the knowledge of healthcare staff, using one-off tools specifically designed for that study. Sixteen were conducted with nursing staff, two with nurses and doctors and two with doctors alone. Due to the variety of tools used for measuring knowledge, direct comparison is problematic. Nevertheless, a more general comparison is possible, particularly in relation to three of the nursing studies which

follow one another. Halfens and Eggink (1995) explored the knowledge of Dutch nurses in relation to useful and non-useful measures for PU prevention, as defined by a consensus report from 1985. The authors reported that nurses were aware of 76.7% of the useful measures, but that only 60% of the measures were used in practice. They also reported that only 40% of the non-useful measures, including massage and donut cushions, were never used.

Hulsenboom et al. (2007) explored the knowledge of nurses in Dutch hospitals using an updated version of the tool developed by Halfens and Eggink (1995), while also using a dataset from this earlier study for comparison with their results. Nurses from the later study (2007) demonstrated significantly improved knowledge of beneficial preventive measures (mean=70.6%, SD: 2.11 $p=0.00$) when compared with nurses from the former study (1995) (mean=65.4%). Meesterberends and colleagues (2013a) also explored the knowledge of beneficial preventative measures with nurses from nursing homes in two countries. The mean scores were higher in the Netherlands (71.3%, SD: 2.9) than in Germany (66.3%, SD: 3.0), which corresponds closely with the scores achieved by nurses in the study by Hulsenboom et al. (2007).

A number of studies report individual knowledge scores for specific preventative measures. The most popular preventive measures were maintaining clean and dry skin, the use of square-shaped bed sheets and ensuring good hygiene (Halfens and Eggink 1995; Panagiotopoulou and Kerr 2002; Hulsenboom et al. 2007; Pancorbo-Hidalgo et al. 2007; El Enein and Zaghloul 2011; Meesterberends et al. 2013a). Other studies reported repositioning or turning strategies (Saleh et al. 2013; Mwebaza et al. 2014; Dilie and Mengistu 2015), assessment and management of pain (Nuru et al. 2015) and ensuring adequate protein and calories (Wilkes et al. 1996; Akese et al. 2014).

Romero-Collado et al. (2013) explored the knowledge of primary care nurses and doctors in Spain, using a questionnaire with content based on clinical practice guidelines from 2009 and 2011. The knowledge of nurses was reported to be higher than that of doctors, particularly in relation to products and medication. Nevertheless, another study involving

specialist spinal cord injury units, showed no statistical difference between these professionals ($p > 0.05$) (Gupta et al. 2012).

Setting has also been described as a factor influencing knowledge by Kimura and Pacala (1997), who explored the knowledge of family physicians in one US state. In this study, a significant association was found between knowledge scores and experience as a nursing home medical director ($p < 0.05$) or with physicians having a higher number of patients over 65-years of age on their caseload ($p < 0.01$). However, while these physicians demonstrated good general knowledge in relation to staging, pathogenesis and locations of PUs (84.1%, SD: 11.2%), their knowledge of prevention was much lower (64%, SD: 15%). Odierna and Zeleznik (2003) similarly reported low knowledge of geriatric fellows (58%, SD: 18%), even though they worked with a highly at risk group.

Five of the identified studies report a significant positive association between knowledge and level of staff education (Maylor and Torrance 1999; Panagiotopoulou and Kerr 2002; Pancorbo-Hidalgo et al. 2007; Aydin and Karadag 2010; Nuru et al. 2015). By contrast, other studies report no such correlation (Tweed and Tweed 2008; Gupta et al. 2012; Akese et al. 2014; Al Kharabsheh et al. 2014).

2.3 Attitudes of healthcare staff to pressure ulcers

The identified studies have been divided into four groups based on the tools used for data collection, which will be discussed separately. These include the:

- Attitudes to Pressure Ulcer Prevention instrument (APUP) (Beeckman et al. 2010a)
- An attitudes-based questionnaire by Moore and Price (2004)
- Individual attitude tools develop by other authors
- Attitudes from interview-based studies.

2.3.1 Attitudes to Pressure Ulcer Prevention instrument (APUP) (Beeckman et al 2010a)

The APUP instrument has 13-items within eight sub-scales, validated through review of the literature and double Delphi methodology. Content validity was established to be adequate, while reliability and construct validity were determined through measures of

internal consistency (Cronbach’s α : 0.79) and intraclass correlation (ICC: 0.88). The APUP has been used by seven studies, although one of these has been excluded as it only included twelve of the thirteen items (Cullen-Gill and Moore 2013). The results of the six subsequent studies are summarised in Table 7 with attitude scores ranging between 70% – 89%. Four of the six studies reported satisfactory attitude levels (>75%) with nurses, student nurses and OTs/PTs. Results also indicate an association between staff seniority and positive attitude, in the nursing home setting (Demarré et al. 2012), hospital wards (Beeckman et al. 2011) and even based on year of education for student nurses ($p < 0.05$) (Simonetti et al. 2015). Nurses reported higher perceived responsibility for PU prevention (Demarré et al. 2012; Florin et al. 2014; Aslan and Yavuz van Giersbergen 2016) than OTs/PTs (Worsley et al. 2016).

Table 7: Results of studies that used the Attitudes to Pressure Ulcer Prevention Instrument (Beeckman et al 2010a)

Author	Participants (n)	Overall score (%)
Beeckman et al (2011)	Staff hospital nurses (n=476) Senior nurses (n=25) Tissue viability nurses (n=52)	Mean 70% Mean 78% Mean 77% (SD not reported)
Demarré et al (2012)	Nursing home nurses (n=54) Nursing assistants (n=91)	Mean 78% (SD: 6.9) Mean 72% (SD: 6.1)
Florin et al (2014)	Registered hospital nurses (n=196) Assistant nurses (n=97) Student nurses (n=122)	Mean 88% across all groups Range: 60% - 100%)
Simonetti et al (2015)	1 st year student nurses (n=301) 2 nd year student nurses (n=250) 3 rd year student nurses (n=191)	Mean 76% Mean 76% Mean 79%
Aslan & Yavuz van Giersbergen (2016)	Registered hospital nurses (n=426)	Mean 86% (SD not reported)
Worsley et al (2016)	Hospital OTs and PTs (n=9)	Median 81% (IQR: 76% - 84%)

The range of possible scores for the APUP is 13 – 52

2.3.2 Attitudes questionnaire (Moore & Price 2004)

A questionnaire was developed by Moore & Price (2004) to explore the attitudes of nurses to pressure ulcer practice, with specific content based on a literature review. Five studies used the questionnaire, although comparison can only be undertaken with four of the studies, due to one study adapting the questionnaire to their local context (Tubaishat et al. 2013). Table 8 provides a summary of these four studies, demonstrating a considerable range in attitude scores (57% - 78%). This is particularly evident in the two studies carried out in Sweden, even though the samples show close similarities in terms of size and role (Källman and Suserud 2009; Strand and Lindgren 2010). Kaddourah and colleagues (2016) used the questionnaire with a multidisciplinary group in Saudi Arabia, reporting the lowest overall mean score. While attitude scores by profession were not described, physiotherapists were considered to be the profession least interested ($p < 0.001$).

Table 8: Results of studies that used the attitudes questionnaire developed by Moore & Price (2004)

Author	Participants (n)	Overall score (%)
Moore & Price (2004)	Registered hospital nurses (n=121)	Median 73% (Range: 51% - 91%)
Källman and Suserud (2009)	Registered hospital/municipality nurses and nursing assistants (n=154)	Median 78% (Range: 51% - 96%)
Strand & Lindgren (2010)	Registered & enrolled ICU nurses (n=146)	Mean 62% (SD: 4)
Kaddourah et al (2016)	Registered nurses (n=65) Physiotherapists (n=14) Occupational Therapists (n=19) Doctors (n=7) From a rehabilitation hospital	Mean 57% (SD: 4.8)

The range of possible scores for the Attitudes questionnaire is 11 – 55

2.3.3 Other individual attitude tools

Fourteen studies explored the attitudes of a variety of healthcare professionals using unique questionnaires developed by individual researchers, who included nurses, doctors

and occupational therapists and physiotherapists. While direct comparison of attitude scores is impossible due to the differences in approach, an evaluation of identified themes is achievable.

Overall, positive attitudes to PU prevention and treatment were reported in three of the hospital-based studies with registered nurses (Almeida Tavares et al. 2015; Dilie and Mengistu 2015; Tayyib et al. 2016). Other studies used a more open format for questionnaires with a multidisciplinary approach considered to facilitate improved outcomes (Macens et al. 2011; Romero-Collado et al. 2013; Santos Vieira et al. 2016). However, only 15% of Australian occupational therapists identified that a multidisciplinary approach occurred routinely in practice (Macens et al. 2011). This contrasted with a Canadian study involving OTs, which reported higher levels of satisfaction based on greater referral rates for both prevention ($p>0.05$) and treatment ($p<0.01$) (Giesbrecht 2006).

Three studies from across Africa and the Middle East explored barriers to preventative practice by hospital nurses. Each study reported low staffing, time, patient's condition and lack of resources and training regardless of setting (Al Kharabsheh et al. 2014; Dilie and Mengistu 2015; Tayyib et al. 2016). Dilie & Mengistu (2015) also reported that a lack of job satisfaction was correlated with a reduced likelihood of performing PU prevention (OR= 0.111).

Five studies explored the attitudes of doctors in relation to PU prevention and treatment. Kimura and Pacala (1997) reported that over 70% of family doctors did not feel adequately prepared in their training to provide effective PU care. Similar findings were reported by Cox and colleagues (2013) with 69.6% of critical care doctors reporting that their education associated with prevention ranged from adequate to poor. For treatment, 57.2% of doctors in this study rated their education as poor to very poor. Geriatric doctors from a US study also felt that they were only adequately prepared to provide PU care and had little confidence in selecting treatment products (Odierna and Zeleznik 2003). Nevertheless, in Spanish home healthcare teams doctors' involvement

was considered important, although nurses held greater responsibility and were more adherent to guidelines (Romero-Collado et al. 2013).

Finally, Guihan and colleagues (2003) explored the attitudes of doctors, nurses, social workers, psychologists and others to PU management in a spinal cord injury setting. This study focused on the necessary conditions for discharge of a patient with a SCI and associated PU, with participants reporting the importance of being medically stable and ensuring appropriate social support to manage the PU at home.

2.3.4 Attitudes from interview-based studies

Nine studies used interviews to explore the attitudes of healthcare staff. Two main themes emerged, namely, attitudes related to the involvement of healthcare staff outside of nursing and attitudes about current practice for PU prevention and treatment. Three studies reported nurses' and doctors' attitudes towards the involvement of doctors for PU management. Samuriwo (2012) interviewed sixteen nurses from fourteen hospitals in Wales and reported that nurses considered doctors only to be interested in PUs when there was a 'protection of vulnerable adult [POVA]' investigation into how the PU occurred. Athlin et al. (2010) similarly interviewed thirty nurses from hospital and community settings in Sweden and suggested that doctors held overall responsibility for PU management, but that their insight into PUs was poor. Buss and colleagues (2004) interviewed both nurses and doctors from nursing home settings in the Netherlands, finding that doctors were more involved in directing other staff for PU-related practice. In this role it was reported that doctors were aware of staff using preventative measures which are considered not to be useful, such as massage. However, these measures were not discouraged by doctors for fear that this would lead to a reduction in the active review of a resident's skin.

Rose and Mackenzie (2010) explored the attitudes of Australian OTs to the prevention and treatment of PUs. While the majority indicated that they worked closely with nursing staff, there were also tensions reported, with some less eager to be involved in an area that they perceived to be a nursing domain. Others, however, were keen to become

more involved. Similar findings were reported by Samuriwo (2012), where involvement of the wider multidisciplinary team was reported to be variable, although hospital nurses were particularly grateful for any help they received from physiotherapists, pharmacists and community nurses.

PU management was reported to be given a low status by nurses from two of the identified studies (Athlin et al. 2010; Samuriwo 2010a), with responsibilities often delegated to healthcare assistants, licensed practice nurses, enrolled nurses or assistant nurses (Buss et al. 2004; Sving et al. 2012a). However, while confidence was reported by some nurses in the provision of pressure care by assistant nurses, a lack of documentation may suggest this is misguided (Sving et al. 2012a). Others have reported a lack of interest from healthcare assistants and enrolled nurses, with heavy reliance on tradition and experience, rather than education for PU management (Buss et al. 2004; Samuriwo 2010b). Increasing the status of PU management for nurses was reported by Samuriwo (2010a) to only be possible through experiencing a PU first-hand, leading to an increased priority for preventative practice. Indeed, Garrigues et al. (2017) reported the experiences of nursing students in the US, finding that a high priority was linked to feelings of accountability in practice.

2.4 Professional roles in PU management

2.4.1 The role of the nursing professional

Nursing is the profession traditionally associated with the prevention and treatment of PUs (Cramp et al. 2004; Samuriwo 2012). Accordingly, much of the research literature in this area is devoted to and aimed at the nursing professional. Indeed, in this review only twelve of the identified studies were undertaken with healthcare staff outside of nursing. Therefore, the role of nursing based on the literature is all encompassing, with nurses often considered to be the lead in terms of PU management (Samuriwo 2012). The only exception to this is an Australian study with occupational therapists (OTs), where 60.7% of participants indicated that OT was the profession primarily responsible for PUs in their setting. These included a variety of clinical locations, although aged care represented the

largest sub-group (Macens et al. 2011). While nurses are generally considered the profession most responsible for PU management, a number of studies have highlighted that the day-to-day provision of care is provided by unregistered healthcare staff (Buss et al. 2004; Athlin et al. 2010; Samuriwo 2010a; Sving et al. 2012a).

2.4.2 The role of the healthcare assistant

There is a limited quantity of research exploring the role of the healthcare assistant (HCA) in prevention and treatment of PUs, with only setting specific articles based on local perceptions. Tauchnitz (2014) suggests that the HCA in a UK setting is often the first to identify a PU and that their role involves communicating concerns to a registered nurse. HCAs are also reported to undertake various strategies for prevention, including repositioning. Hampton (2005) undertook a review of the available literature, suggesting that there can be tensions between the role of the HCA and that of the registered nurse, but that generally HCAs should become more aware of PU prevention. Buss et al (2004) reported on PU prevention in Dutch nursing homes, finding that the enrolled nurses did not consider PUs to be a problem and therefore showed little interest in prevention.

2.4.3 The role of the physiotherapist

The available literature surrounding the role of the physiotherapist in PU management covers a variety of settings and geographical locations. For example, Guihan et al. (2009) reported that the role of the physical therapist (PT) in an American spinal cord injury setting included mobility, seating, positioning and equipment provision. However, direct wound care including the choice of dressings and topical agents was also regarded as the role of the PT. These findings are in direct contrast to those reported by Worsley et al. (2016) in a UK hospital, who reported that both PT and OT considered themselves to be responsible to some extent for prevention, but not for treatment. Another UK based hospital study explored nurses' perceptions of the wider team in this area. Results indicate that PTs supported nursing, particularly through repositioning and mobility review, while also completing skin care documentation (Samuriwo 2012). Teaching positioning and handling techniques were also reported to be the role of the PT in

hospital wards in central Sweden (Sving et al. 2012a) and for people with multiple sclerosis in Northern Ireland (Cramp et al. 2004).

2.4.4 The role of the occupational therapist

Seven studies reported on the role of occupational therapists (OT) in the prevention and treatment of PUs in a variety of countries and settings. Four of these international studies identified a role for OTs in the provision of positioning advice, seating and equipment in the community, hospital and spinal cord injury settings (Giesbrecht 2006; Guihan et al. 2009; Macens et al. 2011; Sving et al. 2012a). However, a single site UK hospital study with OTs and PTs considered the prescription of pressure-relieving mattresses and cushions to be the role of the nurse (Worsley et al. 2016). Indeed, these therapists believed that their role was in the prevention of medical device related PUs caused by face masks or neck collars. Ambiguities between the role of the nurse and OT were also reported in an Australian study, with tensions reported by some OT participants (Rose and Mackenzie 2010).

Two of the identified studies reported that the role of the OT was more expansive than equipment provision alone, suggesting an association between preventative practice and the assessment of activities of daily living (Ryan 2008; Rose and Mackenzie 2010). However, Rose and Mackenzie (2010) also highlighted that this expanded role of an OT was not always understood by other healthcare professionals.

2.4.5 The role of the doctor

Five studies explored the role of the doctor in PU management. Four of these studies undertook data collection with doctors from a variety of settings, including critical care, family practice, older person's care and primary care in the United States and Spain. The fifth study used interviews with nurses from a variety of hospitals in the UK to understand the role of different professional groups.

The vast majority (99%) of the family doctors who undertook a survey on PU management in the US considered themselves to have a role in the treatment of a PU

(Kimura and Pacala 1997). However, Romero-Collado et al (2013) found that Spanish doctors considered nurses to be most responsible for PU management, although they felt obliged to direct nurses to determine or modify treatment if the healing of a PU was not progressing. Similar findings were reported by Odierna and Zeleznik (2003) with geriatric fellows in the US, where the role of the doctor was to direct nurses, provide teaching as well as providing PU management. The UK study with nurses reported that doctors were less interested in PU management unless they had recently completed a vascular placement (Samuriwo 2012). In this study, the role of the doctor extended to writing prescriptions for wound care products based on a nurse's recommendation. In a US critical care setting, Cox et al. (2013) reported that while 71.4% of doctors considered prevention to be important to very-important, a slightly higher percentage (73.3%) were more interested in being involved with PU-related research.

2.4.6 The role of the dietician

One study explored the role of the dietician in PU management, albeit from a nursing perspective (Samuriwo 2012). This study interviewed nurses from fourteen UK hospitals, finding that dieticians satisfy the role defined for them in practice guidelines by ensuring that high-risk patients receive appropriate nutritional support to avoid a PU.

2.5 A multidisciplinary approach to PU management

There is a considerable lack of research available that explores a multidisciplinary approach to PU-related practice . Although nine studies were identified through the literature search, three are case reports from single settings that offer minimal generalisability (Baker et al. 2011; Kennerly et al. 2012; Bratta and Long 2014). Three further studies briefly review attitudes to multidisciplinary collaboration, although from a single professional perspective (Rose and Mackenzie 2010; Macens et al. 2011; Samuriwo 2012). The remaining three studies explore multidisciplinary practice with multiple professional groups, but with varying aims and methodologies, leading to difficulties in concluding effectiveness (Rose et al. 2011; Stern et al. 2014; Santos Vieira et al. 2016).

Nonetheless, these studies provide some insight into current multidisciplinary practice in a variety of settings.

A multidisciplinary approach to PU management is promoted as best practice in international guidelines due to the variety of factors that influence PU development (Bratta and Long 2014; Santos Vieira et al. 2016) and the associated positive impact of collaborative practice for prevention and treatment (Kennerly et al. 2012; Samuriwo 2012). Others have also suggested that a multidisciplinary approach is essential, but highlight that it is not implemented consistently (Rose and Mackenzie 2010). Indeed, one Australian study reported that while 71% of participants considered this approach to be best practice, only 15% of the participants identified that this occurred routinely in practice (Macens et al. 2011).

A number of barriers have been established to achieving a multidisciplinary team approach (MDT) including miscommunication, confusion over professional roles and lack of cooperation (Baker et al. 2011; Macens et al. 2011). Rose et al. (2011) reported that an MDT approach to PU management is influenced by issues related to knowledge, resources and workplace culture. Kennerly and colleagues (2012) reported on a conceptual project to achieve collaborative practice in a long term care setting. They describe a series of general facilitators to achieving multidisciplinary practice. These include empowering the team to a shared vision for effective patient outcomes, while also considering individual team members' values, hopes and aspirations.

2.6 Discussion

This review highlights the lack of multidisciplinary research in this area. Of the studies that explored knowledge and attitudes, only fourteen included professions outside of nursing. Four of these studies included both doctors and nurses, four with doctors alone, four involving OTs and/or PTs and only two with an MDT group. The predominant focus of these studies was also found to be the hospital setting, with only nine studies undertaken in the community, four of which were within nursing homes.

This focus on nursing in the research literature unsurprisingly matched the views of participants within the research, regarding PU responsibility. Results from the APUP sub-categories reveal that nurses were generally considered to be responsible for PU-related practice, demonstrating higher scores for this category than therapists (Demarré et al. 2012; Florin et al. 2014; Aslan and Yavuz van Giersbergen 2016; Worsley et al. 2016). Results also indicate that this view is shared by other professions, including doctors (Romero-Collado et al. 2013) and physiotherapists (Kaddourah et al. 2016). One exception to this was a study with Australian occupational therapists, where over 60% of those surveyed considered that they held primary responsibility for PU practice. However, this study did not include nurses.

While the perceived responsibility for PU practice is considered to be with nurses, the results of this review demonstrate considerable variability in their knowledge and attitudes to this area of practice. Some of this variation has been attributed to professional level and experience, with several authors reporting significant ($p < 0.001$) associations between knowledge and level of nursing role (Goodridge et al. 1998; Beeckman et al. 2011; Lawrence et al. 2015). However, while senior nurse specialists such as Tissue Viability Nurses (TVNs) demonstrated the highest level of knowledge, their scores did not reach the satisfactory level prescribed by the authors (>60%) (Beeckman et al. 2011). Conversely, of the other studies that used this tool only student nurses from Gunningberg et al. (2013b) and a small number of OTs and PTs from Worsley et al. (2016) demonstrated satisfactory knowledge scores. Consequently, this questions the validity of this satisfactory level and the reported positive associations by staffing level. Associations between educational level and knowledge were inconclusive with a variety of studies reporting both positive and negative associations (Chapter 2.2.4). It is apparent that levels of knowledge both in the community and acute settings, across professional groups may be unsatisfactory. Of particular note is the lack of knowledge specifically regarding preventative measures.

Due to the small number of studies with professions outside of nursing and the limited number of participants in these studies, it is difficult to draw overall conclusions about their relative level of knowledge and attitudes. This is particularly evident in the scores

reported for OT/PT, where small sample sizes may only represent a particularly interested or disinterested group (Kaddourah et al. 2016; Worsley et al. 2016).

Knowledge and attitude scores also demonstrated considerable variability by setting. For example, the results of the PUKAT demonstrate a difference of up to 30% with nurses from different settings (Table 6). Setting may also be implicated in the differences between knowledge scores of doctors from US medical centres (69% - Levine et al. (2012)) and rehabilitation hospitals (79% - Kaddourah et al. (2016)) (Table 4). This may represent a difference in focus within a rehabilitation setting, given that immobility is a primary risk factor for PU formation. While these studies were undertaken in different countries, inconsistencies in knowledge score by setting were also reported by three Iranian studies using an adapted version of the PUKT. Iranmanesh et al (2011, 2013) and Rafiei et al. (2014) reported improved levels of nursing knowledge in an orthopaedic setting, when compared to critical care/trauma settings. These results may also demonstrate the difference in focus for staff working in a trauma/critical care setting, where the management of life-limiting conditions must take precedent. However, while this discussion represents an interpretation between studies using the same knowledge tools, one older study conducted in the community, acute and care home setting, reported no significant difference in knowledge by setting ($p < 0.001$) (Goodridge et al. 1998).

Prevention has been established to be more effective than treatment for patients and healthcare providers (VanGilder et al. 2008a; Padula et al. 2011). However, the knowledge of healthcare staff in relation to preventative measures appears to be generally low, with six of the PUKAT studies reporting lower levels of knowledge in this specific aspect. In this questionnaire, preventative measures was divided into measures to reduce 'amount' or 'duration' of pressure and shear, with all six of the studies finding that the former category had unsatisfactory levels of knowledge. While these results may indicate a universal lack of knowledge in this area, it is also possible that the staff did not consider the statements in this category to be realistic to their practice experience, particularly in relation to equipment provision and repositioning schedules. Results indicated that participants had a greater level of knowledge for the 'duration' category,

although only two studies reported satisfactory levels (Gunningberg et al. 2013b; Worsley et al. 2016). Nursing assistants demonstrated the lowest scores for both the knowledge and attitude categories in relation to prevention (28% - 55%). These findings give some cause for concern as registered nurses have been reported to delegate responsibility to nursing assistants (Buss et al. 2004; Sving et al. 2012a).

Although a multidisciplinary approach to PU prevention is promoted as best practice and has been suggested to have a positive influence on patient outcomes (Macens et al. 2011; Romero-Collado et al. 2013; Santos Vieira et al. 2016), this review has highlighted that a wider understanding of an MDT approach to PU prevention is limited in the currently available literature. This is primarily borne out of a lack of available research conducted with professions outside of nursing, or with a representative multidisciplinary group. Only four studies included multiple roles, with two of these exploring knowledge and/or attitudes with tools that have not been validated for use with professions outside of nursing (Kaddourah et al. 2016; Santos Vieira et al. 2016). These studies were also conducted in single site locations, with limited applicability more widely. Santos Vieira et al. (2016) was also poorly translated from Portuguese to English, making it difficult to interpret the results for meaningful application more widely. The third study explored an MDT approach to treatment of PUs via telemedicine, although predominantly in relation to the involvement of a plastic surgeon (Stern et al. 2014); while the final study was a published conference presentation with limited information (Rose et al. 2011). Of these four studies, none were conducted in a community setting, while only five studies out of the eighty identified for this review were undertaken in the community with single professions outside of nursing.

There are limitations associated with this review, particularly in relation to answering research question three. While a scoping exercise was undertaken to find appropriate search terms (Appendix A), these may have been insufficient to fully answer this question, given that they only yielded nine results. Additional terms may have been warranted in relation to teamwork, while widening the search beyond PUs may have provided greater scope to answer this question. Indeed, a previous Cochrane review exploring wound care teams for preventing and treating PUs found no eligible studies for

inclusion (Moore et al 2015). It is therefore clear that there is a fundamental lack of understanding of what constitutes an MDT approach to PU prevention in the community. Guidelines are thus provided on a pragmatic basis, with healthcare professionals who remain uninvolved clearly representing untapped resources for PU prevention (McCulloch 1998). It is, therefore, important to understand more generally why an MDT approach might be successful in a healthcare environment and what are the factors that foster good multidisciplinary practice.

Conceptually, multidisciplinary practice has been defined as the inclusion of multiple healthcare professionals working on the same project, but “independently or in parallel” to one another (D’Amour et al 2005, p120, Siegler & Whitney 1994, Schofield & Amodeo 1999). This definition promotes the involvement of multiple professional groups, but does not align with a collaborative approach that is considered to influence patient outcomes. Alternatively, an interdisciplinary approach has been described as the integration of practice across both registered and unregistered healthcare staff and is considered to meet the increasingly complex needs of changing patient demographics (Satin 1994; D’Amour et al. 2005; Nancarrow et al. 2013). Nancarrow and colleagues (2013) explored the characteristics of a good interdisciplinary team and identified ten principles as shown in Table 9. Kennerly et al. (2012) reported a series of facilitators to achieving collaborative practice for PU prevention in long term care, which link to the general characteristics described by Nancarrow et al. (2013). In particular, these authors highlight the importance of a shared vision, but also of taking into account the needs of individuals within the team.

Table 9: Characteristics of a good interdisciplinary team (Nancarrow et al. 2013), reproduced under creative commons attribution licence

Theme	Description
Leadership and management	Having a clear leader of the team, with clear direction and management; democratic; shared power; support/supervision; personal development aligned with line management; leader who acts and listens
Communication	Individuals with communication skills; ensuring that there are appropriate systems to promote communication within the team
Personal rewards, training and development	Learning; training and development; training and career development opportunities; incorporates individual rewards and opportunity, morale and motivation
Appropriate resources and procedures	Structures (for example, team meetings, organisational factors, team members working from the same location). Ensuring that appropriate procedures are in place to uphold the vision of the service (for example, communication systems, appropriate referral criteria and so on)
Appropriate skill mix	Sufficient/appropriate skills, competencies, practitioner mix, balance of personalities, ability to make the most of other team members' backgrounds, having a full complement of staff, timely replacement/cover for empty or absent posts.
Climate	Team culture of trust, valuing contributions, nurturing consensus, need to create an inter-professional atmosphere
Individual characteristics	Knowledge, experience, initiative, knowing strengths and weaknesses, listening skills, reflexive practice, desire to work on the same goals
Clarity of vision	Having a clear set of values that drive the direction of the service and the care provided. Portraying a uniform and consistent external image
Quality and outcomes of care	Patient-centred focus, outcomes and satisfaction, encouraging feedback, capturing and recording evidence of the effectiveness of care and using that as part of a feedback cycle to improve care
Respecting and understanding roles	Sharing power, joint working, autonomy

2.6.1 Conclusion

This review has highlighted the poor understanding of current practice in the community setting in relation to multidisciplinary or interdisciplinary approaches to PU prevention. As an interdisciplinary approach is considered to achieve improved outcomes, it is important to explore the context of current practice in relation to the characteristics set out by Nancarrow et al. (2013) in this research. In doing so, a greater awareness of the barriers and facilitators to achieving interdisciplinary practice may be gained in order to develop measures for changing practice. Accordingly, the aims of this research are:

2.6.2 Aims

1. To provide a greater understanding of the context of pressure ulcer prevention as a interdisciplinary approach in the community setting
2. To explore knowledge and attitudes amongst the interdisciplinary team towards PU prevention
3. To gain an understanding of the barriers and facilitators to interdisciplinary practice
4. Design an intervention to promote interdisciplinary PU prevention and treatment

2.6.3 Objectives

1. Explore current interdisciplinary PU practice and the feasibility for future practice with healthcare professionals working in the community setting
2. Assess knowledge and attitudes of healthcare staff through questionnaire response and discussion
3. Analyse discussions with staff to discover key determinants of practice requiring change and build strategies towards implementation of interdisciplinary working
4. Assess the feasibility of implementing an intervention to promote interdisciplinary practice

Chapter 3: Methodology

3.1 Theoretical underpinning

This research is considered to be grounded in pragmatism. Pragmatism is traditionally regarded as a proxy for practicality in the selection of research methods. However, a number of authors have cautioned that this approach neglects the more fundamental question underlying the paradigm, of ‘why to do research in a given way’ (Denzin 2012; Morgan 2014). Indeed, it has been argued that through pragmatism, knowledge is acquired through a process which emphasises human experience and the contextual environment (Dewey 2008b, a). Given the lack of research in relation to interdisciplinary approaches to PU prevention in the community setting, the current understanding of these individual and contextual factors is limited. Nevertheless, a theoretical understanding of the necessary components to support an interdisciplinary approach in healthcare has been identified (Nancarrow et al. 2013) and provides a frame of reference for this work. It is therefore important to explore the aims and objectives highlighted in Section 2.6.2/3 using pragmatism as the underlying foundation. Identifying appropriate methods within the research process to meet these objectives is also fundamental to attaining knowledge that is relevant to the social context (Patton 1990; Morgan 2007; Tashakkori and Teddlie 2010)

An interdisciplinary approach to PU prevention can be considered to be a complex intervention with multiple interacting factors including organisational, team and individual components (MRC 2008). A systematic approach to the research process has been advocated for the development and evaluation of interventions (Dewey 2008b; MRC 2008). The MRC framework for developing and evaluating complex interventions (MRC 2008) recommends the development of a theoretical understanding of the likely processes of change when developing a complex intervention. A focus on the implementation of the intervention is considered to be a critical part of the development phase. To understand the factors associated with implementation, a model for the implementation of change (ICM) has been used (Grol and Wensing 2013b) (Figure 6). The targets for change (Step 2 – Figure 6) were

established by identifying actual performance, i.e. level of interdisciplinary approach; target group, i.e. healthcare professionals involved; and setting, i.e. organisational structure. An explanatory sequential mixed methods design was adopted to gather relevant data on these factors. This approach uses quantitative methods to establish topic areas for further qualitative inquiry, enabling the convergence of data sources to better explore the research objectives (Creswell 2014). The qualitative methods were specifically used to explore the complexity and context associated with the target group and setting, in accordance with a pragmatic worldview (Johnson and Onwuegbuzie 2004) (Figure 7). Consequently, while a mixed methods approach has been adopted, the qualitative methods can be considered to be the primary methods for investigation. Indeed, it has been suggested that one method should take precedence when using a mixed methods approach (Morse 1998).

The potential barriers and facilitators for change were analysed using two coding manuals, based on behaviour change theory, as frameworks for problem analysis (Figure 6 – Step 2 & 3). These manuals were developed by de Bruin et al. (2009) following the work of Abraham and Michie (2008), and the Cochrane Effective Practice and Organisation of Care group (EPOC 2014). The use of these manuals as coding frameworks allowed the grouping of identified barriers and facilitators into individual, team, organisational and structural factors and more specifically to determinants of behaviour change. These determinants inform a series of evidence-based techniques to ultimately establish 'strategies and measures to change practice' (Figure 6 – Step 4). The feasibility of implementation of these measures has been studied in one community NHS Trust team (Ch. 5/6).

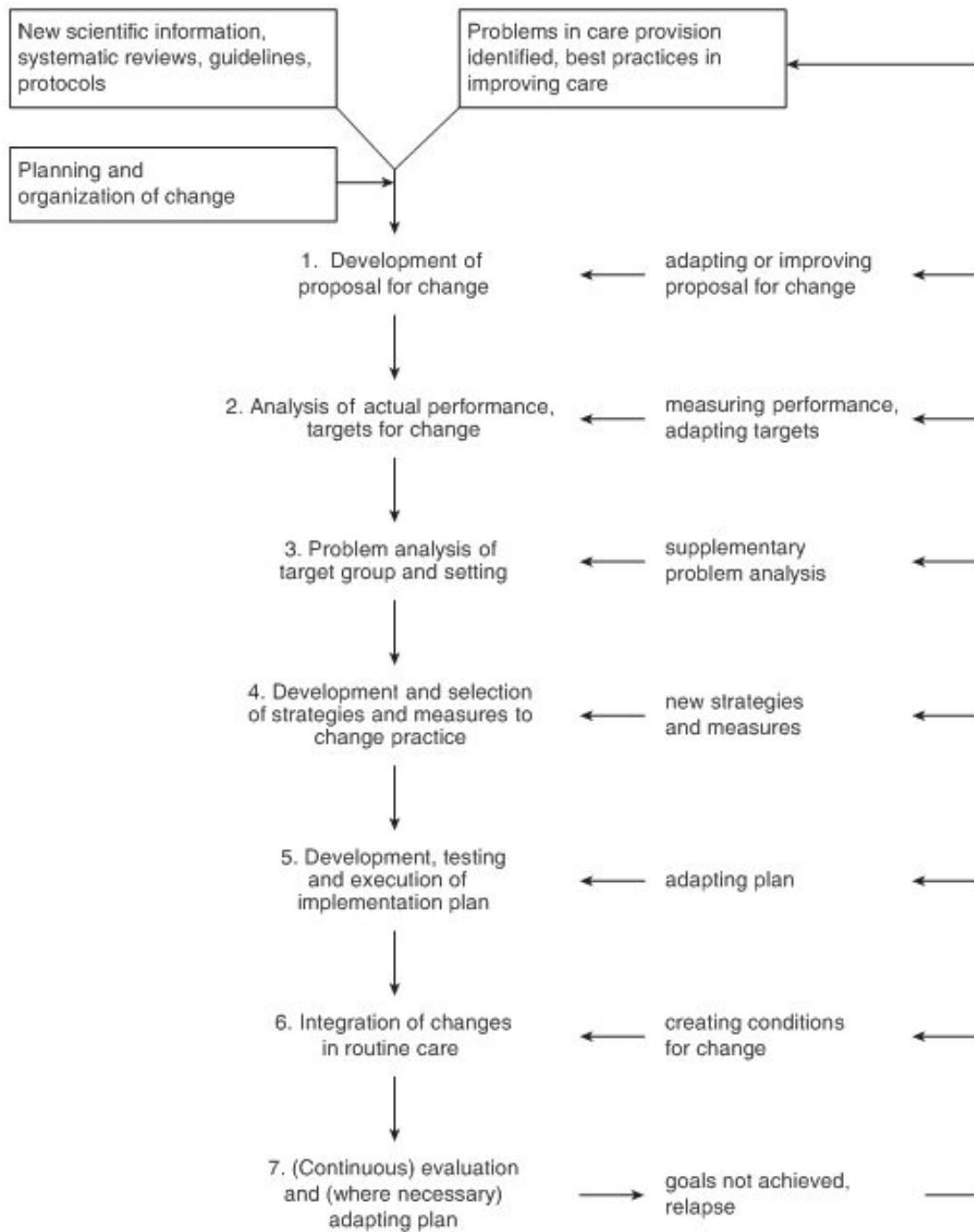


Figure 6: Implementation of Change Model (Grol & Wensing 2013b, p46), reproduced with permission

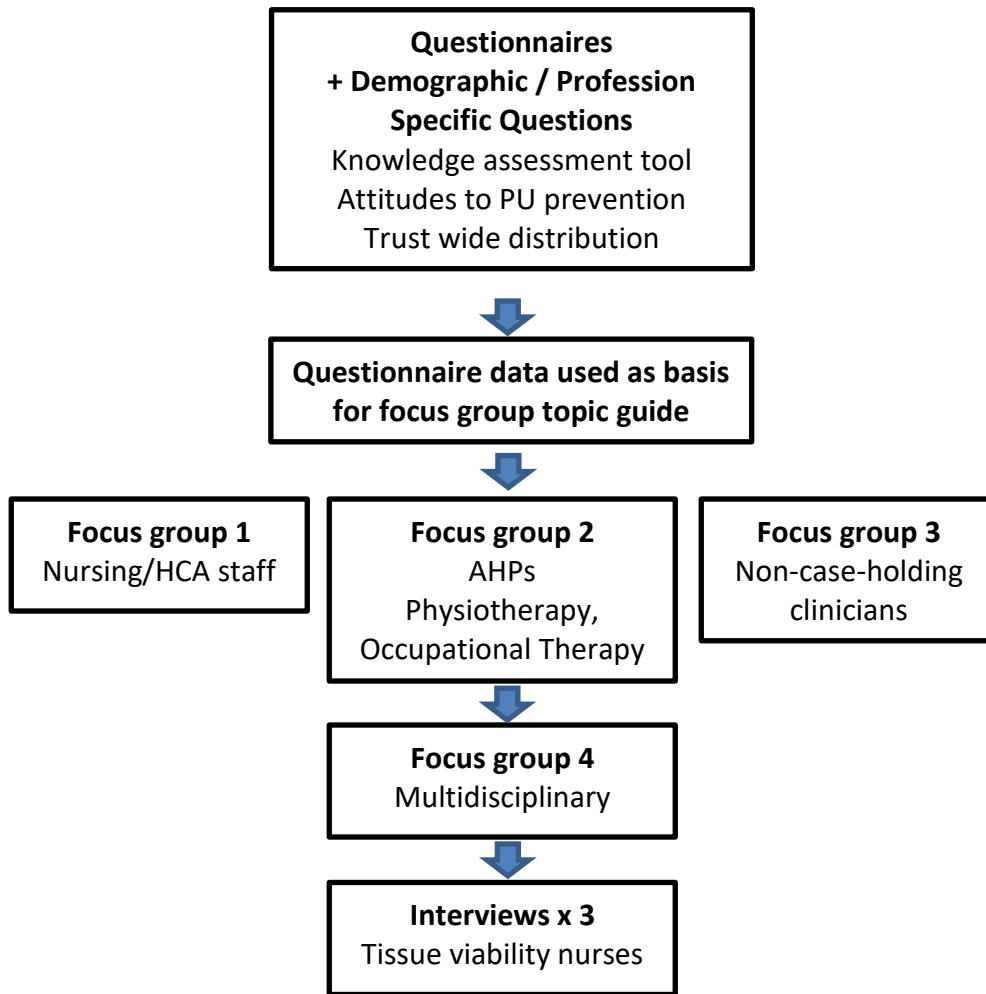


Figure 7: Sequential mixed methods research process flow

Chapter 4: Sequential mixed methods study

4.1 Study approach and design

A multiphase sequential mixed methods study was undertaken within a large community NHS Trust. Initially, two quantitative questionnaires were used to explore the knowledge and attitudes of different staffing groups to PU prevention (Beeckman et al 2010a, b) (Section 3.3.1-2, Appendix I, J). These results informed focus group discussions, which in-turn guided the discussion for three interviews (Figure 7), providing context and triangulation for the closed questionnaire responses.

4.2 Sample and setting

Recruitment aimed to establish a representation of healthcare professionals as well as other members of staff within a community NHS Trust. The rationale for undertaking this research in the community setting was the increasing focus in terms of both policy and healthcare funding in the community as well as the known challenges of PU prevention (Edwards 2014; OECD 2015). The selected community trust provided services for people with physical and mental health needs, learning disabilities and social care needs in southern England. The staff population at the time of data collection was 6889 with non-clinical staff excluded. This included nursing, allied health professionals, medical staff and other clinical roles as well as management and administrative staff, who were all invited to take part in data collection.

4.3 Data collection and analysis

This study used quantitative questionnaire surveys (Section 3.3.1-2, Appendix I, J) to establish themes in relation to knowledge and attitudes. Subsequently, qualitative focus groups and interviews were used to explore context. Figure 7 outlines the study design. This comprehensive data collection methodology was undertaken to reduce social desirability bias and therefore provide reliable and valid data for analysis.

4.3.1 Questionnaire Survey

Questionnaires were used to explore the knowledge and attitudes of various professional groups to PU prevention across the community team (Beeckman et al 2010 a, b) (Appendix I, J; Table 11, 12: sub-themes). The questionnaires were distributed through an online survey tool and in paper form to achieve the best response. A participant information sheet was provided as part of the questionnaire (Appendix D). The online survey link was distributed through the community NHS Trust's communications department, through an email newsletter and staff intranet pages to healthcare professionals and other members of staff. Participation was further encouraged by management staff for the different divisions (health, learning disability and mental health), and by lead clinicians. Distribution of the paper questionnaires was conducted by the researcher at events related to tissue viability. Those who agreed to take part were provided with opaque envelopes for their completed questionnaires to maintain anonymity and confidentiality.

Staff members were asked to assess their own suitability to take part according to the following criteria:

1. Involvement in the allocation of referrals to a professional group (nursing, AHP etc.)
2. Direct or indirect contact with patients
3. Use of RIO Electronic Patient Record System to document patient contact/actions

This group of 'non-clinical' staff were only asked to complete the attitudes to PU prevention questionnaire as some of the areas covered in the knowledge assessment tool may be outside of their scope of training. This was facilitated automatically through the online survey tool when participants selected their role at the beginning of the questionnaire. Allied health professionals were asked to undertake additional items (Section 3.3.2, Table 13) at the end of the attitudes questionnaire, while all participants were asked a series of demographic questions (Table 10).

Table 10: Demographic questions

Demographic questions
Age
Gender
Role
How many clinical years have you been working post registration?
Which division of the community do you work?

4.3.1 Knowledge Assessment Tool (PUKAT)

The knowledge assessment tool (Appendix J; Table 11) was developed by (Beeckman et al. 2010b). The PUKAT has 26-items that represent different areas of knowledge in PU practice and was developed through review of the literature. The PUKAT has been shown to have construct validity with a statistically significant mean difference in overall scores between PU expert nurses and non-PU experts ($p < 0.001$), while internal consistency was shown to be good overall (Cronbachs α : 0.77). Test-retest reliability assessed with nursing students was deemed to be satisfactory (intraclass correlation coefficient: 0.88 (95% CI=0.79-0.93, $p < 0.001$). However, development and validation was only undertaken with nursing staff and therefore cannot be claimed for a wider multidisciplinary audience. Nevertheless, for the purpose of this PhD project, many of the items are applicable to a wider professional audience. Pilot testing was undertaken with a small sample of allied health professionals to ensure that questions could be translated to these professional groups (Section 3.3.3-4).

Table 11: PU Knowledge Assessment Tool (Beeckman et al 2010b)

Knowledge Assessment Tool (PUKAT) sub-themes (Beeckman et al 2010b)
Aetiology & Development
Classification and observation
Risk assessment
Nutrition
Preventive measures to reduce the amount of pressure/shear
Preventive measures to reduce the duration of pressure/shear

4.3.2 Attitudes to Pressure Ulcer Prevention instrument (APUP)

The APUP instrument (Appendix I; Table 12) developed by Beeckman et al. (2010a) has 13-items following five sub-scales with participants asked to choose one answer from a 4-item Likert scale (strongly agree – strongly disagree). The content validity of the instrument was identified through literature review and double Delphi methodology involving two expert panels. Beeckman and colleagues (2010) conducted pilot testing with nurses and nursing students to evaluate clarity, ambiguity, format and time to complete (Section 3.3.3-4).

Table 12: Attitudes to Pressure Ulcer Prevention Tool sub-themes (Beeckman et al 2010a)

Attitudes to Pressure Ulcer Prevention (APUP) tool sub-themes
Personal competency
Priority of pressure ulcer prevention
Impact of pressure ulcers
Responsibility of pressure ulcer prevention
Confidence in the effectiveness of prevention

Psychometric evaluation was also undertaken to assess construct validity and stability reliability. This process was undertaken with nurses (n=258) and nursing students (n=291) with measures of internal consistency and intraclass correlation demonstrating the instrument to be reliable and valid overall (Cronbachs α : 0.79, Intraclass correlation: 0.88 (95% CI=0.84-0.91, $p < 0.001$). However, as with the knowledge tool, the APUP was only validated with nursing staff rather than a multidisciplinary sample. Consequently, a number of additional statements were asked of AHP staff in this study, representing physiotherapy, occupational therapy and podiatry (Table 13). This followed the same format as the APUP, but appeared on a separate page of the online survey tool and was scored separately. While many of the statements in the APUP are generic and could be asked of any profession, it was decided to add these further items to gain a more detailed AHP specific response to assist with building the topic guide for the qualitative phase of the investigation.

Table 13: AHP specific attitude statements

AHP Attitude statements	
Podiatry	I feel confident in my ability to differentiate a pressure ulcer from a diabetic foot ulcer
	When managing wounds I work as part of a multi-disciplinary team
	If I have identified a patient to have or be at risk of developing a pressure ulcer I refer to the multidisciplinary team
	I often communicate with nurses or occupational therapy/physiotherapy regarding issues related to patient's tissue viability
	I feel that pressure ulcer prevention/management is part of my professional identity
Occupational Therapy / Physiotherapy	Maintaining mobility reduces the risk of pressure ulcer development
	Appropriate seating and postural support is essential in the prevention of a pressure ulcer
	During my day-to-day clinical work I often consider the impact of my interventions on the patient's skin
	I feel that pressure ulcer prevention/management is part of my professional identity

4.3.3 Piloting of questionnaires

Piloting is important to establish the intelligibility and acceptability of a data collection tool (Jones and Rattray 2010). It was used to address issues such as ambiguity in questionnaire wording or technical problems relating to questionnaire completion, before being distributed more widely. As validity and reliability of the APUP and PUKAT was only established with nurses, piloting with a representative sample of AHPs and other staff from outside of the community NHS Trust was important prior to data collection. A pilot study was undertaken through the use of online survey software to replicate the conditions of the main study. The aims were as follows:

- Recruit healthcare professionals and non-professionals from University Hospital Southampton NHS Foundation Trust and University of Southampton to undertake the questionnaire and provide feedback
- Establish any ambiguity in the wording of questions or statements
- Establish the time it takes to complete the questionnaires for differing professional groups

- Gain feedback on the format and process of taking part including any technical problems associated with the online survey tool

4.3.4 Pilot Results

A convenience sample of thirteen healthcare professionals and other members of staff were recruited for piloting. Table 14 demonstrates the roles tested by the reviewers, their comments and the response to these comments.

Table 14: Piloting results

Role tested	Section	Direct comments	Time taken to complete	Response to comments
Nurse	PUKAT	Saying 20min may put some off. Query age first in demographics, possible yes/no drop down for focus group interest. Possible more description for turning on theme 5 Q2. Theme 2 Q4 – position of sitting clarification, Q5 minimum once per day. Positive and negative wording of each statement a little confusing at times	10min	Changed text on questionnaire home screen to “less than 20 minutes to complete” Moved age demographic question to become fifth option. Added comment to theme 5, Q2 to include: Where turning to a lateral position is mentioned multiple times, it refers to alternate sides.
Physio	PUKAT	Sitting position in bed, chair or both? Remove text at top of each page ‘Please select one answer only’	20min	No change made as unable to ascertain from author of questionnaire whether this refers to sitting in bed, chair or both
Other		Overall satisfied with questionnaire	8 min	
Nurse	PUKAT	Easy to complete, straightforward. Change tick boxes to only be able to select one	3-5min	Tick box option amended to only be able to select one

				option per question/statement
Other		Explain MDT acronym. Good overall impression of questionnaires	2min	Changed MDT to multidisciplinary
Doctor		Clear impression of questionnaires. Useful to have an option if you did not agree/disagree with statement	10min	See general issues
Nurse	APUP	Difficulty switching between positively and negatively worded items. Difficult to answer as no neutral option.	15min	See general issues
Podiatrists x 6	PUKAT / APUP	Second page of questionnaire not opening		Resolved

Two issues were raised by more than one reviewer. These relate to the difficulty in switching between positively and negatively worded items and the lack of a neutral option in the APUP Likert scale. However, as both questionnaires were shown to have both construct and content validity (Section 3.3.1-2), making any changes to these areas would have invalidated the tools. Indeed, it was out of the scope of this project to revalidate these tools. The reasoning for inclusion of both positive and negatively worded items was not reported by the authors (Beeckman et al 2010a, b). However, the most likely reason is to reduce acquiescence bias. Therefore, reducing the chances of participants automatically agreeing with each statement without due consideration (Bowling 2005).

The exclusion of a neutral option in the Likert scale was similarly not discussed by the authors. This likely represents the opportunity to minimise responses from those who have an opinion, but lack motivation to complete the questionnaires and therefore provide a neutral response (Krosnick 1991). The absence of a neutral option may also reduce social desirability in responses (Sturgis et al. 2014).

4.3.5 Questionnaire data analysis

Data collected from the online/paper questionnaires were analysed using appropriate non-parametric descriptive statistics (median and interquartile range) in order to identify themes for discussion in the focus groups. The APUP Likert scale was assigned a numerical value (strongly agree = 4 – strongly disagree = 1 for positively worded items and the reverse for

negatively worded items) with a maximum score of fifty-two and a minimum of thirteen. The knowledge assessment tool responses were assigned a numerical score (correct answer = 1, incorrect/do not know = 0) (Cullen-Gill and Moore 2013).

Further inferential analysis was conducted, using non-parametric tests. The Kruskal-Wallis test was used to assess differences between nursing and allied health professionals in both knowledge and attitudes to PU prevention overall and also the categories of the PUKAT. This test was also used to assess if clinical years' experience was significantly associated with knowledge scores. Microsoft® Excel® (2010) for Windows (Microsoft Corporation, Redmond, WA, USA) and the Statistical Package for Social Sciences (SPSS® version 22) for Windows were used for statistical analysis (IBM®, New York, NY, USA).

4.3.6 Focus group recruitment

Participants who undertook the questionnaires were invited to take part in focus groups. Those participants who chose to do so were asked to provide an email address to be contacted by the researcher. Further recruitment was undertaken in a similar way to the questionnaires with emails sent out by lead clinicians and management staff in the community NHS Trust. The individuals who expressed an interest were contacted by email with further details of the study. These potential participants received an information sheet (Appendix E) and were asked to sign a consent form (Appendix F). Participants from the initial focus groups involving either nurses, AHPs or other staff were asked to also take part in a multidisciplinary focus group (Figure 7). However, it was deemed necessary to open out the recruitment to a convenience sample in order to achieve sufficient numbers from across the community Trust. A typical community team in the health division consisted of a matron, nurses, healthcare assistants, physiotherapists, occupational therapists, rehabilitation assistants and more widely mental health nurses, support workers, social services staff and, geriatricians.

4.3.7 Focus group data collection

Focus groups were used to discuss themes that emerged from the questionnaires as well as other topics highlighted from previous literature. Focus groups offered a non-threatening environment conducive to discussion (Krueger and Casey 2000) with interaction between participants promoting greater depth of data (Morgan 1988). Practically, focus groups are also efficient in terms of both time and financial constraints, with the potential for involving more participants and gaining a wider perspective (Krueger and Casey 2000). This methodology, therefore, provided the best opportunity to meet the aims and objectives of the study.

Each group was planned to consist of a minimum of six participants (maximum of twelve) and be conducted over a 1-hour period. This size was selected to ensure there were sufficient participants to gain a broad range of information, although not too large to ensure that participants felt comfortable to share their views (Onwuegbuzie et al. 2009). Each focus group was designed to have a moderator and assistant moderator present. The moderator's role was to facilitate discussion, allowing and encouraging all members to have a voice, while also taking notes to inform further discussion points. The assistant moderator's role was to undertake the recording (digitally), taking notes, addressing practical needs (refreshments, seating, etc.), and providing verification of data during analysis. The setting for each group was planned to be practically suitable for participants and conducive to group discussion, typically involving a private room within the locality of the clinicians working in the community Trust. A topic guide was created before each focus group based on the questionnaire themes and following inductive analysis of the codes from the previous group/s (Figure 8).

4.3.8 Interview recruitment

Independent interviews were conducted with tissue viability nurses (TVNs) as they were unable to attend the focus groups. TVNs provide a vital non-case-holding advisory role in PU prevention and management. Therefore, it was essential to include their perspective. Three TVNs were purposively sampled from different regions within the community NHS Trust.

These nurses received an email inviting them to take part, with a convenient time and place arranged once agreement was obtained. All of the TVNs received a participant information sheet (Appendix G) and were asked to complete a consent form (Appendix H).

4.3.9 Interview data collection

Three separate semi-structured interviews were conducted with TVNs. Semi-structured interviews were used to explore predetermined themes generated from the focus group data and open-ended questions, to generate in-depth data as a result (Tod 2015). Therefore, complimentary data was gathered from the focus groups, while still retaining the opportunity for the TVNs to discuss their own views. A topic guide was created prior to each interview to facilitate discussion (Figure 8, Appendix K). Each interview was planned to take no longer than one hour and was digitally recorded to allow transcription and data analysis at a later date. Each interview was conducted by one interviewer, with another researcher also present to make notes. A round up of discussed topics was also provided, enabling confirmation of data with the TVNs.

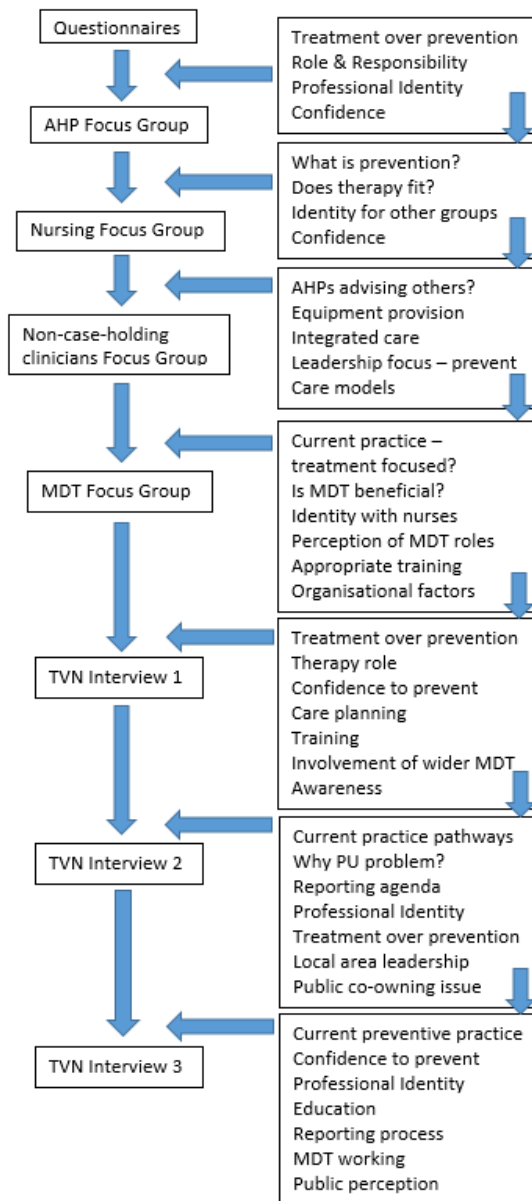


Figure 8: Topic guide schematic. Demonstrates the topics discussed and carried over following from questionnaires to focus groups/interviews

4.3.10 Focus group and interview data analysis

For all focus groups and interviews, data were recorded electronically, transcribed and coded by the doctoral researcher, with additional coding undertaken by two further researchers to ensure rigour. Coding from all researchers was applied to sentences or paragraphs and then merged into one document. After each focus group or interview these data were inductively analysed to inform the development of the next focus group/interview topic guide and for

triangulation purposes. Figure 8 shows the development of topics following each focus group/interview. Upon completion of the focus group/interview data collection, the codes were deductively analysed using two taxonomies of behaviour change as frameworks (Appendix L). The first was the coding manual for individual and team behaviour change techniques developed by de Bruin et al (2009) following the work of Abraham & Michie (2008) and based on behaviour change theory. Table 15 illustrates the relevant theories for each determinant. The second was the Effective Practice and Organisation of Care taxonomy (EPOC) developed by the EPOC Cochrane review group, for organisational and structural factors (EPOC 2014). This ensured the inclusion of factors related to the individual (healthcare professional and patient), resource and organisation, within socio-political and legal contexts (Wensing et al 2013a). A framework analysis approach was used for interpretation of the defined codes and categories (Ritchie and Spencer 1994). A process of 'indexing, charting, mapping and interpretation' was then undertaken in accordance with the stages of framework analysis (Ritchie and Spencer 1994, p. 178). This convergent approach to data collection and analysis was considered to establish greater validity through the use of triangulation, to inform the determinants of behaviour change (Cresswell 2014). The relevant determinants are presented in Section 4.7 and have been used to develop and implement a tailored intervention (Step 4 – Figure 6) (Ch. 5: Development of the interdisciplinary programme).

Table 15: Determinants of behaviour change and associated behaviour change theories (de Bruin et al 2009, Abraham & Michie 2008, EPOC 2014). Numbering (A1-A11) for referencing purposes to determinants in-text. Full coding manual with associated techniques for behavioural change in Appendix K.

Determinants of behaviour change	No.	Behaviour change theories
Knowledge	A1	Transtheoretical model (Prochaska and DiClemente 1984; Prochaska et al. 2002)
Awareness	A2	Transtheoretical model (Prochaska and DiClemente 1984; Prochaska et al. 2002) Precaution-Adoption Process Model (Weinstein 1988; Weinstein and Sandman 2002)
Social Influence	A3	Theory of planned behaviour (Ajzen 1988) Theory of reasoned action (Fishbein and Ajzen 1977; Montano and Kasprzyk 2002) Precaution-Adoption Process Model (Weinstein 1988; Weinstein and Sandman 2002) Persuasion communication matrix (McGuire 1985) Social cognitive theory (Bandura 1986)
Attitude	A4	Theory of planned behaviour (Ajzen 1988) Persuasion communication matrix (McGuire 1985) Social cognitive theory (Bandura 1986) Theories of self-regulation (Thoresen and Kirmil-Gray 1983; Clark and Zimmerman 1990; Kotses et al. 1990) Theories of automatic behaviour and habits (Bargh and Chartrand 1999) Elaboration likelihood model (Petty and Cacioppo 1986a, 1986b; Petty et al. 2002)
Self-efficacy	A5	Protection-motivation theory (Rogers 1975, 1983) Persuasion communication matrix (McGuire 1985) Social cognitive theory (Bandura 1986) Transtheoretical model (Prochaska and DiClemente 1984; Prochaska et al. 2002) Theories of goal setting (Locke and Latham 1990, 2002) Theories of goal directed behaviour (Gollwitzer 1999) Attribution theory and relapse prevention (Weiner 1986)
Intention	A6	Theories of goal setting (Locke and Latham 1990, 2002) Transtheoretical model (Prochaska and DiClemente 1984; Prochaska et al. 2002)
Action control	A7	Theories of self-regulation (Thoresen and Kirmil-Gray 1983; Clark and Zimmerman 1990; Kotses et al. 1990)

		Transtheoretical model (Prochaska and DiClemente 1984; Prochaska et al. 2002)
Maintenance	A8	Attribution theory and relapse prevention (Weiner 1986) Persuasion communication matrix (McGuire 1985) Transtheoretical model (Prochaska and DiClemente 1984; Prochaska et al. 2002)
Facilitation	A9	Transtheoretical model (Prochaska and DiClemente 1984; Prochaska et al. 2002) Social cognitive theory (Bandura 1986)
Organisational factors (EPOC)	A10	Provider orientated interventions: Revision of professional roles, Clinical multidisciplinary teams, Formal integration of services, Skill mix changes, Continuity of care, Satisfaction of providers with the conditions of work and the material and psychic rewards, Communications and case discussion between distant health professionals, Other Patient orientated interventions: Mail order pharmacies, Presence and functioning of adequate mechanisms for dealing with patients' suggestions and complaints, Consumer participation in governance of healthcare organisation, Other
Structural factors (EPOC)	A11	Changes to the setting/site of service delivery, Changes in physical structure, facilities and equipment, Changes in medical records systems, Changes in scope and nature of benefits & services, Presence & organisational of quality monitoring mechanisms, Ownership, accreditation, and affiliation status of hospitals and other facilities, Staff organisation, Other

4.4 Ethical considerations

Ethical approval was gained from the University of Southampton Faculty of Health Sciences ethics committee for the questionnaire and focus group/interview work (ref. FOHS-ETHICS-10973/20097), with permissions granted from research and development in the community NHS Trust (Project number. SHT150, Appendix C). The following ethical considerations have been taken into account in the design of this research:

4.4.1 Consent

For the online questionnaire, consent was implied through participants clicking through from the link provided voluntarily. Both the focus groups and interviews participants were given time to read the participant information sheet (Appendix D, E, G) before agreeing to take part and signing the consent form. The participants were provided with a copy of the consent form counter-signed by the researcher (Appendix F, H).

4.4.2 Anonymity and confidentiality

Confidentiality and anonymity were maintained through compliance with the University of Southampton guidelines available at: <http://www.calendar.soton.ac.uk/sectionIV/research-data-management.html> as well as the Data Protection Act 1998. All physical records e.g. notes, consent forms were kept in a locked cabinet and separated from personal contact details. As it was possible that some of the focus group participants may have known each other, each participant was asked to adhere to a set of ground rules to protect anonymity. One such rule required that discussion points remain confidential within the group and that they should not be discussed outside of the setting. All digital data collected, such as audio recordings, were password protected and held in secure computer files. Anonymised results were, however, presented to the community NHS Trust. These results have also been written up, published and presented with anonymity maintained.

4.4.3 Right to withdraw

All participants were made aware of their right to withdraw their data from the questionnaires, focus groups and interviews. In order to do so, they were provided with the contact details of the researcher. (Appendix D, E, G).

4.4.4 Harm

There were no direct risks involved with taking part in this research. However, some participants may have found recalling previous experiences of pressure ulcer prevention and management in particular circumstances to be distressing. Participants were provided with contact details for the research governance office for independent advice.

4.5 Results

4.6 Demographics

4.6.1 Questionnaire participant demographics

The number of participants who took part in the APUP and PUKAT questionnaires is shown in Table 16. Of the 151 participants who undertook the APUP, 92% were female, while 55% were aged between 45 and 64 years of age. 144 participants provided further demographic information, with 62% indicating that they had more than 10-years clinical experience. Over 69% of participants (n=105) worked in the physical health area, while approximately 16% were based in the learning disability sector, with the remainder working in the mental health or other sectors. Full APUP demographic results by staffing group are shown in Table 17. While fewer participants took part in the PUKAT questionnaire, the demographic trends were similar to the APUP, with a majority of staff having over 10 years' experience and working in the health division. The distribution of professional backgrounds was indicative of the Trust's staffing, with the majority of responders having a nursing background.

Table 16: APUP & PUKAT participant numbers

Profession	APUP (n=)	PUKAT (n=)
Nurse	84	71
Healthcare Assistant (HCA)	15	10
Physiotherapist	9	8
Occupational Therapist (OT)	17	13
Podiatrist	11	7
Other AHP (included Speech & Language Therapists, Associate Practitioners)	4	4
Rehabilitation Assistant (Rehab Asst)	7	6
Management	4	0
Total	151	119

Table 17: Demographics from participants who undertook the APUP instrument

Demographics		Nurse		HCA		Physio		OT		Podiatrist		Other AHP		Rehab Asst		Management	
		<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Clinical experience (years)	Under 2	7	8.5%	2	15.4%	2	22.2%	2	11.8%	0	0.0%	0	0.0%	1	16.7%	0	0.0%
	2-4 years	6	7.3%	4	30.8%	2	22.2%	1	5.9%	2	18.2%	1	50.0%	2	33.3%	0	0.0%
	5-9 years	14	17.1%	2	15.4%	0	0.0%	0	0.0%	1	9.1%	0	0.0%	1	16.7%	0	0.0%
	10-19 years	15	18.3%	5	38.5%	2	22.2%	10	58.8%	6	54.5%	1	50.0%	2	33.3%	4	100.0%
	20-29 years	15	18.3%	0	0.0%	1	11.1%	3	17.6%	1	9.1%	0	0.0%	0	0.0%	0	0.0%
	30+ years	25	30.5%	0	0.0%	2	22.2%	1	5.9%	1	9.1%	0	0.0%	0	0.0%	0	0.0%
Gender	Female	79	94.0%	15	100.0%	8	88.9%	17	100.0%	8	72.7%	3	75.0%	5	71.4%	4	100.0%
	Male	5	6.0%	0	0.0%	1	11.1%	0	0.0%	3	27.3%	1	25.0%	2	28.6%	0	0.0%
Age	18 - 25	4	4.8%	0	0.0%	1	11.1%	0	0.0%	1	9.1%	2	50.0%	1	14.3%	0	0.0%
	26 - 34	18	21.4%	2	13.3%	1	11.1%	2	11.8%	4	36.4%	1	25.0%	1	14.3%	0	0.0%
	35 - 44	12	14.3%	3	20.0%	3	33.3%	5	29.4%	2	18.2%	1	25.0%	2	28.6%	2	50.0%
	45 - 54	32	38.1%	4	26.7%	3	33.3%	9	52.9%	2	18.2%	0	0.0%	2	28.6%	2	50.0%
	55 - 64	18	21.4%	6	40.0%	1	11.1%	1	5.9%	2	18.2%	0	0.0%	1	14.3%	0	0.0%
Area of work	Health	62	79.5%	13	100.0%	6	66.7%	13	76.5%	3	33.3%	2	50.0%	5	83.3%	1	33.3%
	Learning Disability	13	16.7%	0	0.0%	3	33.3%	3	17.6%	0	0.0%	2	50.0%	1	16.7%	2	66.7%
	Mental Health	1	1.3%	0	0.0%	0	0.0%	1	5.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	Other	2	2.6%	0	0.0%	0	0.0%	0	0.0%	6	66.7%	0	0.0%	0	0.0%	0	0.0%

4.6.2 Focus group and Interview participant demographics

The participant demographics of each focus group and interview is shown in Table 18. While these participants were not asked specific demographic questions, the recruited staff were from a broad geographical spectrum across the community NHS Trust.

Table 18: Focus group and Interview participants

Nursing focus group (N=6)	<ul style="list-style-type: none"> - Community sister - Staff Nurse x 2 - Healthcare Assistant x2 - Community Matron
AHP focus group (N=3)	<ul style="list-style-type: none"> - Occupational Therapist x 2 - Physiotherapist
Non-case holding clinicians focus group (N=3)	<ul style="list-style-type: none"> - Management (Nurse) - Clinical Advisor (OT) - Clinical Advisor - Equipment (Nurse)
MDT focus group (N=9)	<ul style="list-style-type: none"> - Community Nurse x 2 - Occupational Therapist - Healthcare Assistant/Trainee Associate Practitioner - Physiotherapist - Community Mental Health Nurse - Healthcare Assistant/Trainee Associate Practitioner (Health & Mental Health) - Community Matron (Mental Health) - Clinical Advisor (OT)
Interview 1	<ul style="list-style-type: none"> - Tissue Viability Nurse (TVN)
Interview 2	<ul style="list-style-type: none"> - Trainee TVN
Interview 3	<ul style="list-style-type: none"> - TVN

4.7 Determinants

The codes identified as important through the analysis phase were grouped around six determinants. These are knowledge (A1), attitude (A4), awareness (A2), social influence (A3), organisational factors and structural factors (A10-11), representing determinants from both

individual and team related taxonomies (Abraham and Michie 2008; de Bruin et al. 2009) and the organisational taxonomy (EPOC 2014).

4.8 Knowledge (A1)

Knowledge was assessed across the community using the standardised questionnaire (Section 3.3.1). In addition, the focus groups and interviews were used to provide greater depth of understanding regarding each profession’s knowledge and learning needs. Table 19 provides a summary of the knowledge scores, including the percentage of participants that demonstrated a mean satisfactory score, defined as >60% by Beeckman et al. (2010b).

Table 19: Knowledge scores with satisfactory levels

Total PUKAT	Median	Range	IQR	Percentage of participants with an >60% satisfactory threshold score
Nurse n=71	17	09-22	15.0-18.5	75 (n=53)
Healthcare Assistant (HCA) n=10	15.5	13-18	15.0-16.8	50 (n=5)
Physio (PT) n=8	17.5	15-21	16.8-18.5	87.5 (n=7)
Occupational Therapist (OT) n=13	18	16-19	17.0-19.0	100 (n=13)
Podiatrist n=7	17	13-19	15.5-18.0	71 (n=5)
Other AHP n=4	16	15-17	15.8-16.3	75 (n=3)
Rehabilitation Assistant (RA) n=6	15	08-18	13.5-17.3	33 (n=2)
AHP (PT, OT, POD, Other AHP, RA) n=38	17	08-21	16.0-18.0	78.5 (n=30)

The overall median score achieved by the community-based healthcare staff for the knowledge questionnaire (PUKAT) was 17/26 (65.4%), representing median satisfactory level. There was some variation in knowledge scores between professions, with OTs achieving the highest scores 18/26 (69.2%) and the healthcare and rehabilitation assistants achieving the lowest scores of 15/26 (57.7%). Although participants with twenty to twenty-nine years’

clinical experience demonstrated the highest median knowledge score (69.2%, 18/26), overall clinical experience did not represent a significant difference to knowledge scores ($X^2(5) = 6.287, p = 0.28$).

The PUKAT is divided into a number of categories, representing different areas of knowledge in PU practice. The results from the aetiology and development sub-theme (Figure 9) demonstrate that OT/PT achieved higher median scores than nurses (83.3% vs 66.7%). However, none of the differences were found to be statistically significant ($X^2(3) = 2.741, p = .433$). Close examination of the answers to specific questions revealed that although all professions achieved satisfactory level scores (>60%), a large proportion (58%) did not identify that a lack of [tissue] oxygen represented a major cause of PU development (Figure 10). It was of note that all of the podiatrists (n=7) identified the correct answer to the aforementioned question.

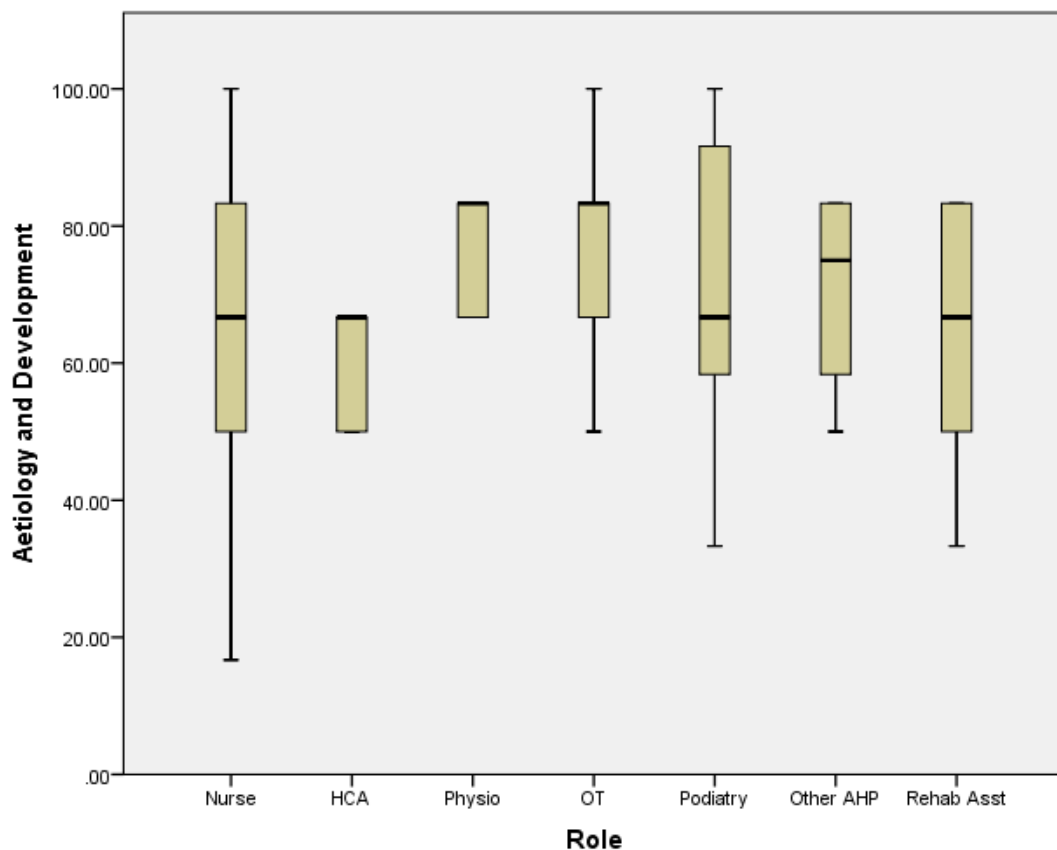


Figure 9: Response to aetiology and development questions by professional groups, representing percentage correct answers (median and interquartile range)

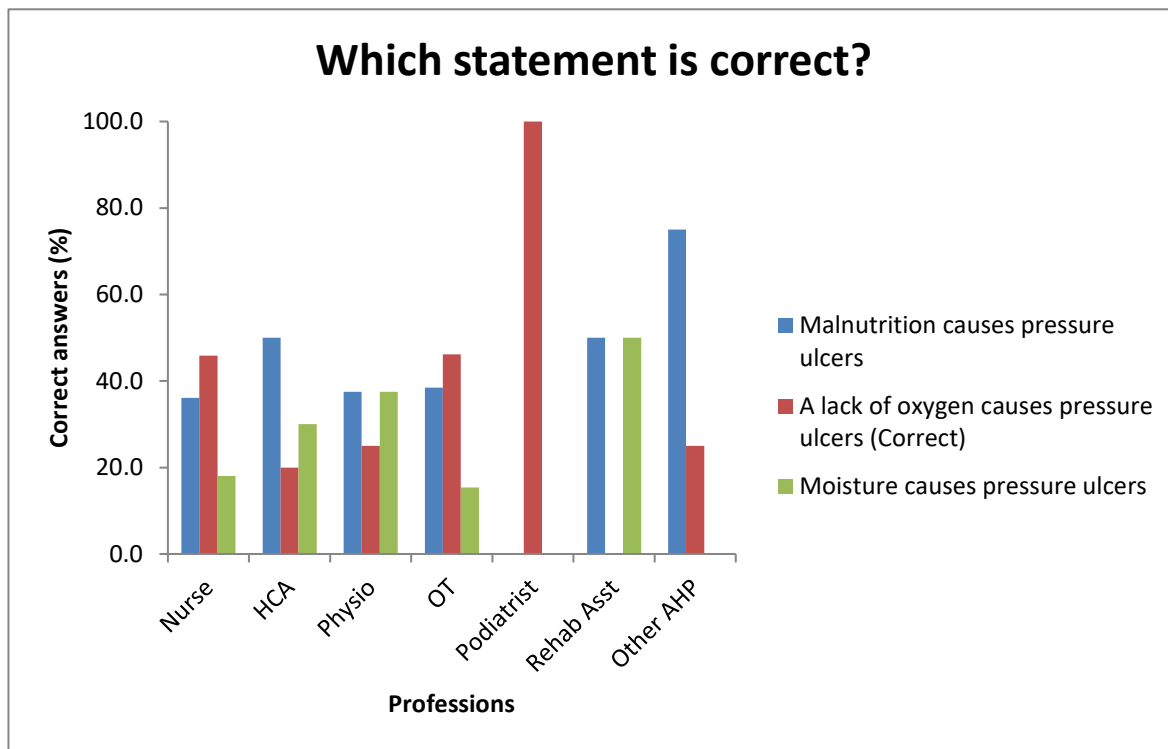


Figure 10: Results from PUKAT: Cause of pressure ulcers

In the sub-theme of classification and observation, PTs achieved the highest median score (4/5) while, with the exception of rehabilitation assistants, all other professions demonstrated a satisfactory 60% (3/5) score (Figure 11). There were no statistically significant differences between groups in this sub-theme ($\chi^2(3) = 6.837, p = 0.077$).

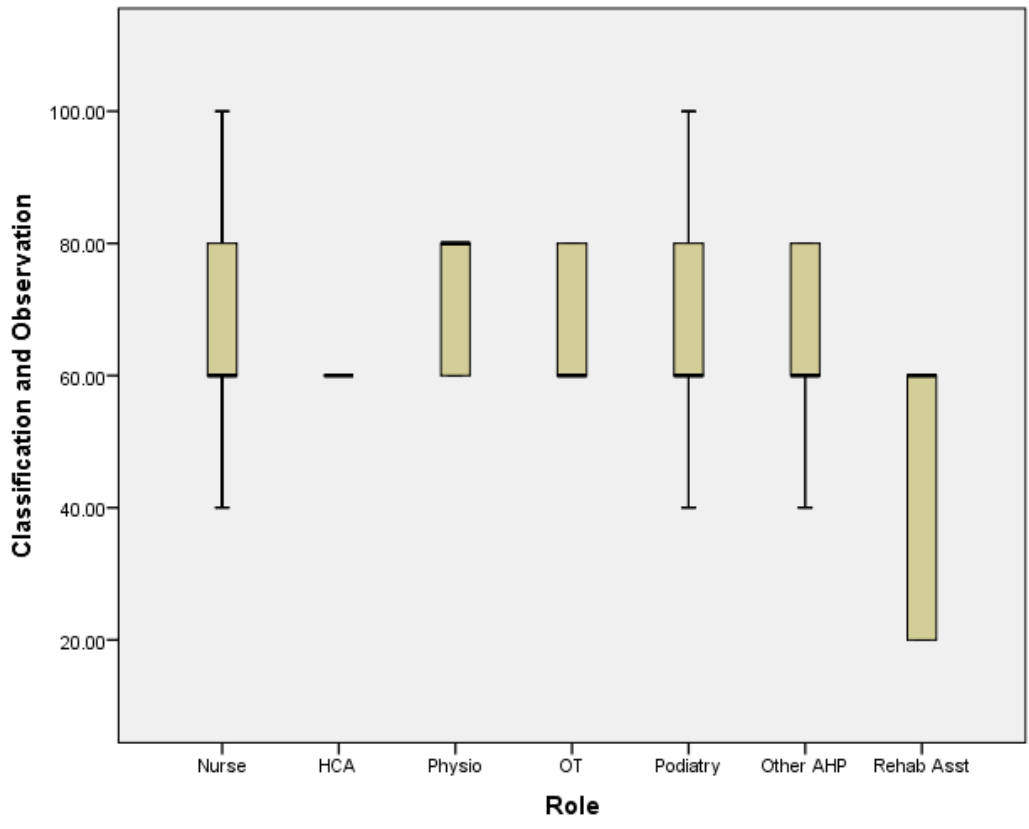


Figure 11: Response to classification and observation questions, by professional groups, representing percentage correct answers (median and interquartile range)

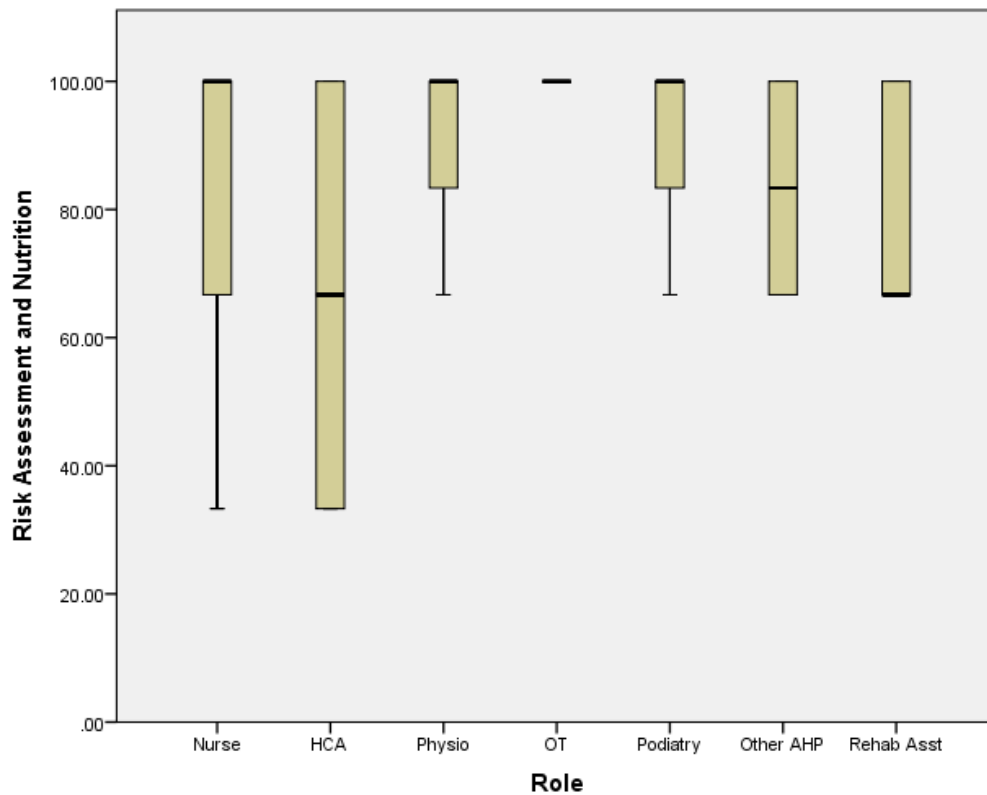


Figure 12: Response to risk assessment and nutrition sub-theme question, representing median and interquartile range scores by profession

Results for the sub-themes of risk assessment and nutrition were combined as jointly these categories represented only three questions (Figure 12). It is clear that all registered healthcare professionals scored highly, while both HCAs and RAs achieved lower scores. Nevertheless, the median score for all staff was above the satisfactory threshold (>60%).

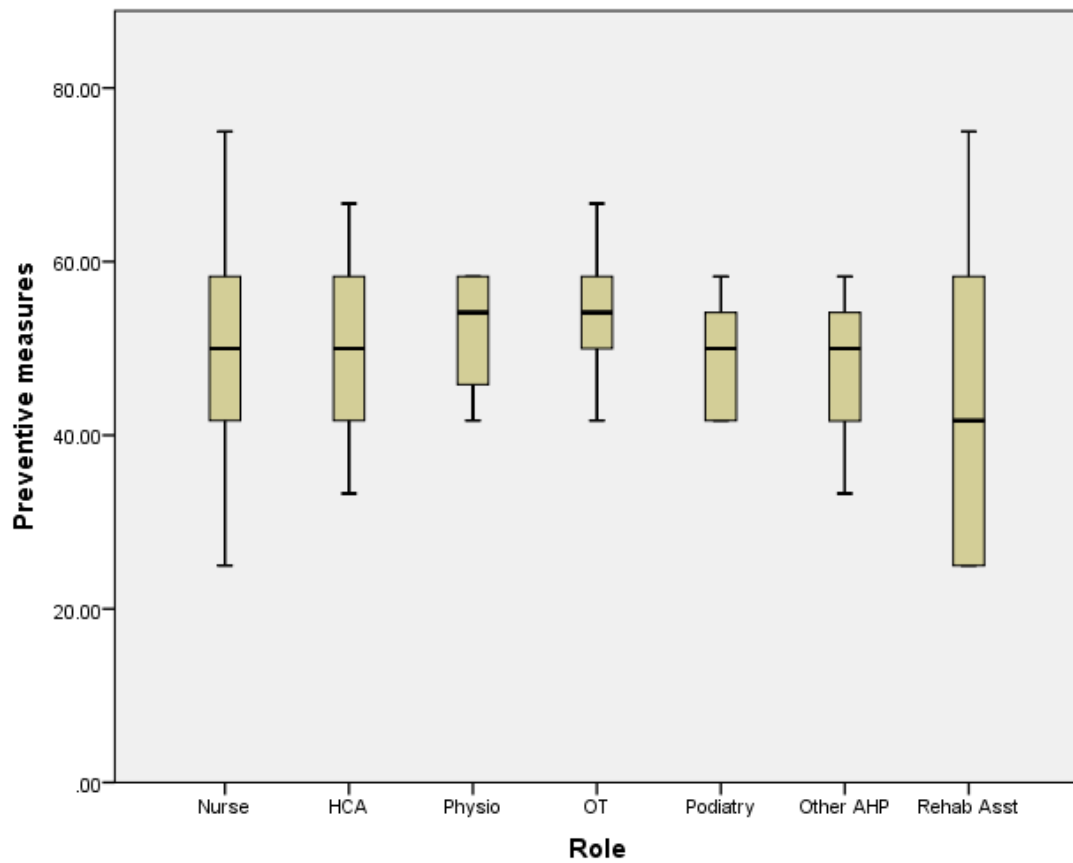


Figure 13: Preventive measures to reduce amount/duration of pressure and shear, by professional groups, representing percentage correct answers (median and interquartile range)

Preventive measures to reduce both the amount and duration of pressure and shear sub-themes were also combined to give an overall result for preventive measures (a total of 12 specific questions). All participants demonstrated a lower than satisfactory overall median score for preventive measures (50%, 6/12). Although there were some differences between professions, as indicated (Figure 13), none were found to be statistically significant ($X^2(3)=1.662, p=0.645$).

Knowledge of preventive measures was also highlighted during both focus group and interview discussions. The dominant preventive measure was highlighted to be equipment provision. Both allied health professionals and nursing participants reported that nurses rely heavily on these resources. Indeed, these participants highlighted that some nurses prescribed equipment to patients without full consideration of an individual's risk factors.

Consequently, one of the TVNs and an OT participant mentioned that it was necessary to consider a more holistic approach, promoting a greater focus on rehabilitation. In particular, they highlight the relationship between overcoming mobility issues and improving independence to reduce the risk of PU development. These are illustrated in the following representative quotes:

“they [nurses] also lean too much on equipment, they think when it comes to prevention, put in a piece of equipment and they don't think of the bigger picture” (TVN)

“Is it actually better that I don't put the equipment in, but we get them more mobile...” (OT)

“They're [the equipment service] struggling to keep up with the nursing demand for pressure relieving stuff where most of the time it's not actually needed” (Physio)

However, three participants from the nursing focus group indicated that it was not routine practice to involve AHPs, suggesting that they would only do so if they faced barriers in ordering equipment. These participants indicated that they already had the necessary occupational therapy and nutritional knowledge. This was supported by a physiotherapist in the study in relation to the lack of referrals received from nurses for physiotherapy to support this area of practice.

“...sometimes we don't need to get OTs involved because, we're not OTs, but we have that knowledge... (Community Matron)

“[I] just audited a multidisciplinary team where the nurses were not referring to the physiotherapist at all cause they said “we've done all the physiotherapy” (Physio)

Nevertheless, facilitators to improving knowledge of preventive measures were discussed, with education highlighted by nurses and AHPs, albeit from differing perspectives. The AHP participants and one of the TVNs described the need to facilitate training that was appropriate and relevant to all members of the community team and more widely to GPs and practice nurses. The community nurses and healthcare assistants tended to focus on the need to educate both carers and the patients themselves, rather than the wider community team.

“...training of everyone from band 2 to band 8, erm, appropriate to their level...” (OT)

“...the care agency that are providing the care for those elderly vulnerable people or their families they have not always necessarily got the information and knowledge...their knowledge regarding the pressure ulcer is hardly there...” (HCA)

4.9 Attitudes (A4)

Staff attitudes were assessed across the community using a standardised questionnaire (Section 3.3.2). Subsequent focus groups and interviews were used to provide greater depth of understanding regarding each profession’s attitude to both PU prevention and collaborative working. Table 20 provides a summary of the attitude scores, including the percentage of participants that demonstrated a mean satisfactory score, defined as >75% by Beeckman et al. (2010a).

Table 20: Attitudes to Pressure Ulcer Prevention Questionnaire (APUP) results by profession

Total APUP	Median	Range	IQR	Percentage of participants with an >75% satisfactory threshold score
Nurse n=84	44	26-52	39.0→47.0	77.4 (n=65)
HCA n=15	45	37-49	39.0→46.0	93.3 (n=14)
Physio n=9	41	37-49	37.0→46.0	67.7 (n=6)
OT n=17	45	29-50	39.0→46.5	76.5 (n=13)
Podiatrist n=11	43	28-48	38.0→45.0	72.7 (n=8)
Other AHP n=4	42	34-44	35.8→43.8	75% (n=3)
Rehab Assistant (RA) n=7	41	38-46	41.0→44.0	85.7 (n=6)
AHP (PT, OT, POD, Other AHP, RA) n=48	43	28-50	38.8→45.3	81.2 (n=39)
Management n=4	46	38-51	.	50% (n=2)

The overall median attitude score was 82.7% (43/52), representing an above satisfactory collated score (Table 20) There was some variation in attitude scores between professions, with the small number of managerial staff achieving the highest scores (88.5%, 46/52). Close examination of the data revealed that nurses demonstrated a slightly higher positive attitude

to PU prevention than the pooled data for AHPs, although this difference was not significant (44/52 vs. 43/52, $p= 0.835$). It is of note that a higher proportion of nurses did not reach the >75% threshold, demonstrating a variability in attitudes within this professional group.

The attitudes questionnaire contained a number of sub-themes representing clinical experience in PU prevention. The results of the questions related to personal competency are illustrated in Figure 14. Nurses exhibited the highest median score for personal competency to prevent PUs (83.3%, 10/12), although there was considerable variation with values ranging between 50% and 100%. AHPs overall achieved the lowest competency values with a median score of 75% (9/12).

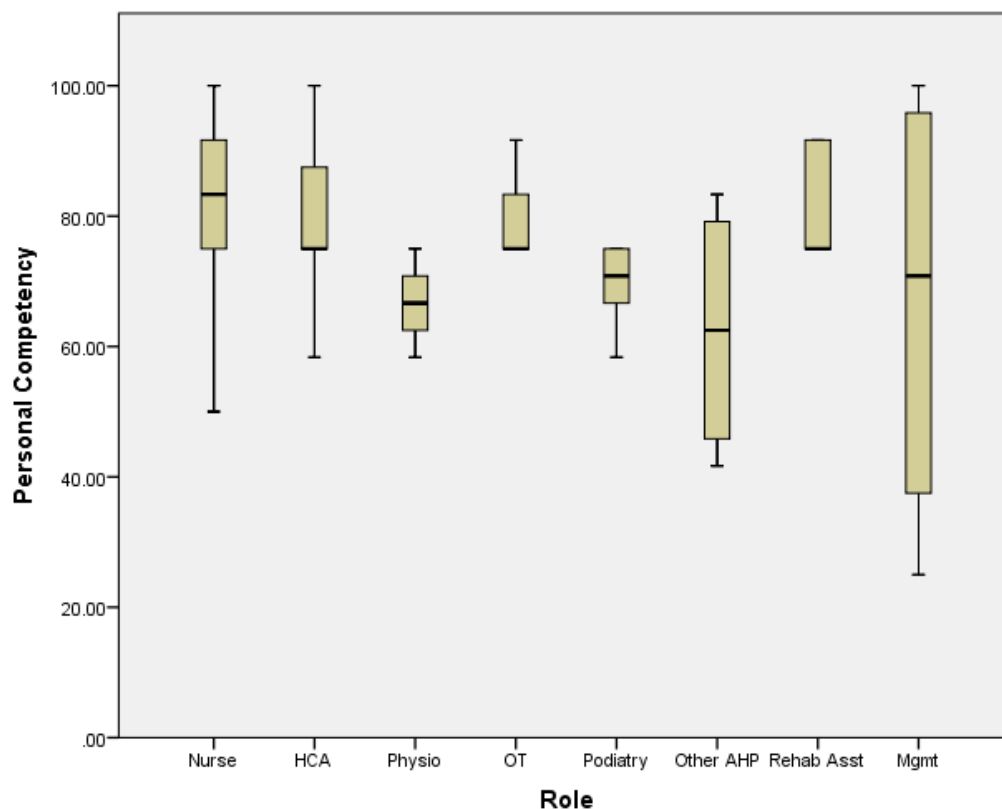


Figure 14: APUP Personal competency to prevent PUs, by professional groups, representing percentage correct answers (median and interquartile range)

The variation in personal competency to prevent PUs demonstrated by nurses may reflect the increasing complexity of patients in the community setting. Some participants suggested that a greater proportion of patients are now remaining in their own home as opposed to

being admitted to hospital. This situation prompted diverse views in terms of achieving preventive practice with a nurse manager reporting a skills gap due to the heavy reliance on carers to achieve prevention. One of the TVNs further suggested that this complexity caused frustration for staff in terms of achieving prevention, while a clinical advisor considered that it increased the rationale for involvement of the wider team in PU prevention.

“Prevention is certainly something that they want to achieve, but I think they also get frustrated, erm, because it’s the nature of the patient they are dealing with...more and more complex, more and more staying at home” (TVN)

“...we’ve all seen carers going into quite complex patients at home who do not have the knowledge or skill to work with those complex patients, so I think there’s a real skill gap in the community from that point of view (Management - Nurse)

Some AHPs considered that attitudes to prevention needed to change from a passive form of caring for the patient, to a greater focus on rehabilitation. An initial approach that encouraged the patient to actively reduce their risk of a PU was considered to be more appropriate than immediately providing equipment.

“...so everybody’s looking to care for the patient rather than going in and saying right you have to do x, y and z, if you can’t do that then we put in an aid, rather than here’s an aid, now we go...that’s causing a massive problem from the patient point-perspective and to [the] equipment store...” (Physio)

Nonetheless, both nurses and AHPs overall held the view that PU prevention was a priority in practice with a median response of 91.7%. Responsibility for PU prevention was less clear, with nurses, HCAs and OTs feeling more responsible with higher median scores (87.5%) than PTs, podiatrists and rehabilitation assistants (75%). It is of note that even within the professional groups, there was considerable variability in scores (Figure 15).

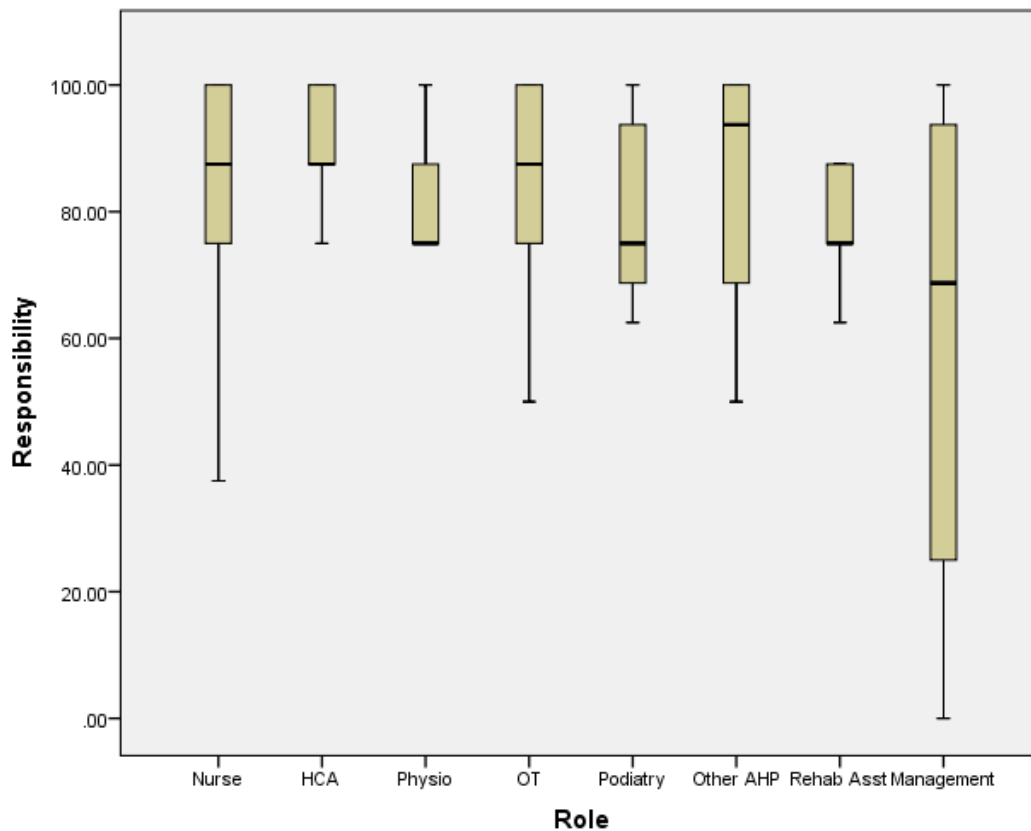


Figure 15: APUP Responsibility sub-theme, by professional groups, representing percentage correct answers (median and interquartile range)

The focus group and interview data provided some context to this variability in perceived responsibility. Some members of staff from nursing and AHP backgrounds identified anxieties amongst community therapists over the perceived loss of professional identity, as well as issues relating to time and capacity to achieve prevention. Consequently, it was identified that some staff created professional boundaries and were unwilling to change their practice for fear of being overloaded. These are captured in the following quotes:

“...a lot of anxiety...about therapists all thinking that they were going to have to do nursing, learn about nursing tasks and nurses having to learn about therapy...” (Management - Nurse)

“...people are much more precious about these boundaries if they are overloaded and haven’t got even the mind-space to take on these new skills...” (Clinical Advisor OT)

While professional boundaries were identified as a barrier to prevention by some participants, there was also recognition that prevention requires more than multiple disciplines working in isolation. Both OT and physio participants as well as more senior nurses indicated the importance of a collaborative approach where knowledge and skills are blended to achieve the best patient outcomes.

“I think now it is seen that with the therapy view you need to get that true balance, you’ve got to work in partnership to get this right...” (TVN)

“thinking more about how they might work in that multi-professional team so that all the knowledge and skills in a much broader sense are blended” (Management - Nurse)

There was substantial variability in the responses from participants regarding the implementation of a collaborative approach. Participants from the AHP focus group and the majority of those taking part in the MDT focus group reported that some teams are able to see past their own professional boundaries and work together. Others, felt that joint collaboration was a waste of time and would not achieve improved outcomes for the patient.

“I’ve seen a shift in the last 6 months of therapy and nursing seeing it a bit more from the other person’s view point and trying to move away from that, oh, it’s the therapists or the nurses issue, it’s actually a patient in the middle of it all and actually how can we all support that patient, erm, but I think, I think some people are more able to embrace that than others...” (OT)

“...if we do discover pressure ulcers, we do discuss with you (p2) the appropriate equipment and stuff like that as well and like you say having everyone being all together now makes it that much easier in terms of the MDT...” (HCA)

“...everybody’s got an input, everyone’s got something to say, you’re there [MDT meeting] for a very long time. Sometimes you just don’t think you’ve achieved a great deal...” (Nurse)

4.10 Awareness (A2)

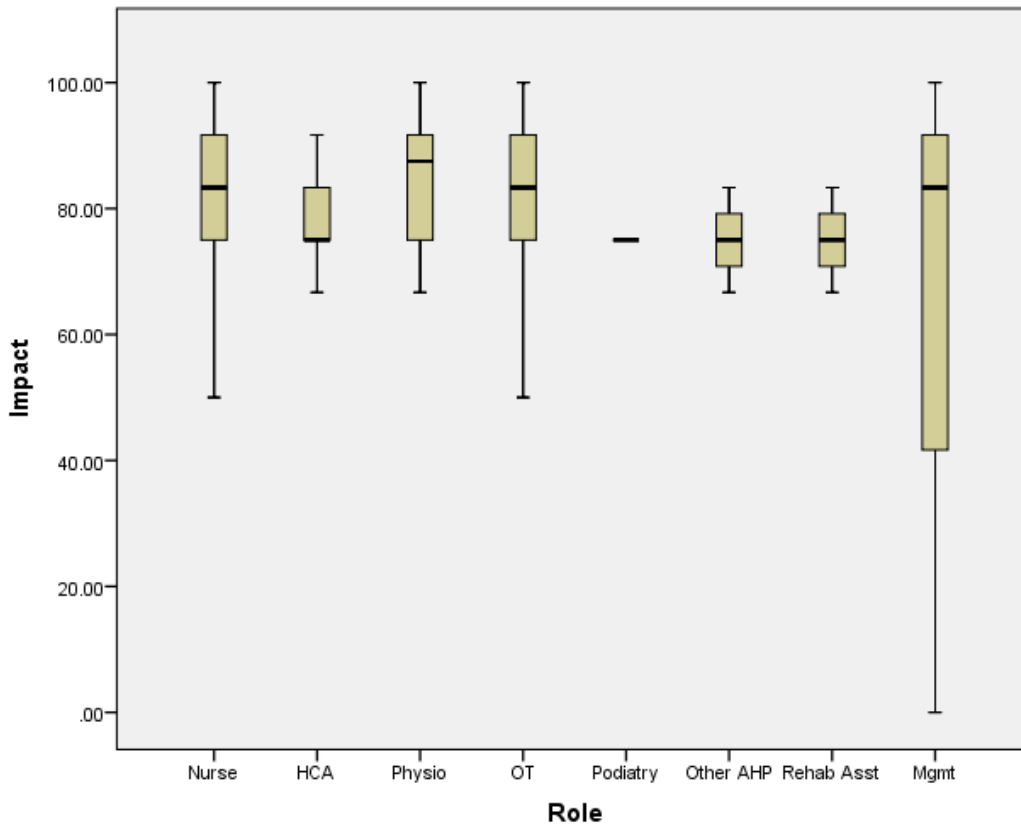


Figure 16: APUP Impact of PU on patients and the financial impact of PU on society sub-theme, by professional groups, representing percentage correct answers (median and interquartile range)

Participants demonstrated a high awareness of the impact of PUs, both on patients and on society with an overall above satisfactory median score of 83.3% (Figure 16). By contrast, a lack of awareness of PUs and their impact was highlighted by a physio and TVN during the qualitative analysis. This existed across the wider team and included both current and new staff. A lack of exposure to PUs was reported to be a barrier to awareness for some AHPs while for doctors, awareness appeared to be dependent on setting.

“...there are lots of therapists out there who’ve never had that, that exposure, they work in isolation...” (Physio)

“...we need to check the skin and doctors just don't get it and the classic statement from a medical director a few months ago...turned round and said to me “I thought pressure ulcers stopped when I was a houseman” (TVN)

It also became apparent that podiatrists have an important role in the prevention and treatment of lower limb wounds, although they generally do not work in the same physical location as other members of the community team. Indeed, one of the TVNs reported that podiatrists were aware of PUs, but disagreed with TVNs over what constitutes a PU compared to other types of wound. This would lead to inevitable implications for reporting and managing these wounds.

“...they [podiatry] will turn around and say nearly everything they see could be pressure so if we started reporting all the patients we’ve seen you couldn't cope with it...” (TVN)

One of the barriers to collaborative practice was reported to be a lack of awareness of what different professional groups could offer as strategies for PU prevention. One participant suggested that it was important to identify what other professions could bring to PU prevention and that experiential knowledge was important to achieve this.

“...there’s no understanding of the professional roles...you don't know what the other person can do until you’ve seen them do it...” (Physio)

Increasing awareness of both the impact of PUs and the potential for a collaborative approach to prevention was felt to be important by many of the participants from both nursing and AHP backgrounds. Education was suggested to facilitate an increase in awareness, with some evidence of effectiveness within professions not traditionally associated with preventive practice. Increasing awareness of patients, carers and the wider community was similarly felt to be essential in strategies for prevention.

“As they’re [mental health nurses] getting more education they are recognising and referring onto us quite a lot” (TVN)

“If it’s much more in people’s awareness I think we could be doing a lot more preventative work” (Clinical Advisor OT)

4.11 Social Influence (A3)

Although participants demonstrated a positive attitude to PU prevention (82.7%, 43/52), as detailed in Chapter 4.4, there was considerable variability in the response to the statement of whether PUs were preventable in high risk patients. Indeed, over 30% of nurses, 11% of OTs, and collectively, over 60% of HCAs/RAs either disagreed or strongly disagreed with this statement (Figure 17).

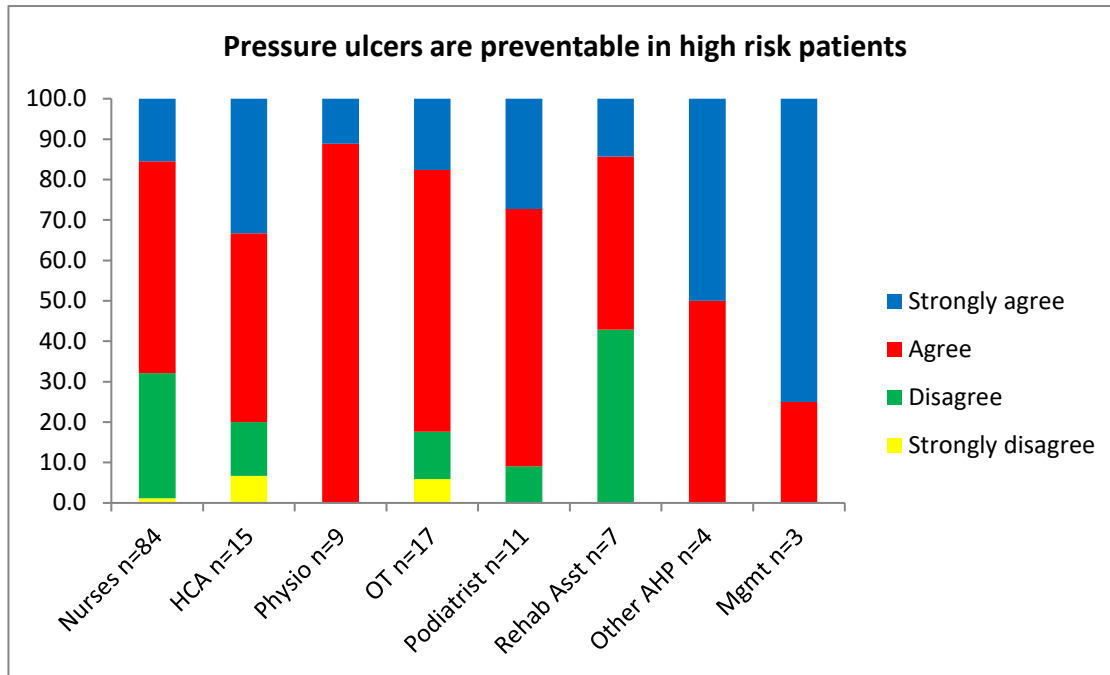


Figure 17: Results from APUP statement 'Pressure ulcers are preventable in high risk patients', representing percentage scores for the four-item Likert scale, by professional group

At the time of data collection, the process for reporting a PU as part of the serious incident requiring investigation (SIRI) procedures required a definition of either avoidable or unavoidable, based on criteria defined by the Department of Health (Section 1.5, Table 2). Thus, if a PU was considered to be avoidable or if equivocal between avoidable/unavoidable, staff were required to attend a reporting panel to justify their preventive methods. TVN participants, therefore, indicated that the focus within some teams had moved from prevention of PUs to ensuring that if they do occur, they are considered unavoidable.

“...the teams are aiming to get an unavoidable pressure ulcer, rather than focusing on preventing that pressure ulcer in the first place” (TVN)

“...it [prevention] really is not rocket science and if you did probably about ten key elements, you would have done all, your utmost to prevent that patient’s skin breaking down and then it would be unavoidable” (TVN)

In addition, a variety of participants from different professional groups considered that the criteria to determine whether a PU was avoidable apportioned blame on staff in what was supposed to be a “non-blame” culture. Staff were, therefore, keen to avoid the reporting panel and described the need to shield themselves from the process. However, while it was reported that professions outside of nursing were also attending panels, responses indicate that accountability was still considered to be the responsibility of nurses. The focus on equipment provision by nurses appears, therefore, to accommodate the need to demonstrate adequate care.

“...I think that the avoidable unavoidable is trying to say oh it is your fault, it isn’t your fault...” (TVN)

“...everyone’s frightened about pressure sores. I think it’s something that is drilled into us, you know pressure sores must, patients mustn’t get them, we’ve got to [do] everything we can to prevent them and... it’ll be all your fault” (Community Matron)

“...the better, the bigger the mattress the more intense the mattress the more expensive... the more money they can spend...then you’ve covered yourself (Clinical Advisors – OT & Nurse)

The desire to protect themselves from the reporting process was reported several times in the focus groups and interviews. A nurse manager described the process of risk assessing a patient on arrival and if a PU was present, identifying where it had been acquired before anything else. A clinical advisor also reported that patients were sometimes referred between professional groups, which although considered to be evidence of improving collaboration, was actually identified as passing the responsibility on. Finally, documentation was suggested to be an important part of classifying whether a PU was unavoidable.

“...for staff it’s about making sure you assess that patient early on, as soon as they come onto the ward, before you’ve even said hello, you know, the poor patient will be checked over

to see if they've arrived with a pressure sore developing so that [it] can be noted and then it's all that "oh, phew it wasn't us, they came with it..." (Management - Nurse)

"what the nurses are now tending to do is where they see that somebody's at risk they are doing referrals directly to OTs ...so I think it feels like there is a bit more joined up working, but...it feels like they're passing the buck now..." (Clinical Advisor OT)

"I know people who've been to it [SIRI panel] have said that it makes you think differently about how you're documenting erm practice erm and a lot of the erm avoidable err cases, you know could've been, it could different if we'd have documented differently..." (Nurse)

4.12 Organisational factors (A10)

Almost all participants described both time and staffing as barriers to employing preventive action. Therapists indicated that they knew their responsibility, but were hampered by insufficient time to undertake PU prevention outside of what they perceived to be their role. A lack of staffing in teams was also directly associated with an increase in the incidence of PUs as suggested by some of the nurses. There was also a reluctance to involve TVNs, as they perceived this would create more work for them.

"...we've got some very good therapists. The biggest frustration they find is...they know what their role and responsibility is, but it's actually having enough time" (OT)

"...where there is [an] area where maybe there is a problem with staffing one of the first things that's noticed is that the rate of pressure sores goes up..." (Community Matron)

"...tissue viability is almost seen as...a hindrance to the team a little bit because they feel that we're creating all this extra work for them" (TVN)

Considerable variability in practice was identified by the participants, emphasised by one community nurse who highlighted differences between teams and areas. A clinical advisor identified that some teams understood the benefits of an integrated approach using the wider team's skill mix to achieve improved patient outcomes. However, other teams were

considered to only work in their own professional groups, sending referrals only if it was deemed absolutely necessary.

“...equipment is seen as OT and wounds are seen as nurses...and standing regularly is seen as physio, which to me shows that it should be multidisciplinary and don't pass this person around, work together, do a joint visit together...” (Clinical Advisor OT)

“...we don't work directly with them, but we can certainly refer...somebody may say maybe we'll try physios or OTs and we're like “oh yeah”. They would then go and assess and see if they can help” (Nurse)

The involvement of both NHS managers and local team leaders was considered to be critical in achieving a more integrated approach, particularly in teams that work in isolation. There was recognition among TVN participants and a physio participant that to achieve these changes in practice required leadership to recognise that PU prevention required more than a response from a single disciplinary group.

“It needs to come from both, education and senior managers within the NHS. People in management didn't even know what it was and we used to think why don't they ever notice us. Now they really notice” (TVN)

“I think it is about if your leader is focusing on actually this is a bigger picture issue...” (Physio)

4.13 Structural factors (A11)

Participants highlighted some practical facilitators to achieving an integrated approach to PU prevention. This included all members of the community team in one geographical location, as opposed to the practice of referrals between locations. Both a TVN and an OT from an integrated team considered that this would increase informal communication between members of the wider team and therefore facilitate collaboration. However, while locality was considered to be important, other participants from a physio and nurse management background suggested that this on its own would not facilitate collaboration.

“I think it [MDT working together in one location] just makes sense really. I know that in a lot of cases it’s just a case of picking up the telephone, but if you’re in an office and you’re all together that communication’s going to happen a lot more frequently than if you’ve got to fill out a referral form, leave a message on someone’s voicemail or send them an email” (TVN)

“...it will be down to individuals because there’s one therapies team who are in the same office as the nursing team and they don’t talk. There’s another therapy team in the same building but on opposite sides and they talk constantly” (Physio)

4.14 Other factors

Accountability at the end of life

Accountability for PUs that occurs at the end of an individual’s life, particularly when associated with the full reporting process, was considered to be unfair by some of the participants from the nursing focus group. PUs in this patient group were deemed to be inevitable as part of the dying process and, as such, were considered to be different from typical PUs. Consequently, the classification as a PU was reported to be changed by nurses to a Kennedy ulcer, therefore, indicating its nature of inevitability.

“...it’s a bit unjust us having to take patients who are end of life and we’ve cared for, you know, to a panel, because you know that is because of the dying process, their bodies are shutting down and they are going to develop those sort of marks on their body, but as of yet we still have to go to stick up for ourselves in the panel unfortunately” (Community Matron)

“...too many nurses think there is a Kennedy ulcer so I’m seeing that batted around all the time at the moment, “oh it’s a Kennedy ulcer, that’s end of life” (TVN)

4.15 Discussion

The overall median knowledge score for community healthcare staff was above satisfactory at a value of 65.4%. This represents a higher overall score than other studies who used the same assessment tool with nurses and nursing assistants. As an example, Beeckman and colleagues (2011) reported a mean value of 50% in Belgium, while Gunningberg et al (2013b) in Sweden reported a mean of 58.9%. As PU practice is traditionally the domain of the nurse it could be predicted that their knowledge would be higher, when compared with other professions. However, both OTs (69%) and PTs (67%) demonstrated a slightly higher median knowledge score. A similar median score of 69% was recently reported for both therapy groups in a UK hospital setting (Worsley et al. 2016).

The sub-themes within the knowledge assessment tool revealed that participants were more knowledgeable in the areas of aetiology and development, classification and observation, than they were in preventive measures to reduce both the amount and duration of external pressure and shear forces. In addition, it was also identified that a large proportion of staff could not identify that a lack of [tissue] oxygen represented a major cause of PU development. It is therefore of concern that staff are unaware of both the mechanism of PUs and the measures to prevent them in practice. While the alternative options of nutrition or moisture could be considered causative factors, others have determined them to be risk factors (NPUAP et al. 2014a). Nevertheless, the focus in current practice could be considered to be on treatment rather than prevention. Indeed, Panagiotopoulou and Kerr (2002) and Worsley et al (2016) both reported similar findings with preventive strategies found to be the lowest scoring category in their results.

Knowledge of preventive measures was also examined as part of the focus groups and interviews (A1). Participants highlighted equipment provision as the primary preventive measure, yet also mentioned that appropriate assessment did not always occur before equipment was prescribed. Similar focus on equipment provision was reported by nurse participants in a study by Samuriwo (2010b). Equipment provision as a 'panacea for all prevention' was questioned by others, with assessment and treatment of the underlying cause considered to be more important. The provision of more sophisticated and expensive

equipment was also considered to reduce the chances of having to take part in the reporting process. An increase in the use of more substantial equipment, such as air mattresses rather than visco-elastic foam mattresses, was also been reported in the Netherlands and Germany (Meesterberends et al. 2014). While this may indicate an increasing need for higher grade equipment for greater patient complexity, it may also suggest a generalised belief amongst healthcare staff that more expensive equipment provides better care quality.

A positive attitude to PU prevention was demonstrated overall, with an above satisfactory median score (83%). This is broadly similar to results from other studies that used the same questionnaire, albeit with nurses, rather than the wider community team. Beeckman et al. (2011) reported a mean score of 71% with a sample of nurses and TVNs in Belgium, while in Sweden and Turkey, nurses demonstrated higher mean scores of 89% and 84%, respectively (Florin et al. 2014; Aslan and Yavuz van Giersbergen 2016). Attitudes data from the community nurses in the current study represented a median score of 85%, while three other professional groups demonstrated slightly higher values, namely management staff (89%) and OT/HCAs (87%). These attitude scores were higher than was achieved by both PTs and OTs (median: 81%) in a recent UK hospital based study using the same tool (Worsley et al. 2016). While HCAs demonstrated a positive attitude, their knowledge scores (Table 19) were among the lowest of all staffing groups (60%). This should represent a concern for the efficacy of current practice as others have previously indicated that PU-related tasks are often delegated to HCAs (Young et al. 2004; Athlin et al. 2010; Samuriwo 2010a; Bååth et al. 2012; Sving et al. 2012b).

Nurses were perceived to be the most accountable profession in the current study, with participants reporting the need to protect themselves from the blame associated with PUs. There was considerable discussion about the PU reporting process, particularly related to whether a PU was avoidable or unavoidable. This was driven by the National Patient Safety Agency criteria, which was meant to promote actions to prevent a PU from occurring (NPSA 2010) (Table 2). However, while offering some guidance, the interpretation of adverse event criteria has been reported to be unreliable in clinical practice (Vincent et al. 2001; Davis et al. 2002; Baker et al. 2004; Zegers et al. 2009). Nonetheless, in the present study, participants perceived that fault was associated with the reporting of an avoidable PU. Consequently, the

focus was on the ability to classify a PU as unavoidable, rather than prevention per se. This may also provide some rationale to the findings from the attitudes questionnaire that over 30% of nurses felt that PUs were not preventable in high risk patients.

Other areas of current practice were also highlighted as important to the classification of an unavoidable PU. This included skin assessment to define if a PU was present on admission or if it had been hospital-acquired following a recent discharge. Documentation was also reported to be vitally important as this would determine whether a PU was avoidable or unavoidable, and subsequently whether the healthcare professional was at fault. Referral to other professional groups was initially considered to be an example of improved collaborative practice, but was instead highlighted as a way of transferring responsibility.

Nurses were reported to be frustrated with the increasing complexity of patients in the community and the subsequent impact on preventing PUs. Some AHPs felt that these changes in patient demographics required an associated change in both the roles and responsibilities across the community team. Indeed, an MDT approach has been suggested to assist the understanding of complex clinical situations outside of the boundaries of normal practice (NHS-England 2015), in order to transform community healthcare (Edwards 2014). However, participants in the current study indicated that there was considerable variability in how teams worked in current practice. Some teams only worked in professional isolation, drawing on other members of the same profession for support and advice. Other teams followed a multidisciplinary approach, working in parallel to one another with the same patient, but rarely collaboratively (D'Amour et al 2005, p120, Siegler & Whitney 1994, Schofield & Amodeo 1999). Finally, participants indicated that a smaller number of teams were considered to take a collaborative interdisciplinary approach, working together for improved outcomes (Satin 1994; D'Amour et al. 2005; Nancarrow et al. 2013).

Differences between team-based working practices for PU prevention and treatment have also been described in an Australian context by Macens et al. (2011). In this study, a multidisciplinary approach was described as normal practice by most participants. However a collaborative [interdisciplinary] approach was less widespread. It is interesting to note that managerial staff described the potential for collaborative practice as achieving a true balance

and blending skills and knowledge together to achieve the most effective outcomes. Similar findings were reported by Gottrup and colleagues in 2001 and Samuriwo (2012), yet barriers exist to achieving this in practice.

Key barriers were seen at the level of awareness (A2) of professional roles and the knowledge and insight to integrate these into preventative practice. Some nurse participants considered it unnecessary to collaborate with other professions given that they had the appropriate knowledge to prevent PUs. This contradicts the findings from Samuriwo (2012), who suggested that nurses should be more proactive in seeking out other professionals to assist with the prevention of PUs.

A lack of time and staffing in practice were reported as organisational and structural barriers to both the prevention of PUs and collaborative practice more generally. Participants suggested that this reduced the potential for different professional groups to become involved in PU prevention and emphasised traditional professional boundaries. Time and staffing factors have been highlighted previously as barriers to PU related practice for nurses (Moore et al. 2013; Johansen et al. 2014) and with AHPs (Worsley et al. 2016).

Participants discussed potential facilitators to collaborative practice, including education that was appropriate and relevant to different staffing groups and levels. However, as knowledge is not an independent predictor of behaviour (Beeckman et al. 2011; Demarré et al. 2012), taking into account attitudes and professional identity of participants is important to achieve effective outcomes. Indeed, cognitions have been found to influence behaviour and the implementation of an intervention in healthcare (Obstfelder et al. 2007; Wensing et al. 2013a). Others discussed the importance of leadership, both within community teams and at senior management level to influence collaborative practice in this area and implement practice change (Berwick and Nolan 1998).

Participants indicated that having all members of the team in one geographical location was important to achieve a collaborative approach. Others, however, suggested that collaboration was more about building individual relationships than the location of the wider team, even though informal discussions between colleagues were considered to be easier. Xyrichis and Lowton (2008) reviewed the factors that facilitate interprofessional working in

healthcare and reported location, team processes and interpersonal relationships (Cartlidge et al. 1987) to be important. Nevertheless, achieving these changes in community practice may be considerably difficult, given the dispersion of staff and resources in such a large organisation. It may, therefore only be practicable in the short term to focus on the individual and team-based determinants of practice.

4.16 Limitations

The main limitations of this study was the use of convenience sampling to achieve representative data from community healthcare staff. Nursing and midwifery staff from the community NHS trust represented 24% of the total workforce, while AHPs represented 8% of the workforce at the time of data collection. However, the attitudes questionnaire from each of these two groups were undertaken by 5.2% and 7.5% of the sample, respectively. This means that a representative sample of the community was not achieved, limiting the generalisation of the present findings.

A greater number of participants undertook the attitude questionnaire, as opposed to the knowledge questionnaire. While both were administered as a single online questionnaire to the majority of participants, the attitudes-based questions came first. Therefore, if participants were limited by time or called away while undertaking the questionnaire, the knowledge questions may have been neglected. However, it is also possible that the knowledge-based questions were perceived to be more difficult to answer.

The knowledge and attitudes questionnaires (Appendix I, J) used for data collection were demonstrated to be valid and reliable with nurses only, although the present study also included other healthcare staff. Indeed the process of revalidating the tool for these other professional groups was considered to be beyond the scope of the present work. This limitation was reduced by piloting the questionnaires with a variety of professionals prior to data collection and modifying according to the feedback (Section 3.3.3-4).

It is possible that some of the responses to the attitudes questionnaire demonstrated social desirability bias. Participants may have provided positive responses that did not reflect their true opinions. While this is a known limitation of questionnaire-based research, it can be

considered less significant for the present study due to the use of the explanatory mixed methods approach. Indeed, the application of additional focus groups and interviews provided context to the quantitative results, therefore supporting wider generalisability of the overall findings.

The aim of each focus group was to recruit a minimum of six participants. However, this was not achieved in two of the groups. In addition, both tissue viability nurses and podiatrists were unable to attend any of the focus groups. However, it was possible to recruit a larger cohort of staff for the multidisciplinary group representing a variety of healthcare staff. Three further interviews were conducted with TVNs as it was considered essential to explore their views as part of the study. It was not possible to recruit any podiatrists or doctors in the focus groups.

4.17 Summary of barriers and facilitators to an interdisciplinary approach to PU prevention

Knowledge (A1)

- Nurses and AHPs demonstrated similar median scores
- Poor knowledge of preventive measures, primarily focused on equipment provision across all professional groups
- A greater focus on rehabilitation was considered by some to be important for the prevention of PUs
- Some nurses felt that collaboration was unnecessary as they had the appropriate knowledge

Attitudes (A4)

- Nurses reported the highest scores in relation to the personal competency to prevent PUs sub-theme, while the lowest was demonstrated by AHPs
- Increasing complexity of patients in the community setting creates frustration for nurses to achieve prevention. AHPs believed this was a rationale for MDT involvement

- PU prevention was considered to be a priority for all participants, although there were varied responses as to which group were responsible
- Anxiety was raised by some AHPs who considered they might lose their own professional identity
- Variation in current practice across the community setting with some teams working in professional silos and others already working in a collaborative manner

Awareness (A2)

- High awareness of the impact of PUs from the majority of participants
- Some AHPs and doctors were reported to lack exposure to PUs, so had limited awareness of the clinical problem
- Discrepancy between podiatrists and TVNs over what constitutes a PU compared to other types of wounds, with resulting implications with respect to the management of these wounds
- Lack of awareness of what different professional groups could offer for PU prevention and how this would impact the outcomes for the patient

Social influence (A3)

- Considerable variability in response to the statement of whether PUs are preventable in high risk patients
- In some teams, focus had moved from prevention to ensuring that if a PU did occur it would be classified as unavoidable
- Staff described a desire to shield themselves from the reporting process through risk assessment, equipment provision, referral to other professionals and documentation

Organisational and structural factors (A10-11)

- Time and staffing levels were described as barriers to preventive action and to community healthcare staff involving the tissue viability team

Other factors

- Nurses felt that they should not be held accountable for PUs that occur at the end of an individual's life, as they were deemed to be an inevitable part of the dying process

Facilitators

- Education was required to be relevant to profession and level of experience
- Teams who already work in a collaborative manner reported improved outcomes in preventing PUs
- Involvement of leadership at local and organisational level was considered to be important to achieving an integrated approach in teams
- All members of the team in one location and the relationship between colleagues was considered to be important to facilitate collaborative practice

Chapter 5: Development of the interdisciplinary programme

5.1 Introduction

The results presented in Chapter 4 demonstrate the variability in current practice, with collaborative approaches to PU prevention poorly established. These results also demonstrate the barriers and facilitators to achieving interdisciplinary practice, categorised by individual/team related factors (A1 – A4) and organisational/structural factors (A10 – A11). These have been coded to determinants of behaviour change to inform the development of “strategies and measures to change practice” (Grol and Wensing 2013b, p46). This chapter will, therefore, describe the development of a plan to achieve an interdisciplinary approach to PU prevention (Figure 18). Nancarrow et al (2013) provides a summary of the characteristics of a good interdisciplinary team (Table 9), which were used as guiding principles for programme development. The programme characteristics are described in this chapter and Appendix M, in accordance with the checklist for group-based behaviour change interventions, developed by Borek et al. (2015). This ensures that the programme can be replicated in a clinical setting and for research purposes.

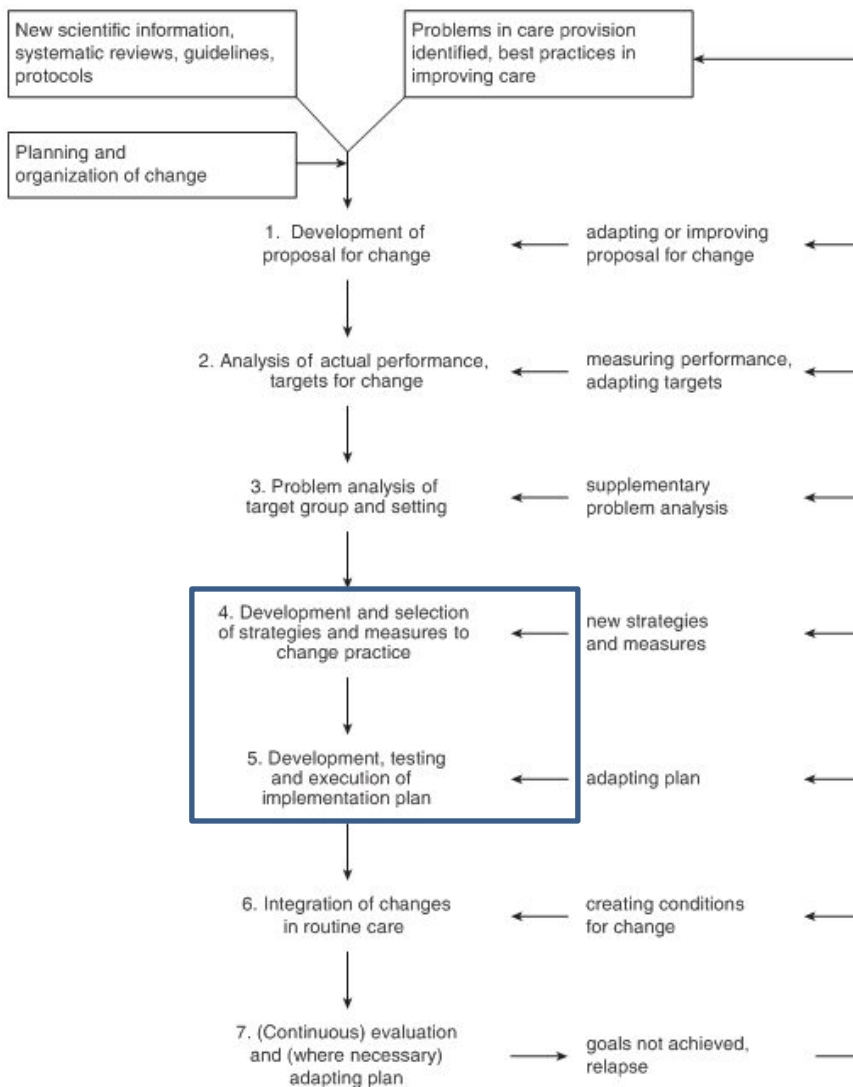


Figure 18: Implementation of change model (Grol & Wensing 2013b, p46), reproduced with permission

5.2 Development of strategies for change

Based on the questionnaires and interviews, knowledge, attitudes, awareness, social influence, organisational and structural determinants of behaviour change were identified as relevant to interdisciplinary working. These determinants informed a series of techniques to change behaviour, in accordance with the frameworks for behaviour change (Table 21). It is also considered important to tailor these strategies for change to the local context of the team (Nancarrow et al. 2013). Similar approaches have been suggested by both Grol and Wensing (2013a) and the Medical Research Council (MRC 2008) to assist change in healthcare.

Table 21: Determinants identified from results with associated techniques for behaviour change (de Bruin et al 2009, Abraham and Michie 2008; EPOC 2014).

Determinant	Techniques	Methods (Section 5.2/3)
Knowledge (A1)	Provide general information Increase memory and/or understanding of transferred information	Tailoring, Individualisation Use of images or metaphors Rehearsing or repeating information in own words, Group discussion with an expert
Attitude (A4)	Re-evaluation of outcomes of current or alternative behaviour Persuasive communication, belief selection Reinforcement of behavioural and motivational progress	Comparison of desired and actual behaviour Reflections of ambivalence between current behaviour and goal Strengthen positive beliefs and or weaken negative beliefs Tailoring Include praise and encouragement Include praise and affirming remarks Affirmation
Awareness (A2)	Risk communication Self-monitoring of behaviour Feedback of clinical outcomes	Information about costs, risks of inaction Scenario-based risk information Person keeps a record of behaviours over time Feedback provided to the person about clinical outcomes
Social Influence (A3)	Information about peer behaviour Provide opportunities for social comparison Mobilise social norm	Information about what peers do and think in relation to the target behaviour Providing social reference for the behaviour Exposing the social norm of important others
Organisational factors (A10)	Skill mix changes Integration of services Communication and case discussion	
Structural factors (A11)	Staff organisation Setting/site of service delivery	

While consideration was given to the organisational and structural factors, these were ultimately considered to be outside of the scope of this project. Therefore, the programme predominantly reflects factors related to the individual and team. Previous research on the use of multifaceted or single programmes is equivocal (Hulscher et al. 1999; Grimshaw et al. 2004). Nevertheless, Grol et al. (2013c) suggests that any programme should reflect the analysis of need, target group and any practical implications. Therefore, a multifaceted strategy was adopted, incorporating a number of the behaviour change techniques, such as providing tailored information (A1), risk communication (A2), social comparison (A3) and re-evaluation of outcomes (A4) (Table 21).

While the techniques were primarily chosen in respect of their determinants, based on the previous data, they were also identified as being deliverable in the context of the programme. Figure 19 demonstrates the relationship between the determinants and the associated techniques. Participants and TVNs/AHP advisors indicated that an educational programme was acceptable as it would be deliverable in the timescale and have the potential for future implementation. Previous research has also found this method of intervention delivery to be beneficial in a clinical setting (Section 5.2.1). The characteristics of a good interdisciplinary team (Nancarrow et al. 2013) were also embedded into the programme, including 'personal rewards', 'training and development', 'quality and outcomes of care', 'respecting and understanding roles', 'communication' and 'clarity of vision' (Table 9).

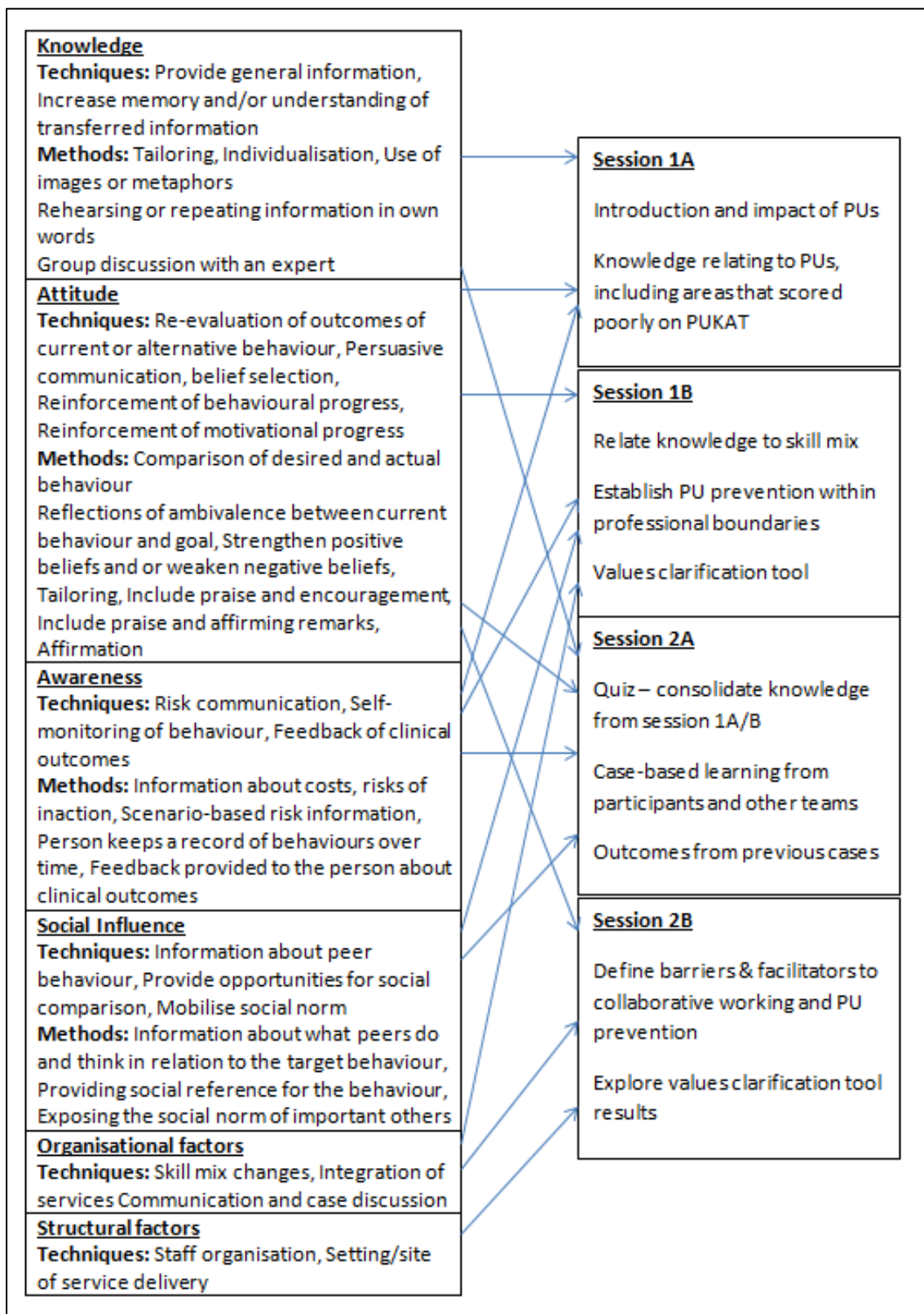


Figure 19: Relationship between determinants, techniques and the programme sessions

A series of tools were chosen to deliver these behaviour change techniques, including didactic education, group discussion with facilitation, assisted reflection using a values clarification tool and case-based learning. The rationale for the use of these tools is provided below and is linked to the relevant determinants:

5.2.1 Didactic education (A1, A2, A4)

Education was highlighted as a potential facilitator to achieving collaborative practice by focus group and interview participants. Grol et al. (2013c) further suggests that education can be used as a method for increasing participants' intrinsic motivation to change practice. While educational programmes have been reported to yield a small effect size (Farmer et al. 2008; Forsetlund et al. 2009; Jordan O'Brien and Cowman 2011), others have suggested clinically significant improvements, particularly with smaller groups (Forsetlund et al. 2009; Wensing et al. 2013b) or if preceded by a needs analysis (Burke and Hutchins 2007). The techniques used as part of the didactic approach reflected the knowledge, attitudes and awareness determinants (Table 21). These included the provision of tailored information, based on data from the exploratory study (Section 4.5) and through discussion with the TVN and AHP advisor. Participants were encouraged to take part and ask questions throughout to ensure maximal participation and understanding. This session also focused on raising awareness of the risks associated with inaction. Didactic education was used as part of session 1A (Section 5.3.1).

5.2.2 Group discussion with facilitation (A2, A3, A4, A10)

Group discussion was conducted used within the programme to achieve a number of the techniques for behaviour change. These included the re-evaluation of outcomes through reflecting on current behaviours and future desired actions, exploring peer behaviour in relation to 'mobilising the social norm' through discussing 'what peers do and think about the target behaviour' (de Bruin et al 2009, Table 21). Groups also discussed the necessary skill mix and professional roles, which are organisational factors, but were included as they reflected important discussion points in the

exploratory study (Table 21). Schmidt (1983) further suggests that group discussion can activate previously gained knowledge, which may enable participants to tailor this knowledge to their own contexts. Group facilitators, who were also experts in relation to this area of practice, ensured that the methods underpinning the techniques were met through ‘prompting, clarifying and elaborating’ on discussions (Abraham & Michie 2008; de Bruin et al 2009 p.4). Group discussion with facilitation was used as part of sessions 1B and 2B (Section 5.3.2/4) and is linked to the awareness, attitude, social influence and organisational determinants (Appendix M).

5.2.3 Values clarification tool (A2, A4)

Values are considered to be an important predictor of behaviour and attitudes (Olson and Maio 2003). The values clarification tool, adapted for use from Warfield and Manley (1990), is designed to enable participants to understand their own values in relation to collaboration, to support the group discussion, while also enabling the collation of this data into a shared vision for the team (Manley 2000). This tool was used as a method for participants to explore their beliefs in relation to collaboration before undertaking a group discussion activity and therefore was aligned to the attitudes and awareness determinants. The values clarification tool was used during session 1B of the programme, with the results presented anonymously during session 2B (Appendix M). The techniques associated with the use of this tool and with the discussion that followed included the ‘re-evaluation of outcomes of current or alternative behaviour’, awareness of behaviour and ‘reinforcing behavioural progress’ towards desired preventive action (de Bruin et al 2009, Table 21).

5.2.4 Case-based learning (A1, A3, A3, A4)

A case-based learning approach uses a clinical case study to develop the “knowledge, skills and attitude” of participants taking part in the programme (Williams 2005, p.577). This was achieved by participants presenting their own case studies and/or contributing to discussion around an example case study. In doing so, participants were able to tailor the information that they received through education to clinical

situations, while also achieving social influence through comparison to the practice of their peers (de Bruin et al. 2009). Case-based learning enabled a “collaborative team-based approach to education”, therefore satisfying the overall aims of the programme (Williams 2005, p.577). This method was used as part of session 2A and links to the knowledge, awareness, attitude and social influence determinants. Techniques also included ‘feedback and re-evaluation of clinical outcomes’ through cases from inside the team and in the wider organisation.

5.3 Development and delivery of the programme content

Content for the programme was informed by the questionnaire, focus group and interview results (Ch. 4), discussion with local tissue viability nurses and international guidelines for the prevention and treatment of pressure ulcers (NPUAP et al. 2014a). Figure 20 highlights the key focus of each session, while a manual was produced to provide instruction and content focus for programme delivery (Appendix M). This manual was also designed to enable future use of the programme in different teams. The structure and delivery of the programme was discussed with a tissue viability nurse and AHP advisor before implementation, representing further interdisciplinary input, and to some extent local tailoring for special needs. This involved meeting in the early stages of intervention development to ensure acceptability of the proposed strategies and then directly before implementation. The TVN also worked closely with the team who would test the programme and therefore provided specific input to ensure local relevance.

The programme was conducted over two non-consecutive half-days, with each half-day separated into two sessions. This approach was adopted as delivering education over multiple days is suggested to be more effective than delivering all content in a single day (Wensing et al. 2013b). There are also pragmatic reasons for conducting the educational programme over two separate days, such as the practicalities of bringing a good proportion of the team together. The study aimed to achieve a wide variety of community-based healthcare staff, which is considered to reduce the potential for apathy and obstruction to new ways of working (Lynton and Pareek 2000a). The first half-day was undertaken in a locally hired room, which provided space for didactic information delivery via presentation

and also two sets of tables and chairs for group-based working and discussion. The second half-day was conducted at the hospital in which the team were located and included the same room layout.

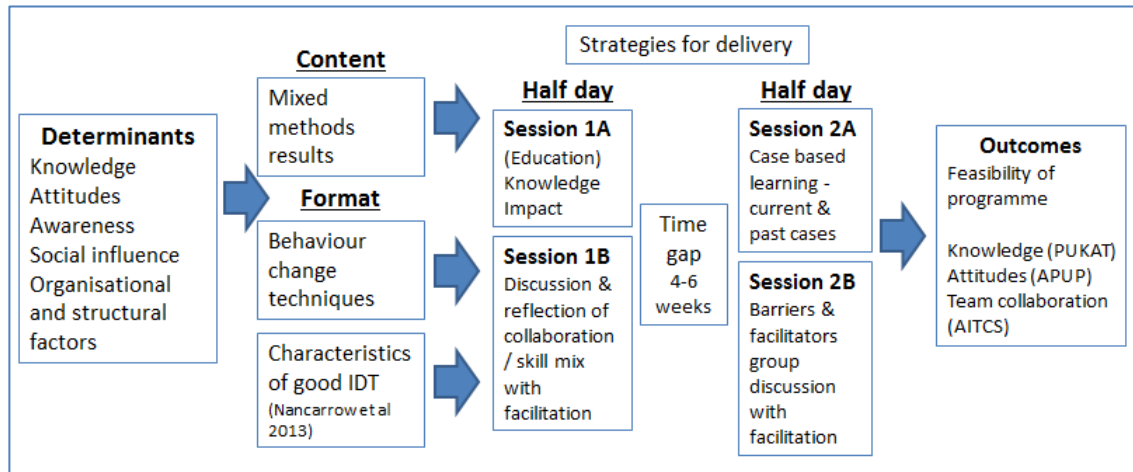


Figure 20: Format for the behaviour change programme

The first session on day one utilised a didactic approach, while the second had a greater focus on group discussion and interaction. This combination of approaches to interventions has previously been reported to improve healthcare practice and outcomes (Beaudry 1989; Owen et al. 1989; Forsetlund et al. 2009). A mixture of delivery methods were utilised to maintain participant’s attention. This has been suggested to be an important consideration in the design of an effective programme, as participants are considered to have short, but frequent losses of attention, during taught content (Forsetlund et al. 2009; Bunce et al. 2010; Wensing et al. 2013b). The programme was delivered and facilitated face-to-face by the researcher, a tissue viability nurse and a clinical advisor AHP from the community NHS Trust. This enabled interaction and engagement between the team and the researcher, while also introducing external professionals who could provide clinical support longer term.

5.3.1 Session 1A

The first session (1A) included themes that scored poorly from the knowledge assessment tool. However, while aetiology and development and risk assessment categories scored highly with registered staff, this was not the case for HCAs/RAs, therefore these categories were also included. Preventive measures scored poorly across all groups and therefore

received particular attention. This session also reviewed the impact of PUs on patients, society and healthcare professionals. Session one, therefore, encompassed both the knowledge and awareness determinants as well as 'personal rewards, 'training and development' and 'quality and outcomes of care' from Nancarrow et al (2013) (Table 9). This session was conducted jointly by the researcher and a tissue viability nurse from the community NHS Trust with experience in presenting this type of content.

5.3.2 Session 1B

Participants were asked to complete the values clarification tool on team collaboration (adapted from Warfield and Manley (1990), Appendix M) in order to encourage thinking about working together. The aim of session 1B was to apply the knowledge gained in the first session to the team's skill mix and establish PU prevention within professional boundaries at both the individual and structural levels. In order to achieve this, participants were asked to work in small multidisciplinary groups to establish the role and responsibility of different professionals in light of the risk factors for PU formation. Participants were also encouraged to make reference to professional standards for practice which were made available to them. It was considered important to integrate knowledge with professional roles in order to engage different members of the community team that may not have previously recognised a role for themselves in PU prevention. Each group were joined by either the TVN or clinical AHP advisor to 'prompt, clarify and elaborate' (Abraham & Michie 2008; de Bruin et al 2009 p.4). This second session afforded the opportunity to tailor the knowledge gained from session 1A, strengthen positive beliefs about PU prevention across the community team and enable social comparison to peers. These techniques for behaviour change were related to the knowledge, awareness, attitude and social influence (Table 21).

A four week break between sessions 1B and 2A was instigated to encourage participants to apply the knowledge gained from sessions 1A and 1B in their practice. This approach is based on the work of Lynton and Pareek (2000b), who have suggested that educational programme participants will explore relevant topics of interest to them and then try the new behaviour, assess its effectiveness, before trying to modify it for themselves. A four week period was chosen to ensure adequate time for staff to implement the knowledge gained into practice.

Each participant was provided with a case study template to record their practice during this four week period (Appendix M). Participants were then asked to feedback on these case studies during session 2A.

5.3.3 Session 2A

The aim of the first session on day two (2A) was to consolidate the knowledge gained from session one through the application of a short quiz and then to hear from participants about how they had applied it into practice. To achieve this, a case-based learning approach was adopted. Participants were encouraged to share case studies from their own practice that had both positive and negative outcomes. An additional case study was also prepared by the clinical AHP advisor and presented to the team. The clinical AHP advisor who facilitated session 2A had previous experience of case-based learning, to support participant satisfaction and greater knowledge acquisition (Hay and Katsikitis 2001). This session was also linked to the knowledge, awareness and attitude determinants through the tailoring of knowledge to real life scenarios, re-evaluation of outcomes and direct feedback of behaviour (Table 21).

5.3.4 Session 2B

Session two on the second day (2B) explored the practicalities required to achieve collaborative working in the community team. Participants were asked to provide feedback on the barriers and facilitators experienced in their own practice and to identify how integrative working could operate in their own team. This was achieved through facilitated group discussions. The facilitators of these groups (TVN or clinical AHP advisor) used guides prepared by the researcher to structure the feedback received into individual, team or organisational factors (Appendix M). This process of exploring the realities of practice has been suggested to be important to achieve the proposed changes into practice (Lynton and Pareek 2000b). This session was also utilised to explore the feasibility of the programme with participants. The facilitators had predefined questions, based on the parameters shown in Table 22, and collated responses for each group. This overall session was designed to take account of the attitudes determinant in terms of reinforcing behavioural progress and

achieving affirmation of the overall aims and objectives of the programme. Both organisational and structural determinants were also considered in terms of the integration of the skill mix and staff organisation.

5.4 Feasibility of the programme's implementation

This programme was implemented with a single group to review its feasibility (Ch. 6). Feasibility refers to the assessment of the practical factors implicated in delivery of the programme into practice (Sidani 2015). In this instance, feasibility also referred to the potential scalability of the protocol to explore effectiveness of the programme (Giangregorio and Thabane 2015). A series of feasibility parameters were defined to reflect these aims (Table 22). The assessment methods used to explore these parameters are described in Chapter 6.

Table 22: Feasibility parameters (* represents the factors of interest in relation to the facilitators)

Feasibility parameters	Stakeholders	Factors of interest
Programme workability	Participants Facilitators*	Timescale of programme Workability of programme format Positives, negatives about the programme Learning outcomes Usability of manual* Programme fidelity using manual*
Programme effectiveness	Participants Facilitators*	Beliefs about effectiveness of programme Awareness of role in PU prevention Beliefs about own effectiveness for PU prevention Group facilitation feedback*
Feasibility of measurement	Participants	Time to complete outcome measures Percentage response rate of outcome measure items Responsiveness of measures Sensitivity of the outcome for change
Target sample	Participants Researcher	Target sample achieved Attendance at both programme days Retention of participants from day one to day two
Expansion of method to larger study	Facilitators* Researcher	Implementation of manual on a wider scale Appropriateness of outcome measures for MDT audience Efficacy of an experimental methodology
Adherence to protocol	Researcher	Instances of non-adherence to protocol

Chapter 6: Feasibility assessment of the interdisciplinary programme

6.1 Aims and Objectives

6.1.1 Aims

1. To review the programme's feasibility for clinical practice and future research
2. To encourage interdisciplinary working for PU prevention in the community

6.1.2 Objectives

1. To assess the programme's feasibility with participants from one community team and programme facilitators
2. To explore whether the programme can encourage interdisciplinary working for PU prevention

6.2 Study approach and design

A small scale feasibility study was designed and undertaken with one community team (Figure 21). This was chosen due to a lack of time and resources to undertake a larger feasibility study that includes a control group. A mixed methods approach to assessing feasibility was undertaken, including semi-structured interviews and three questionnaires. These questionnaires included the knowledge and attitude tools used previously (Beeckman et al 2010a, b) (Section 3.3.1-2, Appendix I, J), and an assessment of interdisciplinary team collaboration scale (AITCS) (Orchard et al. 2012) (Table 23, Appendix N).

6.3 Sample and setting

The study aimed to recruit a community team that was identified as not currently using an interdisciplinary approach for PU prevention. This included nurses, healthcare assistants, occupational therapists, physiotherapists and rehabilitation assistants. The team was identified by tissue viability nurses and local area lead clinicians. Team members were invited to participate in the study through an email from their team leader which included the participant information sheet (Appendix G). Participants were reminded that their involvement was voluntary, in accordance with ethical approval (FoHS-ETHICS-2017-26132 / IRAS: 229103). Team members who were interested in taking part in the interviews informed their team leader. This information was then passed onto the researcher to arrange an appropriate date and time. Participants signed a consent form before undertaking the first interview or before the first session of the programme. The programme was undertaken in the team's community location and at an appropriate time to avoid disruption to clinical routines.



Figure 21: Feasibility study outline

6.4 Data collection and analysis

Participants were asked to complete a series of demographic questions. These included age, gender, role, number of clinical years' experience post-registration and level of previous education in tissue viability. These data were used to explore differences between professional groups in relation to the feasibility parameters.

6.4.1 Semi-structured interviews

Five team members were recruited to take part in an individual semi-structured interview, before and after the programme. This included nurses, a healthcare assistant, physiotherapist and an occupational therapist. The topic guide for the pre-programme interviews was based on the results of the previous study (Appendix K). This provided the opportunity for participants to discuss their own views in relation to interdisciplinary approaches to PU prevention. This feedback also provided a source of information for tailoring the programme to the team in question. The post-programme interviews focused on the feasibility of the programme in relation to the parameters set out in Table 21.

Each interview was arranged at a suitable time for the participant and took no longer than one hour. The interviews were digitally recorded to allow transcription and data analysis at a later date. If participants were unable to attend the second interview on the planned date/time, other times and/or locations were sought. If these participants were still unable to attend, their pre-programme interview data would be used alone in the analysis.

6.4.2 Data collection of feasibility criteria

Data were collected during both programme sessions in relation to attendance numbers, skill mix and staff retention. The number of staff who reported collaborative working between sessions was also recorded. The feasibility of the programme was discussed in groups as part of the second day. All participants received a feedback form at the end of the programme to record additional anonymous feedback (Appendix M).

6.4.3 Attitudes to PU prevention questionnaire (APUP) and Knowledge assessment tool (PUKAT)

The APUP and PUKAT are reliable and valid tools (Section 3.3.1-2), although have not been previously used as outcome measures for a behaviour change programme (Beeckman et al 2010a,b). It was, therefore, important to explore their feasibility for future use, given that knowledge and attitudes were key determinants for change (Section 4.3-4). These tools were considered to be appropriate for use in this feasibility study, having been found to be acceptable and usable in both the pilot and data collection conducted previously (Section 3.3.4/Ch. 4).

Participants were asked to complete the tools in paper form and were provided with opaque envelopes to maintain confidentiality. Each envelope was coded to the relevant consent form so that comparison could be made between pre- and post-assessment scores.

6.4.4 Assessment of Interprofessional Team Collaboration Scale (AITCS)

The AITCS includes 37 statements across three categories (Table 23) that represent the characteristics of interdisciplinary collaboration (Orchard et al. 2012) (Appendix N). The scale uses a 5-item Likert scale (5 = Always – 1 = Never) and has been established to have construct and content validity with a variety of healthcare staff (Cronbach's α : 0.98, Intraclass correlation: >0.75) (Hellman et al. 2016).

Table 23: Assessment of Interprofessional Team Collaboration Scale (AITCS) sub-scales (Orchard et al. 2012)

AITCS sub-scales	
Section one:	Partnership
Section two:	Cooperation
Section three:	Coordination

6.4.5 Data analysis

The interview data were transcribed, coded and developed into categories in relation to the programme's feasibility and barriers and facilitators to interdisciplinary PU prevention. Organisational factors were collated and drafted into a report alongside the other study findings and presented to the community NHS Trust.

Data collected from the APUP/PUKAT questionnaires, AITCS and participant demographics were analysed descriptively using median and interquartile range values. These were chosen due to the non-normal distribution of the small sample, therefore reducing the impact of outliers in the data. These data were used to draw indications about the sensitivity of the outcome measures to detect a change in a larger scale future study.

6.5 Ethical considerations

Ethical approval was gained from the University of Southampton, Faculty of Health Sciences ethics committee (Ref. 26132) and the Health Research Authority (IRAS: 229103 / Ref. 18-HRA-0177). The NHS Trust confirmed capability and capacity before data collection began.

6.5.1 Consent

Tissue viability nurses identified an appropriate team to undertake the programme. The team leader was provided with information about the study and planned programme. Once agreement was obtained, discussions took place to tailor the programme to the team. Participant information sheets were provided electronically before the programme took place. Team members were asked to sign the consent form, with additional consent sought from interview participants.

6.5.2 Anonymity and confidentiality

Confidentiality and anonymity was maintained throughout the study in line with the standards set out in Section 3.4.2.

6.5.3 Right to withdraw

All participants were made aware of their right to withdraw from the study and/or their right to withdraw their data at any time.

6.5.4 Harm

There were no direct risks involved with taking part in this research. Further information can be found in Section 3.4.4.

6.6 Results of the feasibility study

6.7 Demographics

Fourteen participants were recruited from one community team to take part in the feasibility study. The collected demographics indicated a multidisciplinary skill mix (Table 24), with a wide range of age groups taking part (18-25 – 55-64 years). The majority of participants reported either limited experience (0-4 years, n=6) or a large amount of experience (20-30+ years, n=7). Five members of staff took part in the pre-programme interviews, including two nurses, a healthcare assistant, a physiotherapist and an occupational therapist. Three participants returned for the post-programme interviews, including two nurses and the physiotherapist.

Table 24: Demographics for participants who took part in the programme.

Team participants in session 1	Number of participants
Healthcare assistant**	1
Staff nurse	2
Nurse (Community Integrated Lead)	1
Occupational therapist*	3
Physiotherapist	2
Rehabilitation assistant	3
Associate practitioners	2

*One occupational therapist did not take part in session two of the programme

**At the time of the first session, one participant identified as a healthcare assistant, although was trained as a nurse, but without formal registration. In the second session, this participant had received her registration and was therefore classified as a registered nurse

6.8 Feasibility

Results from the interviews, in-session discussions and facilitator questionnaires have been categorised in relation to the feasibility parameters in Table 22.

6.8.1 Timescale of the programme

The programme's format and timescale was considered to be acceptable by participants and facilitators. The two half days taken away from clinical practice was a concern for some, but was preferred to a whole day format. The two separate days were reported to assist the overall pace of the programme.

“...I thought it was really good, it was the right kind of length... I thought it was structured very well and we moved through it at a steady pace which I thought was really nice. There was no element that you felt really rushed and no element that you felt that dragged...” (Nurse)

“Two afternoons allowed us to go away, certainly working with my patients, having that chance to collaborate a little bit, having been tasked to do that...that was a real strength and it gives you time to reflect from the first afternoon...” (Physio)

Undertaking the programme over two afternoons was considered to be effective by participants, highlighting that this time would normally be used for medical notes, rather than patient visits. However, in doing so, the medical notes were required to be completed at a later time, causing delays for the clinicians. Some team members who did not participate in the programme were also required to provide additional clinical cover for those taking part.

“For the attendees good, but those left behind, they aren't so happy, 1st day some staff worked overtime to do patients” (Comments from one group discussion on programme feasibility)

The four week period between the two sessions was considered to be appropriate by two interview participants. These members of staff reported that they were able to apply the information from session one in their own practice. Conversely, the third interview participant found it difficult to complete the case study within the four week time period.

“...it [the four week gap], probably felt about right, any longer and when, when we were tested on our knowledge, I would have forgotten what you taught us in the first session, and any shorter and it wouldn't have had time to see the range of patients...” (Physio)

“...it was very difficult to try and find a patient that was appropriate for that so maybe a couple of extra weeks, maybe would have given us that window of opportunity” (Nurse)

One participant considered that the programme could have included a third half day, held months later. This was considered as a way of following up and exploring the longitudinal outcomes of the two earlier sessions.

“...I wonder if even maybe a meeting further down the line, sort of three or four months after so you know, has this you know, has what you’re doing changed on a day to day basis since we sat through this, it would be interesting to see I think” (Nurse)

6.8.2 Workability of programme format

Both participants and facilitators reported that the programme was well structured and organised. Participants considered the programme to be a high standard for training and were positive about the overall concept and delivery. One participant highlighted the opportunity to step back from day-to-day practice and reflect on current and future working. Taking part in the programme and research was also considered by staff to be a privilege.

“...the way it was set up, I really had no concerns or issues with it whatsoever, I didn’t come away from the set up or the way it was structured or organised thinking oh do you know what, it would have been better if they did it like this, this and this. I think the idea of it was very good” (Nurse)

“It was lively and interesting and entertaining...” “I thought it was, I used the words at the time, gold standard for training, it...also makes us feel very special because we know we’re part of the research and that all feeds into it doesn’t it...it was such a privilege to be on those two afternoons” (Physio)

6.8.3 Feasibility of individual programme elements

Participants and facilitators provided feedback on individual programme elements (Section 5.2). This feedback is collated by programme element below:

Group working with facilitation

The group working elements of the programme were considered to be useful as it provided participants a forum for open discussion. However, it was also highlighted that some participants were less confident to speak out in this environment.

“...personally I quite enjoyed the group work, but I think it’s always a little bit dicey, because what you tended to find both times is that you would have people that would partake in it and people that wouldn’t and that’s not because they didn’t want to but people are shy...” (Nurse)

“I liked having erm people from different areas to discuss and kind of go over pressure area points and yeah tissue viability and erm from a therapy point of view, but erm, no I don’t think there was anything that I disliked about it...” (Nurse)

The facilitated approach to group work was considered to be beneficial, in particular it ensured that there were ground rules established for the group discussions. One of the groups required a greater level of facilitation than the other. The group with a greater number of registered staff and more experience required less support due to their existing relationships. This team also reported that much of the programme content was a refresher and desired a greater level of detail. In contrast, the team with a high proportion of unregistered staff and less experience, sought more support. However, the latter group was more engaged with the content and reported improved knowledge, awareness and team collaboration.

“...they [facilitators] were very good at making sure you didn’t span off on tangents and that you were all listening to one person’s conversation, rather than three...” (Nurse)

“...they didn’t need much facilitation. Groups who did [not] know each other- this would need more” (TVN Facilitator)

Case studies

The case studies enabled participants to assimilate the knowledge gained from the first session into their own practice. Seven of the thirteen attendees completed case studies and provided feedback during the programme. One nurse participant reported that the case studies facilitated the team to think more widely than their standard day-to-day practice. The case study presented by the AHP facilitator also provided an opportunity for a wider perspective.

“...you come back and bring that, those reflections to the second afternoon” (Physio)

“...the case studies...it’s pushing you to think, whereas so often you go out, you do your job, you come back and it becomes habit doesn’t it and you don’t see outside the box” (Nurse)

Didactic delivery

A didactic approach was used for the delivery of information about PU prevention. A particular focus was given to the categories of the PUKAT that scored poorly during the previous study (Ch.4). The knowledge-based learning outcomes are reported in Table 25. Participants were divided over the level of information presented, with some reporting that it was appropriate, and others wanting greater detail. Some nurses also considered that the terminology may have been difficult for unregistered staff and therapists.

“...I think that the information that you gave was applicable to everybody and that everybody would have taken something from that” (Nurse)

“Needed more depth as most knew this and was a refresher. Worth exploring options they didn’t know about” (TVN Facilitator)

Values clarification tool

Participants undertook the values clarification tool in order to stimulate their own thinking about team collaboration. Group discussion followed, although participants found this part of the programme to be too focused on theoretical approaches to collaboration. Participants also suggested that the amount of paperwork in the programme was a burden.

“The idea of spending, an hour was it, talking about collaboration in a round table is, it was great and has helped and informed the team...” (Physio)

‘Theory – collaboration as it is a research project’ (Comments from one group discussion on programme feasibility)

Future programme effectiveness

Participants were asked during group discussions and in the post-programme interviews if they would change anything about the programme. Practical training was highlighted as particularly important, with role play and complex case studies identified as options for the future. One of the facilitators also suggested a section on new developments for PU prevention to encourage learning.

“I thought it worked actually very well...it’s a shame you couldn’t bring in any more practical, but I don’t mind a bit of teaching and I don’t mind a bit of chatting around the table either...” (Physio)

“Second session having a slot on new developments in PU prevention so they can still learn and explore” (TVN Facilitator)

Although the focus of the programme was PU prevention, some participants wanted information on what actions to take after a PU is identified. Finally, one participant considered that a greater degree of integration between groups would have been beneficial for learning opportunities.

“Outline of procedure when wound identified” (Answering ‘what could be improved for the future?’ during one group discussion)

“...mix the tables up a little bit more erm so that you had, you gave the more junior, lower bands, more exposure to the 6s and 7s while they were having those discussions...” (Physio)

6.8.4 Usability and fidelity to the programme manual

The facilitators were provided a copy of the manual (Appendix M) and individual group session guides before the first session. The researcher also met with both facilitators to discuss the aims and learning objectives, as well as answer questions. The programme

followed a structured approach using the manual for guidance, with limited deviation. Both facilitators reported that they had sufficient information to undertake the programme and that participants engaged either “mostly” or “totally”.

6.8.5 Target sample

The target for recruitment was up to twenty participants representing the diversity of a community NHS team. This was achieved, with fourteen participants taking part in the first afternoon and only a single drop out in the second due to illness. The retention of staff was important to ensure the workability and effectiveness of the programme. This was achieved through careful planning with the team leader to ensure an appropriate date, time and location. Although this approach creates an additional planning burden, the facilitators reported that it would be feasible if staffing cover could be arranged. It was also considered to be important for attendees to understand the concept of the programme before attending, in part to support a future commitment to attend both sessions. Achieving an appropriate and representative skill mix was also important. While this was achieved with registered members of staff, the mix of unregistered staff was not representative. Indeed, there were a greater number of RAs, while the only HCA in attendance was a qualified nurse, awaiting professional registration. Nevertheless, participants considered the skill mix overall to be reflective of their larger team, both in role and experience.

“I thought that [skill mix] was very good to be fair, because you had sort of healthcare assistants, you had nurses, OTs, physios, I do think you managed to get a good mix from it. Not only in terms of different professions, but different levels as well...” (Nurse)

“I don’t think you had any band 3s or band 4s from our [nursing] team, and I think that would have been interesting to see because...I think they’re very much, got a nursing head on them” (Nurse)

6.8.6 Learning outcomes

The programme’s learning outcomes were based on the determinants of behaviour change established through the previously collected results (Ch. 4). The individual learning outcomes for each session are shown in the manual (Appendix M). Participant feedback on the programme has been matched to the relevant learning outcome/determinant of change in Table 25. Attitudes represented the largest determinant of change; organisational and structural factors were outside of the programme’s scope.

Table 25: Post-programme feedback linked to determinants and learning outcomes

Determinant / Learning outcome	Participant/Facilitator feedback
Knowledge	<p>“...it was really useful for me, especially having just qualified to consolidate that pressure ulcer knowledge... and I became aware of the services that were available and the things that we could do” (Nurse)</p> <p>“...it was nominally about learning about pressure care, but so much more came out of it and that’s really difficult to measure, but it’s around the team working...” (Physio)</p>
Attitude	<p>“I feel more confident to fulfil my role within that network of people who are involved” (Physio)</p> <p>“...looking back after the second session, I had a conversation with someone that actually I don’t know what is causing this, I could do with someone from a different opinion, different area of expertise to say actually have you thought about this? And for that reason, we’re having a joint visit today with therapy to see if we can get to the bottom of what is causing something...I think that will be really beneficial...” (Nurse)</p>
Awareness	<p>“...one of the things that I pulled out of the second session that we did, it makes you realise how very important it is to work together and you can see how people fall through the net less when you all work together...” (Nurse)</p> <p>“...the posture advisor, I wasn’t even aware she existed, so things like that were really useful and I do think you...have a tendency to get a bit bogged down in your own job, so you focus very much on your own role and what you’re doing, whereas in actual fact when you take a step back and see, we could be working more effectively” (Nurse)</p>
Social Influence	<p>“...you look at how well we could all work together...” (Nurse)</p> <p>“I think one thing that did come out of it is a lot of the time you speak to these people and you never put a face to a name and I know that sounds really silly, but it gave us the opportunity to meet each other and</p>

	therefore feel more comfortable at starting those conversations...” (Nurse)
Organisational Structural	“...it was only because of that course that we thought actually no, let’s just go together and not duplicate and that’s been a really big benefit” (Nurse) “...that easy to and fro of snippets of information is much easier now because we’ve met face to face...so it’s not just the fax, the paper that comes through, the email comes through, but they feel much more confident about picking the phone up and just discussing subtleties” (Physio)

6.8.7 Measurement feasibility

Three questionnaires were used by participants, before and after the programme, to review their feasibility as outcome measures. These results are presented in Tables 26-28 for feasibility purposes only as the study was not powered to assess effectiveness.

Knowledge Assessment Tool (PUKAT)

Table 26 provides a summary of the knowledge scores before and after the programme. The median knowledge score achieved by participants showed no difference from pre to post-test (69%, 18/26). All participants achieved a satisfactory score during the pre-assessment (>60%), while one member of staff dropped below this level in the post-assessment, with a score of 42%. However, overall there were no trends in the results before and after the feasibility programme.

Table 26: Pre and post-test PUKAT scores

PUKAT	Pre (n=14)		Post (n=13)	
	Median	Range	Median	Range
Total PUKAT score Max: 26	18 (69%)	16-22	18 (69%)	11-21
Sub-domains				
Aetiology & Development Max: 6	4 (67%)	3-6	5 (83%)	4-6
Classification & Observation Max: 5	3 (60%)	2-4	2 (40%)	0-4
Risk Assessment Max: 2	2 (100%)	1-2	2 (100%)	0-2
Nutrition Max: 1	1 (100%)	0-1	1 (100%)	0-1
Preventive measures Max: 12	8 (67%)	5-11	8 (67%)	6-9

Attitudes to PU Prevention Instrument (APUP)

Table 27 provides a summary of the pre- and post-programme attitude scores. There were similar median scores achieved during the pre-test period (83%, 43/52) and post-test period (79%, 41/52). Overall, both pre- and post-test data identified above satisfactory level (>75%) attitudes to PU prevention. There were no changes between the time points.

Table 27: Pre and post-test attitudes scores

APUP	Pre (n=14)		Post (n=13)	
	Median	Range	Median	Range
Total APUP Max: 52	43 (83%)	36-45	41 (79%)	38-47
Sub-domains				
Personal competency Max: 12	9 (75%)	7-12	9 (75%)	7-12
Priority Max: 12	11 (92%)	8-12	11 (92%)	8-12
Impact Max: 12	9 (75%)	7-12	9 (75%)	8-11
Responsibility Max: 8	6 (75%)	6-8	6 (75%)	4-8
Confidence Max: 8	6 (75%)	5-7	6 (75%)	5-8

Assessment of Interprofessional Team Collaboration Scale (AITCS)

The pre and post-test median scores for the AITCS are displayed in Table 28. A small improvement (median difference =3%) in the overall scores following the programme was observed. However, there were no changes in the scores for the sub-categories.

Table 28: Pre and post-test AITCS scores

AITCS	Pre		Post	
	Median	Range	Median	Range
Total AITCS	135 (73%)	76-165	141 (76%)	114-163
Partnership	75 (79%)	60-84	76 (80%)	58-86
Cooperation	44 (80%)	38-50	43 (78%)	38-53
Coordination	21 (60%)	13-31	23 (66%)	13-28

These measures were chosen to reflect some of the key aims and determinants of the programme, yet appear to lack sensitivity to show a meaningful difference in these areas. Particularly when compared to the more in-depth qualitative responses. Two interview participants suggested that, while useful, the programme was time consuming and that the paperwork element represented a burden. The terminology used in the questionnaires was also identified as a problem for some participants. Indeed, the researcher was asked to clarify a number of statements used in the knowledge and AITCS questionnaires. Notwithstanding these issues, all participants completed all three questionnaires in the allotted time.

“I think there was quite a lot of paperwork and that was quite time consuming, but equally I could accept that it needed to be done...” (Nurse)

“...things like terminology and things like that...I’ve picked up over the years...that sort of thing was highlighted erm and what we mean...by things and also...for the therapy teams as well...” (Nurse)

6.8.8 Additional Interview results

Beyond the feasibility assessment, the interview results also highlighted a number of contextual factors that influence PU practice in the community, which demonstrate close similarities to the data reported in Chapter 4. Briefly, these included:

- A Reactive approach to PU practice

A focus on treatment over prevention was highlighted by participants. Barriers to preventive practice were described as time, capacity and in some cases a willingness to change. The nature of practice in the community also influenced a reactive approach. However, participants also recognised the need for a preventive mindset, with a suggestion that therapists may be most appropriate for this. The support of local and organisational leadership was also considered important to achieve this.

- Reporting of PUs

Nurse participants reported feeling fearful of reporting an avoidable PU. One participant suggested that PUs were viewed very differently depending on where the PU had originated. If the patient came onto the community caseload with a PU, nurses were less fearful as the PU would be considered unavoidable.

- Role and responsibility

While PUs were considered to be everyone's responsibility, nurses reported that they still received referrals from other professionals for skin assessment. However, participants also suggested that there was some considerable overlap between roles. Nevertheless, when asked specifically about role and responsibility, nurses were considered to be responsible for treatment, OTs for complex equipment and physios for mobility.

- Team communication

Participants highlighted that, although joint working was considered of value, in practice it was only for complex cases involving existing PUs. A lack of communication between different professions was described as a barrier to effective teamwork. Current practice

provided limited opportunity for team-based communication, with MDT meetings described as lacking appropriate time for discussion about the wider caseload. Phone conversations or electronic medical notes were the other methods of communication described, due to the separation of team members by location. Participants considered that enhancing the communication between team members would improve the effectiveness of the team.

6.8.9 Summary of participant feedback for future implementation

Participants considered that the programme was enjoyable and beneficial, with the format allowing good application to practice. Overall, the programme elements were deemed acceptable, with application for all team members. However, there were concerns over the level of information provided, with some wanting greater detail and others concerned by terminology used. Some elements of the programme were also considered to be too theoretical, leading to a desire for more practical elements in the future. There was also frustration about how to implement the knowledge gained, given some of the organisational and structural barriers. It may therefore be prudent to include some practical elements relation to PU prevention and link the programme with a wider implementation plan.

6.9 Discussion of the feasibility results

Two objectives were defined in section 6.1 for reviewing the feasibility of the programme and will consequently form the basis of this discussion:

6.9.1 Objective 1: To assess the programme's feasibility with participants from one community team and programme facilitators

The feasibility of the programme was assessed through the use of qualitative measures, both within and following the programme. Participants undertook a group discussion as part of the second session, while three participants agreed to a post-programme interview. The majority of participants enjoyed the programme format and highlighted the benefits of being able to come together as a team. This was particularly important, given that community

teams are sometimes based in different locations (Section 4.8 / 6.8.8) and divided into 'nursing' and 'therapy' teams. This separation by professional groups may lead to 'professional socialisation', in which professional identities become closed and wider teamwork is considered to be unnecessary (Clark 1997; Sinclair 1997).

While team involvement in the programme identified considerable benefits, there were also a number of organisational barriers to its future feasibility. In particular, it caused time away from clinical practice which required additional cover to ensure staff could attend. The inclusion of the whole community team may have been advantageous for the promotion of interdisciplinary collaboration. However, this would have proved logistically challenging, given the limited resources available to cover the caseload. Future implementation could therefore require additional dates for those who were unable to attend the initial meeting. This would ensure that all team members were able to take part, that the cover was shared and ultimately that there was a clear vision for the team to implement (Nancarrow et al. 2013).

The use of facilitators for the group discussions ensured that participants were able to gain the most from these sessions (Harvey et al. 2002). In this study, participants considered their involvement to be beneficial as they were also experts in this area of practice. This also ensured that participants were made aware of future support that was available and provided greater confidence in the programme's delivery. Providing this support during the sessions and for future practice has been reported to be important components of effective training for teams (Weaver et al. 2014).

6.9.2 Objective 2: To explore whether the programme can encourage interdisciplinary working for PU prevention

Participants indicated that the programme built confidence in the potential of their own role as part of the wider team in prevention strategies for PUs. This is encouraging, given that the programme was designed to explore how the role and knowledge of individuals could be used collectively. The programme was also considered to encourage interdisciplinary working

in relation to other areas of practice , demonstrating the benefit of using the interdisciplinary framework by Nancarrow et al. (2013).

Knowledge and attitudes represented key determinants of change in relation to achieving an interdisciplinary approach to PU prevention (Ch. 4). Team collaboration was also identified as an important outcome. Three outcome measures were chosen to reflect these parameters (Section 6.4.3-4) and used before and after the programme to assess their feasibility. The results revealed little or no difference between time points, across all measures. However, the study was not designed or powered to deliver statistical changes in these measures and power has been directly associated with responsiveness (Fok and Henry 2015).

The knowledge and attitude measures were considered to be effective outcomes for measuring change in educational programmes (Beeckman et al 2010a, b). Indeed, both tools had strong reliability results, measured through intraclass correlation coefficients, and can be considered responsive to change as a result (Fok and Henry 2015). The APUP also used a 4-item Likert scale, which can be considered responsive to change, due to not providing a neutral response option.

There are, however, issues to consider regarding the appropriateness of the outcome measures. Although the tools had strong reliability and stability over a one week test-retest period (Beeckman et al 2010a, b), this is substantially different to the four week period in this research. This may have influenced the tools' consistency and ultimately their responsiveness to change. Furthermore, the high baseline scores may have caused a ceiling effect for change. The tools were validated with nurses in Dutch and Belgian hospital settings, yet in this study were used with a variety of healthcare staff in the community. Indeed, two Swedish studies found that the content of the PUKAT and the APUP was more difficult to understand and less relevant to their local context.

The PUKAT is considered to identify only 'declarative' knowledge, rather than higher order knowledge such as 'analysis' and 'synthesis' (Demarré et al. 2012). However, the interdisciplinary programme required participants to engage more in these higher order functions. It is, therefore, possible that this outcome measure was not sensitive enough to detect the more complex changes associated with the programme.

Participants may have rushed through the measures at the end of the programme without due focus on the content, given that it was the end of the afternoon. This may have been further exacerbated by the length of the team collaboration scale (AITCS), which consists of 37 questions. The AITCS has been suggested to be appropriate for exploring changes in team culture (Orchard et al. 2012). However, culture change is a wide ranging concept (Reeves et al. 2010) and it is debatable whether a single measure could incorporate all the necessary variables to detect a difference. Moreover, change is often considered to be a longer term process (Grol et al. 2013), which may not have been detected given the relatively short duration of the programme.

The use of interviews afforded a greater degree of feedback than would have been achieved through questionnaires alone. The feedback from the pre-programme interviews provided an element of tailoring and localisation to the programme. These elements are considered important for achieving behavioural change (Abraham and Michie 2008; de Bruin et al. 2009). The post-programme interviews provided time to explore the feasibility parameters in more detail than would have been possible in group discussions alone. They also provided an opportunity for participants to discuss their thoughts openly, away from their colleagues. The interviews provided a more comprehensive understanding of the programme's feasibility and context and highlights the benefit of using a mixed methods approach.

Chapter 7: Discussion

7.1 The context of PU prevention as an interdisciplinary team approach in the community

The overarching aim of this research project was to explore and understand the context of an interdisciplinary approach to PU prevention. Nancarrow and colleagues (2013) identified characteristics associated with good interdisciplinary teams, which have been used to explore the context of interdisciplinary PU prevention (Table 9). These characteristics are therefore most conveniently presented in separate sections:

7.1.1 Leadership and Management

The support of local and organisational leadership was highlighted as important for the promotion of preventative and interdisciplinary practices, both in this study and in previous work (Borrill et al. 2000). Furthermore, to achieve these aspirations for practice, leaders must be able to embrace change and improvement strategies (Xyrichis and Lowton 2008). Indeed, participants reported that it was important for team leaders to understand the value of different team members. However, the involvement of therapists was considered to be particularly difficult without the full co-operation of their respective team leader. Moreover, many community teams have separate managerial support, leading the nursing and therapy workforce. This would create a barrier to interdisciplinary PU prevention if one leader does not perceive that their team should be involved (Norman and Peck 1999). Indeed, this may partly influence the variability in practice, with some teams effectively working in isolation, others in parallel, but few collaborating fully between professional groups.

7.1.2 Communication

Communication must be facilitated by individuals with the necessary skills and the wider contextual environment to foster interdisciplinary working (Nancarrow et al. 2013) and is key to collaboration (Barr et al. 2006; JCAHO 2007; Kripalani et al. 2007). A split team location

(structural barrier – EPOC 2014) was considered by some participants to be a barrier to communication (Section 6.8.8), a finding supporting previous literature (Reeves et al. 2010). Participants believed that informal communication was important, yet considered that current practice did not facilitate this. Instead, communication between professional groups tended to be conducted via more formal channels, such as email, referral or MDT meetings. However, these were only undertaken to manage complex existing PUs, limiting the potential for interdisciplinary PU prevention. Unrestricted communication is an important part of a team's processes and is considered to promote effective care. Indeed, poor communication has been reported to be the main cause leading to patient harm (Reeves et al. 2010). The feasibility assessment identified that participants had a beneficial opportunity for interdisciplinary discussion, increasing the potential for collaboration, despite restrictions of co-location.

7.1.3 Personal rewards, training and development

Training, development and learning represent core requirements for a good interdisciplinary team (Nancarrow et al. 2013). The feasibility study provided an opportunity for increasing PU-related knowledge and developing collaborative team work. It also offered the opportunity for staff to get to know each other and build confidence for interdisciplinary working. Improving collaboration between team members and others, such as TVNs and AHP advisors, were identified as personal rewards. The outcomes of the interdisciplinary programme correspond closely with the findings of Harden (1998), who reported that such programmes can encourage team work. The mechanisms for achieving this were:

- improved confidence and understanding of role,
- improved communication and
- contemplation of practice.

7.1.4 Appropriate resources and procedures

In both the exploratory and feasibility studies undertaken as part of this research, a series of organisational and structural factors were identified as having an impact on achieving an

interdisciplinary approach to PU prevention. Similar findings have been reported previously in more generalised research on teamwork in healthcare (West and Slater 1996; Nancarrow et al. 2013). In the present study, these factors included having the necessary resources and procedures in place to facilitate a team-based approach, including the requisite number of staff in teams. Dorning and Bardsley (2014) and Pinkney et al. (2014) have previously reported gaps in workforce provision across both nursing and AHPs in the community. Indeed, without appropriate staffing there is an inevitable impact on time, which may lead to reactive approaches to practice (Section 6.8.8). Furthermore, participants highlighted that MDT meetings, which may provide an opportunity for interdisciplinary communication, were not attended by all staff. However, while it may be assumed that such organisational and structural barriers would impact all community teams, the variability in collaborative practices reported appears to indicate otherwise (Ch. 4).

7.1.5 Appropriate skill mix

Participants identified that the perception of an appropriate skill mix is different from team to team. Indeed the variability in collaborative practice suggests that for some teams a traditional nursing focus is considered appropriate, without the need to involve other professional groups. However, effective outcomes are considered to be achieved through a mix of skills and personalities (Nancarrow et al. 2013), which may also include AHPs alongside nursing. While this approach was adopted by some, it was often identified as more relevant for complex treatment rather prevention. Oliver (2015) argued that AHPs have a fundamental role to play for integrating NHS community services towards prevention. Furthermore, links between the risk factors for PU formation and the professional role and expertise of healthcare staff outside of nursing have been identified (Section 1.5). While it is clear that there are structural barriers, such as location, which influence an appropriate skill mix, awareness was also considered to be important. The programme was designed to improve staff awareness of the wider skill mix for PU prevention. In doing so, some participants reported corresponding changes to their practice following the programme (Section 6.8.6).

7.1.6 Climate

A good interdisciplinary team is suggested to foster a culture of trust and values from its individual members (Nancarrow et al. 2013). However, some nurses were considered to be unwilling to change their practice and embrace the wider contribution of others. Correspondingly, the evaluation of current practice highlighted that some AHPs considered PU-related practice to be outside of their professional identity (Section 4.4). However, the feasibility study identified that professions outside of nursing are becoming more involved in this area of practice. Nevertheless, barriers still exist to connect nursing and AHP workforces due to differences in caseload management. Indeed, these differences seemed to reduce the potential for staff to understand the contributions of other professional groups and in doing so, develop a trust culture in this area of practice.

7.1.7 Individual characteristics

The characteristics of individuals are important to establish an effective interdisciplinary team. Indeed, Reeves et al. (2010) argues that individuals need to show skills and exhibit proficiency in the area of practice to establish a culture of trust. Knowledge is regarded as an important individual characteristic (Table 9) (Nancarrow et al. 2013). However, as previously highlighted (Section 6.8.8), the collective results appear to demonstrate a focus on treatment rather than prevention. Furthermore, variation in the level of knowledge between different members of the healthcare team was observed, in both the exploratory (Ch.4) and feasibility studies (Ch.6). For example, unregistered members of staff demonstrated the lowest levels of knowledge in relation to PU prevention, yet demonstrated the highest attitude scores. In comparison, PTs had a high level of knowledge, but the lowest scores for attitude. Some of these differences in individual knowledge were also apparent through the feasibility study, resulting in some staff wanting more detail and others struggling with terminology. However, experience is also considered to be an important individual characteristic. Demographic data in section 6.7 demonstrates that there was split in experience levels across the group, which may, therefore, account for these findings.

Fundamental to achieving an interdisciplinary approach is a willingness of individual team members to work towards the same objectives (Reeves et al. 2010). The results of this research (Ch. 4/6) have highlighted factors that influence the implementation of a collaborative approach. Skjørshammer (2001) identified a number of factors linked to achieving a collaborative approach. These included the clinical task and its perceived importance, and the maintenance of an individual's professional identity.

7.1.8 Clarity of vision

The vision of an individual team is established both by individuals and the wider organisation. For individual healthcare institutions, values are, at least to some degree, determined centrally through policy and guidelines. Indeed, a vision for teamwork in healthcare has been advocated through policy recommendations, yet lacks implementation guidance at a local level (Reeves et al. 2010). Establishing an interdisciplinary vision for PU prevention within community teams is further complicated by different professional backgrounds, with their associated beliefs and philosophies (Becker et al. 1961; Melia 1987; Hall 2005). Differences were observed in the attitude of different professional groups in the earlier exploratory study (Section 4.4). Nevertheless, the community team taking part in the feasibility study were open to taking part in a programme evidently about PU prevention. Indeed, this team were open to exploring an IDT approach to PU prevention and able to utilise the programme to develop a theoretical vision for their service. Results reported in section 6.8.6 also highlight some of the practical plans for implementation as a result of this new vision.

7.1.9 Quality and outcomes of care

The feasibility study provided participants with an opportunity to feedback on current practice and identify how collaborative approaches could influence PU outcomes (Section 6.8.6). Participants described a greater focus on working together to achieve effective and efficient practices (Section 6.8.6). Indeed, Nancarrow et al. (2013) identified this as an important characteristic of a good interdisciplinary team. The reporting of PUs provides a formal mechanism for exploring outcomes, although it is considered ineffective at forming learning opportunities (Ch. 4/6). Furthermore, local opportunities for discussion and

feedback on a more informal basis are limited (Section 6.8.8). The programme, therefore, provided a mechanism for feedback and engagement between staffing groups that is not currently available.

7.1.10 Respecting and understanding roles

This research has highlighted the lack of clarity that surrounds role and responsibilities for PU prevention in the community. This confusion was considered to be a barrier to interdisciplinary working for some participants. However, others talked about linking the risk factors for PU development to the day-to-day roles of different professional groups (Section 4.5/6.8.8). To understand the true potential of a particular role, it was considered important to see what different professional groups could offer. To achieve this, Nancarrow and colleagues (2013) highlight the importance of joint working, but also of sharing power between professions. This requires a potentially complex interplay between nurses who are considered traditionally responsible for PUs, and AHPs. While nurses may be willing to share the power with others, AHPs must also be willing to utilise and demonstrate their skillset for improving outcomes. Moreover, it is important for team members to understand and uphold individual roles to achieve effective outcomes, both for patients and internal relations (West and Markiewicz 2004). However, some participants raised concerns about generic working and a loss of professional identity, which is considered to cause friction between groups (Stark et al. 2002). The group and case-based learning elements of the programme were designed to improve the understanding of different roles (Section 5.2.2-4). Participant feedback indicated an increased awareness of roles within the team and how these could be used to improve outcomes and collaboration.

7.2 The implementation of change model (ICM)

The ICM was used to provide a systematic approach to understand the theoretical domains of change and develop a complex intervention. There are two options for undertaking the problem analysis phase, represented by the 'bottom up' and 'top down' approach. In the

former, the data are collected and then coded to determinants of behavioural change. A 'top down' approach first identifies a specific theory before undertaking the data collection. The 'bottom up' approach was used due to the lack of evidence to support one specific theory over another (Walker 2004). In selecting strategies and outcomes for change, two taxonomies of behaviour change were used to ensure that the programme was developed in a theoretically effective way (Abraham and Michie 2008; de Bruin et al. 2009; EPOC 2014). It may have been possible to develop a programme based on the qualitative coding alone. However, the taxonomies provided an effective method for establishing the necessary programme techniques from the data.

The feasibility of the interdisciplinary programme and its delivery was tested with a single team in the community in accordance with recommendations by Grol and Wensing (2013b). The aim of recruitment was to identify a team that was not currently working in an interdisciplinary manner. However, the team who took part were already considered to employ some interdisciplinary approaches to PU prevention, which may have impacted their views on the programme's efficacy. This may have resulted from some confusion over the term 'interdisciplinary' during the recruitment process (Section 4.10). It is clear from the results of the interviews that the team employed a 'multidisciplinary' approach to some of their practice. That is, they worked "independently or in parallel to one another" and had a greater focus on treatment over prevention (Ch.6) (D'Amour et al 2005, p120, Siegler & Whitney 1994, Schofield & Amodeo 1999). The team leaders agreed to take part in the programme, partly to build the knowledge of new staff and partly to support the research. During the programme and in the interviews afterwards it became evident that the team derived some benefit from taking part.

7.3 Limitations

The research has a number of limitations, which, in most cases, can be attributed to the practical realities of conducting clinical research. These limitations therefore have an advisory capacity, not only for future related research, but also for the development and implementation of complex interventions in practice.

This research was contextualised in the community setting, yet has limited generalisability to other community areas due to the small number of participants. The programme may, therefore, only reflect a limited number of the actual determinants of practice.

The interviews provided important feedback on the feasibility of the programme, but also demonstrated some challenges which may have influenced the results. Of particular note was the loss of two interviewees from pre- to post-programme. One participant was unable to attend the second session and therefore could not provide feedback on the whole programme. It is unknown why the other participant was unable to attend the post-programme interview. It is possible that both were apathetic to the programme as a whole and therefore did not want to provide negative feedback. This may have been further compounded by the fact that most of the feedback from the other team members was positive, providing a potentially biased perspective with respect to the programme.

Although this research is viewed pragmatically, certain limitations arise in the use of quantitative and qualitative approaches. The presence of the researcher is considered to be a potentially confounding variable, impacting the validity of the results (Leung 2015). In this regard, all practicable measures were taken to avoid undue influence on the process of questionnaire data collection. This was achieved with the use of an internet-based survey tool which was used by the majority of participants. Although paper copies of the questionnaires were made available at certain events, the role of the researcher was only to ensure availability. For the focus groups and interviews, topic guides were developed through the interpretation and perspective of the researcher. This perspective was based on clinical experience as well as the objective quantitative data, which is considered to have enriched the research outcomes (Leung 2015). However, it is also important to note the maintenance of reliability and trustworthiness in the process of data analysis, in particular through the use of triangulation with senior academic colleagues

7.4 How has this research advanced prior knowledge

This research has increased knowledge of community-based PU practice, particularly given the limited number of community studies previously identified in the literature (Ch.3). This is particularly important given the increasing impetus for healthcare to be provided in a person's own environment (Edwards 2014), and therefore demonstrates the timely nature of this work.

Engaging and understanding the perspectives of a range of staff has been fundamental to this research and represents a key advancement in knowledge. Indeed, this research can be considered novel, given the limited number of previous studies conducted with multiple professional groups. The literature review (Ch.3) identified only two previous studies, conducted in countries and settings which were not generalisable to a UK community setting (Kaddourah et al. 2016; Santos Vieira et al. 2016). Other studies have explored the concept of a team-based approach to PU practice, but are limited by professional diversity. Indeed, many provide only a single professional viewpoint. This lack of research is surprising, given the large number of recommendations for team-based working for PU practice (Gottrup et al. 2001; Cramp et al. 2004; APWCA 2008; Bergquist-Beringer and Makosky Daley 2011; Houghton et al. 2013; AWMA et al. 2014; NHS-England 2014; NICE 2014),

The findings of the present research have also provided an increased understanding of the barriers and facilitators to interdisciplinary PU prevention. Indeed, many of these factors correspond with a conceptual framework for understanding the theoretical factors associated with interprofessional teamwork as summarised in Figure 22. These factors are proposed to fit into four affective domains, each with an interdependent relationship.

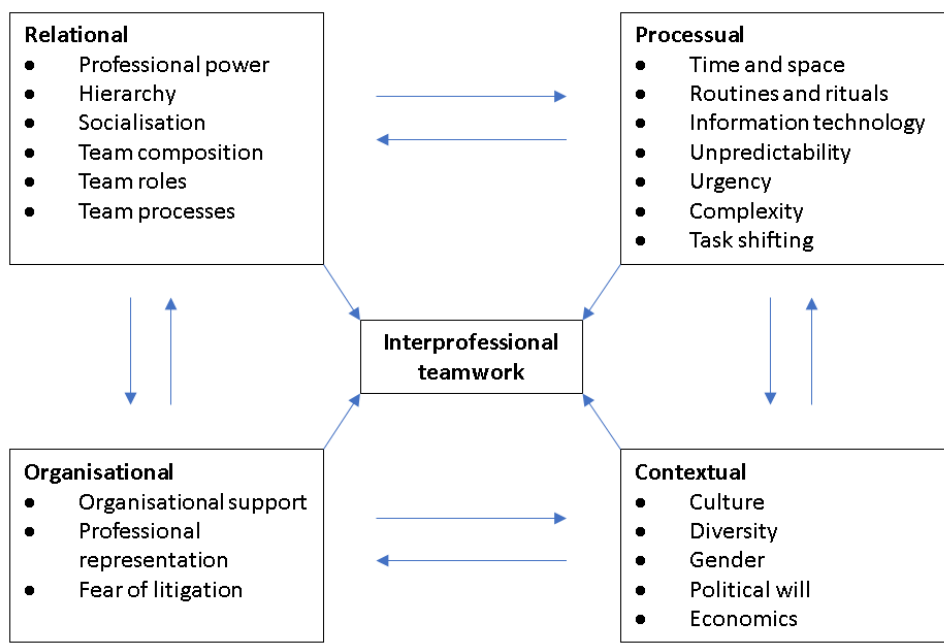


Figure 22: Framework for interprofessional teamworking (Reeves et al 2010). Reproduced with permission

Furthermore, this research has identified that the prevailing culture of PU practice represents a reactive approach and is often considered to be a nursing issue. This appears to be partly driven by the contextual environment, but also by practical issues. These include time and space, routines and rituals and information technology, categorised in the processual domain in Figure 22. Nevertheless, there are other factors in this domain, such as increasing caseload complexity, which is currently acting as a barrier to practice. However, this was also identified as leading to the expansion of team roles and a greater focus on teamwork in some cases.

The interdisciplinary programme, developed from these results, reflects a new and potentially innovative way of delivering education to staff and promoting interdisciplinary practice. However, as indicated in Figure 22, conceptually an influence may also be seen on the organisational and contextual barriers. The programme was considered by both attendees and facilitators to have made a positive effect from a relational and processual standpoint. However, a multifaceted approach, that includes a team-based programme, in conjunction with a wider organisational message, is suggested to achieve effective interdisciplinary practice (Reeves et al. 2010). However, while this approach may represent the ideal, the focus of the present research was the individual and team-based aspects of

interdisciplinary PU practice. This has resulted in the development of new insights that have the potential to inform future policy, research and practice.

The overarching aim of this thesis was to explore the factors associated with an interdisciplinary approach to PU prevention. However, the results may also be applicable to other areas of clinical practice. Indeed, findings from both the exploratory and feasibility studies highlighted role and communication as being particularly relevant to achieving interdisciplinary practice. These findings are consistent with the relational domain of the interprofessional framework and the wider characteristics of a good interdisciplinary team, which are not PU specific (Reeves et al. 2010; Nancarrow et al. 2013). Both role and communication were found to be relevant to effective interprofessional practice in a Canadian qualitative study by Suter et al. (2009), which focused on general healthcare practice. While more recently, Franz et al. (2018) reported similar findings in the neurological rehabilitation setting.

This research also consistently identified from the participating clinicians that PU practice is reactive, rather than proactive towards prevention. These findings have direct applicability to wider healthcare practice and policy in the UK and around the world, given that prevention is a key driver for future healthcare provision (DHSC 2018). Although previous studies have identified a preventive approach to benefit the patient and be more cost effective (VanGilder et al. 2008a; Padula et al. 2011), it is evident that there are significant barriers to achieving this. This research, therefore, contributes to the awareness of such barriers, not only for PU-related practice, but also more widely in the community setting. Furthermore, utilising the identified facilitators through the interdisciplinary programme caused participants to think more widely about collaborative working for improved outcomes.

Specifically, this research has demonstrated that the process for reporting PUs is a barrier to both effective prevention and interdisciplinary PU practice. These findings may also be relevant to other reportable events, such as falls, venous thromboembolism and urinary tract infections, which have also been included in financially incentivised schemes to reduce their incidence (DH 2012). Finally, although these studies focused on identifying the individual and team-based factors associated with interdisciplinary PU prevention, these were often

interconnected with organisational and structural issues. Such issues, including the co-location of teams, time and workforce provision, have wide-ranging implications for healthcare practice, including for interprofessional working (Xyrichis and Lowton 2008) and missed care (Griffiths et al. 2018). The research team will provide detailed feedback to the organisation hosting the study, to provide context to these barriers for implementing proactive preventative practice.

7.5 Future work

The programme and associated manual were developed based on the results presented in Chapter 4 and represent a relatively specific snapshot in terms of time, population and organisational context. It would, therefore, be beneficial to update the content of the manual for future application, based on the needs of the team and those of the organisation. The current programme and delivery were tailored to the community team in order to take account of the local context and aid the change process, yet still conformed to the identified determinants (MRC 2008; Grol and Wensing 2013a). Due to the variation in practice between teams and geographical areas, this same process is recommended for future use of the programme. Indeed, if the programme is delivered through local TVN and AHP clinicians who are linked to the team taking part, there may already be an awareness of how to tailor the programme.

Although the programme was delivered using a face-to-face approach to facilitate interdisciplinary communication, there may be scope to use digital technology for future delivery. Indeed, digital technology development and adoption represent a key driver for many nations worldwide, to help manage an aging and more complex health demographic e.g. NHS ten year plan (NHS 2019). Reeves and Freeth (2003) discussed the potential for technology supported collaboration, highlighting the capacity to overcome barriers such as co-location and time. Furthermore, the use of digital platforms to deliver interprofessional learning has been found to improve many of the characteristics associated with a good interdisciplinary team (Cook et al. 2008; Means et al. 2010). Using the internet for interdisciplinary learning has also been found to support engagement with a programme and other participants (Murphy 2008). However, others have suggested that a more personalised

approach is preferable to reduce isolation and the potential for technical issues (Shrader et al. 2016; Reeves et al. 2017). Nevertheless, digital technology offers significant potential to support interprofessional working more widely and may therefore provide a long-term solution to support collaborative practice. Indeed, technology has the potential to support teams to improve communication and teamwork (Goodwin and Alonso 2014; Calciolari et al. 2016). It may, therefore, be beneficial for future work to understand the role of in-person interventions in combination with digital resources to support future practice.

While the programme was undertaken with a local community team, there is considerable potential for it to be used in wider community practice, nationally and internationally. The final stage of the implementation of change model highlights the need for future evaluation and development of the programme (Grol and Wensing 2013b) (Figure 18). Future work should further explore the feasibility of the interdisciplinary programme with a larger cohort of community teams in the UK and more widely. Indeed, given the identified variability in practice, it would be beneficial to explore the feasibility parameters (Section 5.4) with a representative cohort of teams. Furthermore, a longitudinal review of the clinical outcomes following the programme could also be beneficial.

With all elements of feasibility considered, a full effectiveness trial would represent a standard assessment by which the impact of the interdisciplinary programme could be assessed. This would include a control group and be designed to limit the impact of confounding variables. Through the assessment of effectiveness it may also be prudent to quantify the impact of an interdisciplinary approach on PU incidence. However, given the complexities of determining a community-acquired PU (section 1.3) and the poor reliability of adverse event metrics (Smith et al. 2016), primary outcomes of this evaluation would require careful consideration. The cost-effectiveness of an interdisciplinary approach could also be considered against established practice. Therefore, an economic evaluation as part of any future research would certainly prove beneficial to its associated impact.

Future work should include investigation of the organisational and structural determinants identified in Chapter 4. These may include factors such as the co-location of staff in the same team. This was highlighted as important by some participants, as well as Nancarrow et al

(2013) and the EPOC group (2014). Consequently, understanding the extent to which this structural determinant has an influence on practice would be beneficial for organisational planning. Furthermore, location can be considered a processual factor in the interprofessional framework (Reeves et al. 2010). Therefore, it may also be beneficial to understand the impact of location on team roles and processes. In doing so, a change in the context of community based PU prevention may be identified (Figure 22).

Future work should also explore changes in some of the wider contextual issues raised through this research. These include understanding the factors influencing a reactive approach to PU practice. In addition, gaining a stronger understanding of the influence of the current PU reporting process in the community would be important. Given the findings of this research, a retrospective review of reported PU cases, with subsequent actions and outcomes, would be beneficial. Indeed, this may be timely, given the publication of recent guidelines, which eradicate the current definitions of avoidable/unavoidable PUs, for implementation from April 2019 (NHS-Improvement 2018).

This research has focused on the perspective of the healthcare team in delivering an interdisciplinary approach to PU prevention. Patients can be considered an integral part of the healthcare team for PU prevention, particularly in the community (Bergquist-Beringer and Makosky Daley 2011). However, gaining their perspective was outside of the scope of this research, while previous work in this area is also limited (Nixon et al. 2015). Future work may, therefore, seek to explore the patient perspective and role within the wider community team for PU prevention. Furthermore, a collaborative approach between healthcare professionals and patients is considered to result in improved outcomes (Bissell et al. 2004). An interprofessional education programme for patients and healthcare staff, focused on reducing stereotypes and building skills for interaction, may help to achieve such outcomes (Howe 2006). Indeed, it may be beneficial to include these elements in future iterations of the interdisciplinary programme developed through this research.

While it has previously been suggested that a team-based approach can influence clinical outcomes for PU treatment and prevention (Houghton et al. 2013; AWMA et al. 2014; NICE 2014), there is currently a dearth of evidence to demonstrate this conclusively. This research

has provided an insight into the potential for an interdisciplinary approach to reduce PUs, providing a starting point for the development of future research. Such work may seek to establish a more robust link between interdisciplinary practice and the prevention of PUs in the community. This may be achieved alongside the programme's future work, using longitudinal follow-up of clinical caseloads after the programme. However, this may only provide an indication of effectiveness, given the difficulties in predicting PUs through current risk assessment tools (Park et al. 2016). Nevertheless, with training and organisational support an interdisciplinary approach may lead to greater levels of multi-professional clinical judgement to identify those at risk. Indeed, it would be beneficial to quantify the most effective skill mix for achieving prevention and treatment of non-healing PUs. In doing so, this body of evidence may inform health policy and practice to reduce the burden of PUs on individuals, healthcare organisations and society.

7.5.1 Conclusion

This research has provided a new insight into interdisciplinary community-based PU practice, where knowledge is currently limited. It has identified a number of key determinants to practice, namely, knowledge, attitudes, awareness, social influence, organisational and structural factors. Through the utilisation of behaviour change theory, strategies have been developed to target the individual and team-based factors, using a new approach to training healthcare staff in the community. In considering the integration of existing knowledge in relation to interdisciplinary working, it is recommended that future strategies for the promotion of collaborative practice in this area should be multifaceted. In doing so, the messages delivered as part of the programme may be reinforced at an organisational and wider contextual level.

Dissemination

The results from the knowledge and attitudes questionnaires and early results from the focus groups and interviews were presented as conference posters at the World Union of Wound Healing Societies, 25th-29th September 2016 and the European Region of the World Congress

of Physical Therapy, 11th-12th November 2016. These early findings were also presented to the tissue viability team within the community NHS Trust. The fully integrated mixed methods results were presented at the 19th EPUAP annual meeting, 20th – 22nd September 2017.

Journal papers submitted

An interprofessional approach to pressure ulcer prevention: A knowledge and attitudes evaluation

Submitted to the Journal of Multidisciplinary Healthcare, accepted 12th February 2019 (Appendix O).

Two further papers will be submitted based on the results of this thesis. The first will follow on from the paper above and include the qualitative findings of this research. It is anticipated that this paper will also be submitted to the Journal of Multidisciplinary Healthcare. The second paper will report on the development and feasibility of the interdisciplinary programme.

While unrelated to the data collection from this study, a journal publication was also authored (as second author) and accepted by the journal 'physiotherapy' entitled 'Identifying barriers and facilitators to participation in pressure ulcer prevention in allied healthcare professionals: a mixed methods evaluation' (accepted February 2016) (Worsley et al. 2016).

Future dissemination

The results of the feasibility study were presented as a conference poster entitled: 'Implementing an interdisciplinary approach to pressure ulcer prevention in the community setting', at the 20th EPUAP annual meeting, 12th – 14th September 2018.

The full study results will be formally reported and disseminated within the community NHS Trust, including with participants of the studies. Results will also be disseminated to the tissue viability team, training and development team and AHP clinical advisors.

Appendices

Appendix A: Search strategy

Appendix B: Critical appraisal of literature review studies

Appendix C: Research permission from NHS Trust

Appendix D: Participant information sheet - Questionnaires

Appendix E: Participant information sheet – Focus groups

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Appendix I: APUP Questionnaires

Appendix J: PUKAT Questionnaires

Appendix K: Interview topic guide

Appendix L: Coding manual for behaviour change techniques

Appendix M: Programme manual

Appendix N: Assessment of interprofessional team collaboration scale

Appendix O: Accepted publication in the Journal of Multidisciplinary Healthcare

Appendix A Search strategy

Research questions

4. What is the level of knowledge and attitudes of different professional roles (See inclusion criteria) to pressure ulcer prevention and treatment?
5. What is the evidence base for professional roles in pressure ulcer prevention/treatment?
6. What is the evidence for a multidisciplinary approach to pressure ulcer prevention?

Boolean searches conducted in CINAHL, Medline, AMED, PubMed, Cochrane library

Databases

Research question 1 and 2

- A. Healthcare professional (grouped OR)
- C. Pressure ulcer (grouped OR)
- All above (grouped AND)

Research question 3

- B. Multidisciplinary (grouped OR)
- C. Pressure ulcer (grouped OR)
- All above (grouped AND)

Search A

1. Healthcare professional*
2. "Healthcare staff"
3. Allied health profession*
4. Nurs*
5. Doctor
6. Geriatric*
7. physician
8. Physiotherap*
9. Physical therap*
10. Occupational therap*
11. Podiatr*
12. Dietician
13. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12

Search B

14. Multidisciplinary
15. Multiprofessional
16. Interdisciplinary
17. Interprofessional

18. Transdisciplinary
19. Transprofessional
20. 14 or 15 or 16 or 17 or 18 or 19

Search C

21. "Pressure ulcer"
22. "Pressure sore"
23. "Pressure injury"
24. Decubit*
25. "Bed sore"
26. "Pressure care"
27. "Pressure damage"
28. "Deep tissue injury"
29. "Medical device related pressure"
30. 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29

Searches conducted in PEDro database (This database does not have the facility for advanced searching or searching with Boolean operators. Eligibility criteria applied during title review)

1. "Pressure ulcer"

Searches conducted in OT Seeker database (Open search to determine if any studies on 'pressure ulcers' had been published. Eligibility criteria applied during title review)

1. Pressure ulcer
2. Pressure sore
3. Pressure injury
4. Decubit*
5. Bed sore
6. Pressure care
7. Pressure damage
8. Deep tissue injury
9. Medical device related pressure

1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9

Appendix B Critical appraisal of literature review studies

Title / Author	Method	Comments / limitations
Stern et al 2014 Pressure ulcer multidisciplinary teams via telemedicine: a pragmatic cluster randomised stepped wedge trial in long term care	Canada, AIM: cost and clinical effectiveness of an enhanced MDT vs normal care for PU Rx in LTC Pragmatic cluster randomised stepped-wedge trial Observation, Interviews, Economic evaluation EMDT – Advanced nurses in LTC, Nurse Practitioner, Chiroprapist, OT, Plastic surgeon in hospital via telemedicine Primary outcome – reduction in PU surface area (cm ² /day) Secondary outcomes – Time to healing, % healed, incidence, prevalence, Pain, hospitalisation, ED visits, utility, cost	Trained to measure wounds with photography, but not clear if the assessor always took the photo from the same position. Some adjustment for known predictors of wound healing, but may still have been factors that impaired wound healing Wound team not necessarily representative of other teams elsewhere Aligned with other research showing no impact of specialist teams for healing PUs (Vu et al 2007)
Bratta & Long 2014 Driving change in PU prevention through interdisciplinary team collaboration	USA, Case report in single setting	Minimal application more widely than setting
Chaboyer & Gillespie 2014 Understanding nurses' views on a pressure ulcer prevention care bundle: a first step towards successful implementation	Australia, AIM: Explore the barriers and facilitators to the use of a care bundle for PU prevention Discussion with clinicians and a pilot previously conducted (Gillespie et al 2014) to identify problems with bundle and adapt to local context Interviews to understand nurses views, recruited through purposive sampling for representation of participants	One setting and one care bundle. Not all of the nurses interviewed had used the care bundle with patients, responses were instead perceptions of its use Discussed that data collection was undertaken to saturation, but short interviews only
Garrigues et al 2017 Attitudes of nursing students about pressure injury prevention	USA, AIM: Examine the attitudes of nursing baccalaureate students towards their role in PU prevention Purposive sampling to recruit students with a range of learning experiences related to PU Semi-structured interviews. Theoretical framework used for formulation of interview guide (Wenger's communities of practice social learning theory). Inductive thematic analysis. Verification of	Small sample, although appears representative of a number of views Data saturation not clear Homogenous sample in relation to ethnicity

	codes with interview transcripts and participant checking, peer reviewer	
Hampton 2005 Healthcare assistants: their role in PU prevention	UK, Background information, review of existing literature	Cannot be defined as research, although provides some useful insights into the literature on HCA role and the relationship with nursing
Iranmanesh et al 2013 Orthopaedic nurses' knowledge about PUs in Iran: a cross sectional study	Iran, AIM: To assess nurses' knowledge about PUs in Iran Two hospitals in Tehran, one with 29 orthopaedic beds, one with 39 orthopaedic beds. 68 nurses invited to take part. Pieper PU knowledge tool used (score of >90% considered adequate in original paper), translated to farsi using forward-backward procedure, with reliability established ($\alpha = >0.80$)	Convenience sample may not be generalizable to wider populations of nurses, although could be applicable to orthopaedic nurses as response rate was high.
Baker et al 2011 Interprofessional management of a complex continuing care patient admitted with 18 PUs: A case report	Canada Case report	Case report with limited generalisability to other settings, but demonstrates the potential of a team approach for the healing of PUs
El Enein & Zaghloul 2011 Nurses' knowledge of prevention and management of PU at a health insurance hospital in Alexandria	UAE, AIM: Assess knowledge of nurses regarding PU prevention and management at a hospital. Inclusion of registered nurses, diploma nurses, technical nurses on surgery, medicine, oncology, orthopaedic, intensive care unit, neurology Questionnaire developed from the literature and then through Delphi technique with head nurse, nursing director, infection control nurse 70% set as level of sufficient knowledge Piloted questionnaire	Data discrepancies in useful and non-useful measures (6 of the useful and 4 of the non-useful measures judged by less than 70% of the sample).
Guihan et al 2003 SCI healthcare provider attitudes about PU management	USA, AIM: Evaluate the variability in clinical decisions about PU management, to understand the factors that influence this variability. To discuss the implications for how to best address the observed variability. Survey using patient scenarios to highlight patient characteristics on HCP decision making. 500 surveys distributed at American Paraplegia Society meeting	No testing of survey, team development, but no information on specific methods for development
Lawrence et al 2015 A survey of Australian Nurses' knowledge of pressure injury/PU management	Australia, AIM: Measure nurses' knowledge of PU prevention and management Cross sectional survey, modified version of the PU knowledge tool by Pieper & Mott 1995	Modified knowledge tool. 1 item deleted, 3 added, although face and content validity by 5 nurses Convenience sample

	One district in Southern Australia including 2 hospitals and several other acute care facilities, primary care and community services. 70% indicated satisfactory knowledge	
Maylor & Torrance 1999 Pressure sore survey part 2: Nurses' knowledge	UK, Knowledge and opinion questionnaire based on literature and researchers' experience, validated with nurse specialists, piloted with 25 nurses. Questionnaire on demographics, pre-reg education, post-reg education, contributory factors in PU formation, use of risk assessment and equipment. 625 sent out. Min score =18, Max score=72	Single location Good response rate (70%) Questionnaire scored to expert opinion, but no Delphi method undertaken No qualitative analysis of free text answers
Ryan 2008 Occupational therapists: a frontline approach to better managing PUs	USA , Comment Linking Braden scale to OT practice for PU prevention	Comment piece, limited generalisability
Levine et al 2012 PU knowledge of medical residents: an opportunity for improvement	USA, Authors used two measures of wound care knowledge. Pieper knowledge tool and a photo wound identification test	Urban area in USA, PU knowledge test based on AHCPH guidelines from 1992. Tested and validated with nurses only
Pieper & Mott 1995 Nurses' knowledge of PU prevention, staging and description	USA, AIM: Examine RN knowledge of PU prevention, staging and description 47 item PU knowledge test developed, validated and tested with nurses. Tool split into three sub-sections – risk and prevention, staging, wound description	Convenience sample, Some of the sample undertook the questionnaire before going into an education session. It is unclear if this was a statutory session, but if voluntary in nature these nurses may have had an interest in PUs previously, therefore inflating the scores.
Goodridge et al 1998 Staff knowledge about PU prevention: results of a multisite study	USA, Aim: Explore knowledge of nurses and nursing assistants as part of a larger study that looked at prevalence and impact of an educational programme Setting: 13 healthcare agencies in Manitoba including 2 large hospitals, 4 acute community hospitals, 2 LTC facilities, 3 rural hospitals, 1 care home, 1 home care agency. 3355 questionnaires sent out to convenience sample of RN, LPN and HCAs prior to attending education sessions PU knowledge tool – Modified version of Pieper and Mott. 11 items retained, 5 modified, 8 new items added. Total possible score = 24. Clinical experts reviewed revised tool for content validity and clarity	Modified questionnaire therefore loss of validity from previous testing, panel of experts reviewed validity, but not clear whether these were nurses or the process of validation
Almeida-Tavares et al 2014 Portuguese nurses' knowledge of and attitudes	Portugal, AIM: Explore the knowledge and attitudes about four common geriatric syndromes, including PU in Portuguese hospitals. Evaluate the influence of demographic, professional and nurses'	5-item Likert scale Coercion possible with the presence of the researcher in the hospitals while nurses undertook the questionnaires

<p>toward hospitalised older adults</p>	<p>perception about hospital education support, geriatric knowledge and burden of caring for older adults, upon the RNs knowledge and attitudes. Cross-sectional descriptive study in 5 hospitals, based on number of beds and size of nursing workforce Convenience sample of RNs in medical, surgical or critical care specialty units Exclusion of nurses working with children or young adults or nurses who did not provide direct care (including managers/supervisors) Geriatric nursing knowledge/attitudes subscale of the geriatric institutional assessment profile (demonstrated to have specificity, conformity, appropriateness, utility). 5 item Likert scale. 2271 questionnaires distributed. Overall and categories scored between 0-1</p>	<p>– “explain the aim of the study, answer questions and encourage study participation”</p>
<p>Gul et al 2017 A descriptive, cross-sectional survey of Turkish nurses’ knowledge of PU risk, prevention and staging</p>	<p>Turkey, Cross sectional survey distributed in paper form Modified version of Pieper PU tool based on Lawrence et al 2015, but with 1 question removed and 3 added Setting – 612 bed hospital in Istanbul >70% = satisfactory knowledge, proficient knowledge mean: 61% Content validity by 6 nursing professors (CVI: 0.918). Test-retest with 30 nurses (not stat sig different ICC: 0.926), Cronbach’s α: 0.814. Good inter-rater reliability. Total eligible nurses: 420</p>	<p>‘I don’t know’ category added to Likert scale – participants may choose middle answer and not commit to their true beliefs</p>
<p>Ilesanmi et al 2012 Nurses’ knowledge of PU prevention in Ogun state, Nigeria: Results of a pilot study</p>	<p>Nigeria, AIM: Assess nurses’ knowledge of international recommendations for PU prevention, test reliability of PU knowledge test Setting: State teaching hospital 2 week data collection Participants were directly involved with patient care and from medical, surgical neurological and orthopaedic units Adapted version of PU knowledge tool by Pieper & Mott >80% score = high knowledge, 59%-79% moderate knowledge Split half reliability testing for consistency as unable to meet with same group of nurses at a later date for a retest</p>	<p>Authors adapted item to: A heel protector such as a water filled glove relieves pressure on the heels (not in international guidelines) Authors suggest that as PU knowledge test has content validity and reliability assessed it can be used in other countries, but version used in this study is amended, therefore does not hold. Added ‘I don’t know’ to Likert scale</p>
<p>Qaddumi & Khawaldeh 2014 PU prevention knowledge among</p>	<p>Jordan , AIM: Explore knowledge levels and sources of knowledge about PU prevention and barriers to implementing PU guidelines Survey – PUKAT (Beeckman et al 2010)</p>	<p>Specific to hospitals in Jordan, although random sampling used from across nursing workforce Added ‘I do not know’ option to PUKAT (Beeckman et al 2010) to avoid participants guessing answers.</p>

Jordanian nurses: a cross-sectional study	List of knowledge sources for where nurses gained their knowledge of prevention Barriers to implementation of PU prevention (from Moore & Price 2004) Sample – Nurses from medical, orthopaedic, ICU, burns, surgical, coronary care in 8 hospitals in central Jordan. Inclusion criteria: nurses with bachelor/master degree, provide direct care, at least 1 year experience	
Rafiei et al 2015 PUs. How much do nursing students really know?	Iran, AIM: Explore information that student nurses receive on PUs and the knowledge they have on the topic. Setting: 2 governmental nursing colleges Final year bachelor nursing students invited to participate PU knowledge test (Pieper & Mott 1995) translated version as per Iranmanesh et al 2011	Convenience sample, use of PU knowledge tool updated by Iranmanesh 2013, validated with orthopaedic nurses. Not sure if validation with trained orthopaedic nurses applies to student nurses.
Rose et al 2011 PU prevention & management: healthcare professionals' experiences & perceptions regarding multidisciplinary practice (ABSTRACT)	Australia, Conference presentation AIM: Explore current practice in PU prevention & mgmt. 5 x focus groups including OT, PT, Nursing, Medics, Dieticians Inductive analysis	No evidence of full-text study published and therefore impossible to assess quality
Santos Vieira et al 2016 Interdisciplinary care to patients with PUs	Brazil , AIM: To explore the perceptions of medical and multidisciplinary residents about their role to patients with PUs Setting: a university hospital Participants included staff from – nursing, nutrition, psychology, pharmacy, PT, social work, physical education Semi-structured questionnaire	No validation of questionnaire Translation into English difficult to ascertain the meaning of results
Tauchnitz 2014 The vital role of HCAs in the detection and avoidance of pressure damage	UK Commentary	Commentary on practice in a UK hospital. Not generalizable more widely
Tweed & Tweed 2008 Intensive care nurses' knowledge of PUs: Development of an assessment tool and effect of an educational program	New Zealand, AIM: Develop an assessment tool to determine the effect of an educational program on ICU nurses' knowledge of PUs Setting: 12 bed ICU in Wellington, NZ All qualified RNs invited to take part (n=75) Education programme based on Prentice following AWMA guidelines and given to participants (3hrs)	Loss of participants throughout as requests to complete questionnaires by letter rather than in person (baseline only test under observation) 3 different tests may account for the differences in scores and pass rates Single ICU setting

	<p>3 separate knowledge tests developed conducted on 3 separate occasions (tested for difference with Friedman test), based on Prentice, but adapted following expert Delphi review (n=8). 11 questions on prediction, prevention, management with max score of 27. Pilot with 7 nurses</p> <p>Baseline – knowledge Educational programme 2 weeks – knowledge test then 20 weeks – knowledge test Expert panel also determined the satisfactory scoring level for each area of the tool based on the expert groups’ mean scores</p>	
Kennerly et al 2012 A nurse-led interdisciplinary leadership approach targeting PU prevention in long term care	<p>USA, AIM: Description of a project conceptualised by an interdisciplinary team of researchers that examined a nurse led approach to improving the quality of outcomes in LTC (Project title: Turn everyone and move)</p> <p>MDT approach including nurses, social workers, chaplains, LTC admins, PT, OT, dietary staff, maintenance staff for a better outcome than would have been possible with a single-disciplinary approach.</p>	Single report mainly surrounding nursing leadership necessary to facilitate team working for a reduction of PUs
Pieper & Mattern 1997 Critical care nurses’ knowledge of PU prevention, staging and description	<p>USA, AIM: To survey critical care nurses’ knowledge</p> <p>Cross-sectional survey at two acute care sites (urban & suburban) distributed to 400 nurses</p> <p>PU knowledge test (Pieper & Mott 1995) 90% satisfactory score as content considered basic for nurses</p>	Test demonstrated low reliability for sub categories: Staging $\alpha = .49$, Wound $\alpha = .59$, Prevention $\alpha = .80$, Total $\alpha = .85$
Zulkowski & Ayello 2005 Urban and rural nurses’ knowledge of PUs in the USA	<p>USA, Explore knowledge using the Pieper knowledge tool</p> <p>Sample: Nurses from hospitals, LTC facilities, and home care in urban and rural locations</p> <p>Over 700 questionnaires sent out in New York</p> <p>Additional questionnaires also sent out to all rural nurses in Montana (64 rural nursing homes)</p>	Whole sample not accounted for- missing 6% (n=14) Poor response rate in New York
Guihan et al 2009 Therapist's role in PU management in persons with SCI	<p>USA, Cross-sectional survey administered to therapists attending a conference of the therapy leadership council on SCI. Survey based on CPG recommendations and expert review, the PT normative model & Guide to PT (both from APTA). Drafts reviewed by experts and final review by colleagues of the authors</p>	Only therapists in leadership positions, captive audience at conference - is this truly representative? Usual practice = >75%, respondents possibly confused about definition of term tissue mobilisation.
Buss et al 2004 PU prevention in nursing homes: views and beliefs of	<p>Netherlands, AIM: Explore the views and beliefs of enrolled nurses and other healthcare workers in Dutch nursing homes about PU prevention</p>	Small number of participants (n=18)

enrolled nurses and other healthcare workers	Semi-structured Interviews in 5 nursing homes with enrolled nurses, team leaders, head nurses, staff nurses, physicians Before the interviews a list of sensitising concepts were formulated based on literature on behaviour, knowledge use, research use Open coding, selective coding, member check of the data. Jacard index used to determine the level of agreement between the two researchers	
Strand & Lindgren 2010 Knowledge, attitudes and barriers towards prevention of pressure ulcers in intensive care units: A descriptive cross-sectional study	Sweden, Investigate RN and EN knowledge and attitudes and perceived barriers across four ICUs in Sweden (thoracic-surgical, Burns, neuro-surgical, general) Nursing staff (RN & EN) 139 RN, 176 EN met criteria Questionnaire based on questions tested for use by Kallman & Suserud 2009, based on Moore & Price 2004, Lewin et al 2003. Alterations made to questions to fit an ICU setting, piloted with 4 RN and 4 EN, replaced open-ended questions (due to non-completion rate) with named risk factors for agree/disagree. Five point Likert scale for attitude questionnaire items Linked to theory of planned behaviour.	Low response rate RN = 54.7% EN = 39.8%
Demarre et al 2012 Pressure ulcers: knowledge and attitudes of nurses and nursing assistants in Belgian nursing homes	Belgium, Knowledge, attitudes & correlations with compliance of PU prevention guidelines Convenience sample of 9 Belgium nursing homes with a representative 18 wards chosen. Sample: nurses and nursing assistants Questionnaires (Beeckman et al 2010a,b)	Only one area within Belgium, convenience sample, no response rate mentioned
Tubaishat et al 2013 Nurses' attitudes and perceived barriers to PU prevention in Jordan	Jordan, Cross sectional multi centre self-administered questionnaire developed and adapted from Moore & Price 2004 (8 items related to attitudes), face and content validity established	5-point Likert scale - respondents use middle. Small sample size of assistant nurses, self-reported questionnaires
Pancorbo-Hidalgo et al 2007 Pressure ulcer care in Spain: nurses knowledge and clinical practice	Spain, AIM: Determine Spanish nurses' level of knowledge of existing guidelines for PU prevention & Rx, level of implementation into practice, professional and educational factors that influence knowledge and practice. Developed questionnaire, reliability assessed through Cronbach's alpha ($\alpha=0.92$).	Self-administered questionnaires, nurses self-reported clinical practice - may have tailored their responses to suit the aims of the study,
Panagiotopoulou & Kerr 2002 Pressure area care: an	Greece, Aim: Explore Greek nurses' knowledge of risk factors, areas at risk, recommended preventive strategies also information on current	Exclusion of those who would have little or no experience of pressure area care or those who had specialist

exploration of Greek nurses' knowledge and practice	preventive practice and barriers to good practice. Exploratory and descriptive study. Data collected over 4 week period, cross-sectional survey	knowledge & senior nurses with little or no patient contact, nurses from ICU, A&E, theatre and psychiatric wards excluded. Some areas of validated instrument removed and others added, although face & content validity established by experts, who also worked on wording to maintain reliability of the instrument. Level of missing data due to self-report questionnaires.
Aydin & Karadag 2010 Assessment of nurses' knowledge and practice in prevention and management of deep tissue injury and stage 1 PU	Turkey Descriptive study to determine nurses knowledge and usual practice Knowledge tool developed by authors and reviewed by two experts with amends made, then piloted with 21 nurses, revised then sent to 3 rd expert Conducted in 3 hospitals with nurses in neurology, orthopaedics, physical rehabilitation, ICU	No psychometric validation of the tool Questionnaire undertaken in the presence of the researcher
Moore & Price 2004 Nurses' attitudes, behaviours and perceived barriers towards PU prevention	Ireland, AIM: Staff nurses attitudes to PU prevention, behaviour of nurses toward PU prevention, staff nurses perceived barriers to PU prev. Cross sectional survey	N=130 needed, 300 selected to allow for high non-response rate. Over -recruiting? 5 point Likert scale - responses in the middle?
Sving et al 2012 Registered nurses' attention to and perceptions of PU prevention in hospital settings	Sweden, Observations of RNs and semi-structured interviews, review of patient records, descriptive design RNs from 3 wards (geriatric, orthopaedic, medical) at different hospitals in central Sweden. Before the nurse-patient observations the researcher worked one shift on each ward to learn the routines and localities. Field observation guidelines used Interviews based on EPUAP guidelines and researchers own experience as a nurse Nurses not informed of specific observations	Observations may cause a change in behaviour
Kallman & Suserud 2009 Knowledge, attitudes and practice among nursing staff concerning PU prevention & treatment – a survey in a Swedish healthcare setting	Sweden, Cross sectional survey developed and adapted from Moore & Price (2004) and Lewin et al (2003) translated (forward-back), items added and removed, expert review (n=3), piloted with 8 RN/NA. 47 items with 5-point Likert scale, open ended responses In 6 hospital clinics (2 wards per clinic randomly selected) and 6 healthcare centres in Western Sweden. Head nurses randomly selected RNs and NAs	Amended questionnaire in comparison to Moore and Price may limit the comparability. Positive or negative positioning of questionnaire statements - disagreement between Moore & Price. 5-point Likert scale may encourage participants not to commit to an opinion

<p>Aslan & Yavuz van Giersbergen 2016 Nurses' attitudes towards PU prevention in Turkey</p>	<p>Turkey, Setting: One hospital Nurses in medical (8), surgical (10) clinics and ICUs (9). 660 nurses included APUP (Beeckman et al 2010)</p>	<p>Single hospital location so generalisability limited</p>
<p>Rose & Mackenzie 2010 Beyond the cushion: a study of OTs perceptions of their role and clinical decisions in pressure care</p>	<p>Australia, Grounded theory, semi-structured interviews, data analysed using constant comparative method to explore the perceptions of OT's about their role & clinical decision making when providing pressure care management</p>	<p>Data saturation achieved after 9 interviews, when repeated themes were being identified in the data.</p>
<p>Macens et al 2011 Pressure care practice and OT: Findings of an exploratory study</p>	<p>Australia, AIM: Exploration of the profile of OT in pressure care in Australia through survey research. National distribution of survey, non-probability sampling distribution via professional OT association 351 participants identified to provide adequate representation Online survey, piloted within university faculty with OTs, 37 items</p>	<p>Non-probability sampling - may introduce bias as may not be representative of the total population. Sample size calculator estimated 351 participants needed to represent population. Participants who responded tended to be those who are more experienced and hence more experienced in PU care and higher in confidence, predisposing them to undertake the survey. Final sample not evenly spread across all states. May have been social desirability bias where ideal response is given rather than a response that is reflective of actual experience (De Vaus 2002)</p>
<p>Giesbrecht 2006 Pressure ulcers & OT practice: A Canadian perspective</p>	<p>Canada, Cross-sectional survey to gain a national perspective of practice in Canada & identify directions & trends in the management of PU. Qual & Quant data. Qual = open ended narrative responses -> concepts, categories, codes (Miles & Huberman 1994) Audit of process & end product with no changes required. Quant = chi-square, fisher p> 0.10 due to hypothesis generation rather than testing.</p>	<p>Significance level p>0.10 (hypothesis generation not testing). No formal definition of a PU provided to participants. Small study = difficult to generalise, response bias possible.</p>
<p>Meesterberends et al 2013 Knowledge and use of PU preventive measures in nursing homes: a comparison of dutch and german nursing homes</p>	<p>Netherlands/Germany, Cross sectional questionnaire survey in a prospective multi-centre cohort study One or more wards from 10 nursing homes in NL and Germany Knowledge assessed via questionnaire developed by Hulsenboom et al 2007 – PUQ-2003, based on Dutch PU guidelines, includes test on useful and non-useful measures with participants required to answer on a Likert scale of useful, sometimes useful, not useful, do not know Questionnaire translated into German and face validity established Participants included RNs, practical nurses, nursing aides</p>	<p>Difference in response rate between the two countries. Germany = more nurses, NL = more nursing aides as a sample. Self-reporting of preventive measures</p>

Samuriwo 2010 The impact of nurses values on PU prevention	UK, Qualitative study to determine the value nurses place on PU prevention through semi-structured interviews & grounded theory.	Only able to generalise to exact circumstances.
Samuriwo 2010 Effects of education & experience on nurses' value of ulcer prevention	UK, Semi-structured interviews, Straussian grounded theory	As per Samuriwo 2010
Samuriwo 2012 PU Prevention: the role of the MDT	UK, Semi-structured interviews, Straussian grounded theory	The role of the MDT from a nursing perspective. Data from Samuriwo 2010 with different aims – difficult therefore to see how saturation was achieved on these themes
Beeckman et al 2011 Knowledge & attitudes of nurses on PU prevention: A cross sectional multicenter study in Belgian hospitals	Belgium, AIM: Study the knowledge & attitudes of nurses about PU prevention in Belgian hospitals. Explore the correlation between knowledge, attitudes and the application of adequate prevention. Cross-sectional randomised study using clinical observation to assess adequacy of PU prevention & survey to assess PU prevalence. Questionnaires for the assessment of knowledge and attitudes (Beeckman et al 2010a, b) Adequacy of preventive care assessed in random sample of 94 nursing wards in 14 Belgian hospitals (paediatric, day care, maternity, mental health care excluded) Data on knowledge and attitudes collected from a random selection of at least 5 nurses from each participating ward	Results could be too negative as participants randomly selected. Participants could have given socially desirable answers during attitude assessment leading to the attitudes results possibly being too positive.
Cramp et al 2004 The incidence of PU in people with MS and persons responsible for their management	Northern Ireland, Questionnaire based on literature review, sent to GPs (n=1083)	No pilot of questionnaire, no mention of validation
Florin et al 2014 Attitudes towards PU prevention: a psychometric evaluation of the Swedish version of the APUP instrument	Sweden, AIM: Validation of instrument. Describe and compare attitudes towards PU prevention between RNs, assistant nurses and student nurses APUP (Beeckman et al 2010) translated into Swedish using back translation model Goodness of fit not adequate, five factor model of instrument could not be confirmed with the sample.	APUP instrument was not suited to the Swedish sample. The five factor model developed by Beeckman did not fit the data well, neither did a 4 factor model developed by the authors.

	Cronbach's α for total scale: 0.63	
Simonetti et al 2015 Nursing students' knowledge & attitude on PU prevention evidence based guidelines: a multicentre cross-sectional study	Italy, AIM: Assess knowledge and attitudes of nursing students 7 nursing schools in three Italian regions Convenience sampling – all students enrolled in Bachelor of nursing, all three years (n=855) APUP and PUKAT (Beeckman et al 2010 used) supervised by researcher to avoid participants using other resources to answer Questionnaires translated using forward-back translation method Pilot testing with 219 students Internal consistency assessed using Cronbach's α : 0.88 Expected difference of 15% between year of education Mean 33.3% \pm 5% set as acceptable level	Associations assessed not causal relationships Cannot exclude scoring differences based on teaching
Gupta et al 2012 Comparing and contrasting knowledge of PU assessment, prevention and management in people with SCI among nursing staff working in two metropolitan spinal units and rehabilitation medicine training specialists in a three way comparison	Australia, AIMS: Assess difference between two SCI units in terms of nursing knowledge Assess whether knowledge varies based on years' experience Assess difference between levels of knowledge in rehabilitation registrars and nurses Cluster sample of RNs and ENs, and doctors training to specialise in rehabilitation medicine 24-item questionnaire developed by the authors with spinal and nursing experts 10 multiple choice items on prevention and 10 on mgmt. 28 nurses in unit A, 24 in unit B	Not clear if doctors were from unit A or B Unit A had higher number of cases with complex PUs Small sample Doctors who participated more senior (not representative)
Odierna & Zeleznik 2003 PU education: a pilot study of the knowledge and clinical confidence of geriatric fellows	USA, AIMS: Assess the types of educational exposures that geriatric fellows have during training, begin validation of an instrument that examines knowledge of PU care Survey developed to assess education, feeling of preparedness for managing patients with PU (5-point Likert), teaching on PU, knowledge of PU. Knowledge test modelled on Norvid et al 1996, updated based on RCTs & guidelines (15 questions), geriatric educators provided content validity, piloted with 5 medical students. Distributed to 52 fellows	Wording of some of the items in the tool Tool not validated Non-standardised testing
Chianca et al 2010 PU knowledge among nurses in a Brazilian university hospital	Brazil, AIMS: What do Brazilian nurses know about PU prevention, assessment and staging?	Difficult to interpret some of the results.

	<p>Is there a difference between knowledge scores among nurses related to work setting, years of experience in nursing, or years working in hospital?</p> <p>Cross sectional convenience sample 141 nurses with bachelor degrees invited to participate from single university hospital PU knowledge test used (Pieper & Mott (1995) adapted to 41 items by Pieper & Caliri (2002) to represent nursing practice in Brazil Face and content validity established with experts (Fernandes et al 2011) Questionnaire conducted using paper/pencil in the presence of a researcher</p>	
<p>Gunningberg et al 2013b PU knowledge of RNs, assistant nurses and student nurses: a descriptive, comparative, multicentre study in Sweden</p>	<p>Sweden, AIM: Describe and compare RN, AN and SN knowledge regarding PU prevention Comparative multi-centre study Nurses from hospital wards (surgical, orthopaedic, medical, palliative) in 3 hospitals, students from two universities. Total sample of 577. PUKAT with 5 multiple choice questions added about behaviour in clinical practice, translated to Swedish using back translation model</p>	<p>No information relating to the validation of additional five questions Not analysed by ward No pilot and consequently some participants found some items difficult to understand</p>
<p>Nuru et al 2015 Knowledge and practice of nurses towards prevention of PU and associated factors in Gondar University Hospital, Northwest Ethiopia</p>	<p>Ethiopia AIM: Assess knowledge, practice and factors associated with PU prevention among nurses Cross-sectional study with potential sample of 255 Self-administered questionnaire, pre-tested including 22 knowledge and 22 practice-based questions Data collection controlled through training for collection Pre-test involved use of 6% of the questionnaire on nurses and expert review for content, Cronbach's for internal consistency (0.76) Mean level for the questionnaire was considered acceptable knowledge and good practice</p>	<p>Piloted 6% of questionnaire with nurses. No indication of why only 6% and not indicated how many nurses undertook the pilot. The scoring of the questionnaire is not clear in methodology</p>
<p>Rafiei et al 2014 Knowledge about PU prevention, classification and management: A survey of RNs working with trauma patients in the Emergency department</p>	<p>Iran, AIM: Examine the knowledge of trauma nurses to PU prevention, management. & classification Cross-sectional study in two teaching hospitals 185 ED nurses invited to take part Knowledge assessment tool (Pieper & Mott 1995) used, translated from English to Persian with forward back procedure (undertaken as</p>	<p>Previous reliability established but not with critical care nurses. Assumed reliability with nurses in this study</p>

	part of Iranmanesh et al 2011). Internal consistency and test-retest undertaken as part of this previous study	
Miyazaki et al 2010 Knowledge on PU prevention among nursing professionals	Brazil Nursing team members from an inner city hospital Contact made with 158 nurses, nurse auxiliaries (450), nursing technicians (49) (Goal for recruitment set at 289. Use of Pieper's knowledge tool, validated by Fernandes (2008)	Single hospital site, no details about locations that the nurses worked. Old knowledge tool (1995) for a study published 15 years later
Romero-Collado et al 2013 Knowledge about medications and products to prevent and treat PU: a cross sectional survey of nurses and physicians in a primary health care setting	Spain, Questionnaire with 3 sections – socio-demographic, division of responsibility, statements based on recommendations in clinical practice guidelines. (Statement section modelled on Pancorbo-Hidalgo with additions), pilot undertaken for understanding and time for completion.	Not formerly validated questionnaire, lack of external validity, Fewer physician participants than nurses
Title / Author	Method	Comments / limitations
MEDLINE		
Tayyib et al 2016 Pressure injury prevention in a Saudi Arabian intensive care unit Registered nurse attitudes toward prevention strategies and perceived facilitators & barriers to evidence implementation	Saudi Arabia, AIM: Examine RN attitudes, barriers & facilitators to skin care Data collected in an ICU of a public hospital in SA with survey distributed to 60 nurses Survey with 42 items (38 from APUP and barriers and facilitators tool used in paediatric ICU from an American children's hospital (Schindler 2009), 4 additional items developed from literature and local context) Content validity explored with 5 expert nurses CVI: 0.97, Cronbach: 0.85, Construct validity assessed for 13 items on barriers & facilitators Two open-ended questions, analysed using thematic analysis	Single location, lacks generalisability Self-reporting
Mwebaza et al 2014 Nurses' knowledge, practices and barriers in care of patients with PUs in a Ugandan teaching hospital	Uganda, AIM: Explore nurses' knowledge and practices regarding risk factors, prevention, management of PUs Cross-sectional quantitative study Non-probability sampling Nurses providing direct care included = 84 from three medical, three surgical wards, the burns ward and orthopaedic ward Structured questionnaire Research assistant observed 2-3 nurses on each ward – Nursing actions were noted including prevention/management practices	No validation of questionnaire elements No information on how nurses were approached

	<p>Checklist included: number of patients with first stage PU or more, number of times patient was turned, availability of pressure reducing devices, treatment of areas at risk, moisture prevention, debridement, dressing change, consultation with colleagues, presence of formal risk assessment tool.</p> <p>Questionnaire included items related to knowledge of PU and risk factors, current practices to prevent/manage PU, barriers to providing best care</p> <p>Observational checklist: number of patients stage 1+, frequency of turning at risk patients, availability of PU reduction devices, continuous assessment & treatment of PU by nurses, moisture prevention, debridement, daily dressings of PUs, involvement of other care providers, presence of formal assessment tool (recorded if at least two nurses seen)</p> <p>Pilot with ten nurses</p> <p>Average knowledge measured by achieving at least five correct answers on each questionnaire section</p>	
<p>Miller et al 2017 Pressure injury knowledge in critical care nurses</p>	<p>USA, AIM: To examine nurses' knowledge related to PU prevention and staging following educational/experiential initiatives</p> <p>To examine knowledge in relation to years' experience</p> <p>Setting: 2 critical care units in the Midwestern USA</p> <p>Recruitment over 3 weeks including all RNs on units (70 RNs)</p> <p>Questionnaire – Pieper-Zulnowski PU knowledge test (2014) (reliability/validity established by test authors – Cronbachs $\alpha = 0.80$ (acceptable) (staging=0.67, description=0.64, prevention/risk=0.56) (Poor)</p> <p>Reliability tested to be 0.63</p>	<p>Poor internal consistency for individual items</p> <p>Limited generalisability</p> <p>Post education only no pre test assessment</p>
<p>Larcher-Caliri et al 2003 Knowledge of PUs by undergraduate nursing students in Brazil</p>	<p>Brazil, AIM: Examine knowledge of Brazilian nursing students</p> <p>All students in 3rd or 4th year invited (166) analysed together in study</p> <p>PU Knowledge test (Pieper & Mott 1995) translated to Portuguese (forward-back method) Piloted with 8 students</p> <p>46 of 47 items maintained</p>	<p>Problem with validity as the total number of items in the tool changed, item about heel protectors changed to water filled gloves (outside of international guidelines)</p>
<p>Worsley et al 2016 Identifying barriers & facilitators to participation in PU prevention in allied</p>	<p>UK, Mixed methods cohort study in single UK hospital</p> <p>Convenience sample of Physio & OT</p> <p>Focus group</p> <p>Knowledge and attitudes questionnaires (Beeckman et al 2010a, b)</p>	<p>Small sample and single location make this study less generalizable to the wider population. No correlation with demographics</p>

healthcare professionals: a mixed methods evaluation	Topic guide with piloting Coding, categorising, triangulation with consensus on findings established between three researchers	
Cullen-Gill & Moore 2013 An exploration of 4 th year undergraduate nurses' knowledge of and attitudes towards PU prevention	UK Two questionnaires (Beeckman et al 2010) A convenience sample of 4 th year undergraduate nurses (60) from a university	APUP = 13 items, only assessed for 12 with no description of which one was missing. Not given the method for 'demonstrating' competency
Hulsenboom et al 2007 Knowledge of PU prevention: a cross-sectional and comparative study among nurses	Netherlands, AIM: Investigate the development of nurses knowledge related to preventive measures over time and whether being in an organisation that audits PUs influences knowledge Cross-sectional design involving nurses employed in Dutch hospitals Datasets combined from 2003 and 1991 to assess for differences in nursing knowledge (1991 data from Halfens & Eggink 1995) 2003 survey population consisted of two samples (1: subscribers of professional journal n=976, 2: obtained by randomly contacting 23 of the 48 hospitals that participated in the prevalence survey of 2003 n=750) 1991 survey population consisted of subscribers to same journal employed at hospitals. Nurses were approached by mail to complete the questionnaires Inclusion for both 1991/2003 – RN, in hospital, direct involvement in patient care, had to have answered more than 10% of questions about preventive care. Questionnaires - PUQ-2003, based on 1991 version adapted to include content from 2002 guidelines. 2 sections useful and non-useful measures for prevention. 1991 version based on 1985 consensus of PU prevention Sufficient knowledge defined at >70% score	Query over comparability between datasets Large heterogeneity between samples yet only differed significantly on work experience (p=0.001) Logistic regression demonstrated that changes were not due to demographics Postal surveys susceptible to selection bias, response rate low = possibly only positive staff Some guidelines based on opinion
Halfens & Eggink 1995 Knowledge, beliefs and use of nursing methods in preventing pressure sores in Dutch hospitals	Netherlands, AIM: Explore the extent to which different methods are used for prevention and knowledge and beliefs of nurses regarding the usefulness of various methods Questionnaire sent to all nurses in general and university hospitals in the Netherlands Questionnaire included a list of 27 preventive measures from consensus report (1985) (9=useful, 11= useful only in individual cases,	No validation of measures, some guidelines based on expert opinion due to lack of evidence

	7= not useful). Mailing list of free nursing journal used to contact nurses – 730 nurses randomly selected	
Akese et al 2014 Assessment of nurses' knowledge on evidence-based preventive practices for PU risk reduction in patients with impaired mobility	Nigeria Single hospital Questionnaire (75-items) adapted from AHRQ instrument on preventing PUs in hospitals, separated into three sections PU identification/staging, risk factors, preventive practices. Face and content validity established. Reliability established with twenty nurses, internal consistency good (Cronbach's α : 0.84) 347 nurses were invited to participate	Single site, lacks generalisability to wider context
Title / Author	Method	Comments / limitations
AMED		
Saleh et al 2013 PU prevention and treatment knowledge of Jordanian nurses	Jordan, AIM: Determine level of knowledge in relation to guidelines for prevention and treatment Explore frequency of prevention/treatment interventions Explore variables associated with nurses' utilisation of PU prevention and treatment interventions Self-reported cross-sectional survey Hospitals with more than 200 beds and having medical, surgical & critical care units – 11 hospitals met the criteria Survey based on earlier work, 60 items validated with 10 researchers and nurses, then piloted with 40 nurses with 32 returned. Survey developed to 45 items with content validity established Included categories: prevention interventions, treatment interventions Participants needed to indicate degree of appropriateness of the intervention to nurses' knowledge (yes or no) To what degree the implemented the intervention in practice (always, sometimes, rarely, never) Regression with variables only significant in univariate analysis	Degree of appropriateness – yes/no – How can you measure degrees with a yes/no answer
Wilkes et al 1996 Nurses' knowledge of PU management in elderly people	Hong Kong, AIM: Assess RNs knowledge of risk factors, prevention and grading Describe measures used for the treatment of PUs Identify RNs perceived hindrances to the provision of necessary nursing care for prevention and treatment Convenience sample of RNs working in the Hong Kong health system and registered on post-registration Bachelor of Health Science	Small sample, questionnaire not validated

	Questionnaire used, modified from Wilkes et al 1993, open & closed questions piloted with 6 experienced RNs in Australia Questionnaire distributed in university class time to RNs	
PubMed		
Title / Author	Method	Comments / limitations
Galvao et al 2017 Knowledge of the nursing team on PU prevention	Brazil, AIM: Describe and analyse nursing team members' knowledge about classification, evaluation and prevention of PUs in ICU Quantitative end of course paper with nursing team (48) Inclusion criteria, hospital staff working with patients Knowledge assessment tool (Pieper & Mott 1995)	Use of old knowledge assessment tool, recognised by author and mentions about review by author of tool (Pieper), but not clear if any changes were made
Hand search		
Title / Author	Method	Comments / limitations
Kimura & Pacala 1997 PUs in adults: Family physicians' knowledge, attitudes, practice preferences and awareness of AHCPH guidelines	USA, Survey with family Drs to determine knowledge, attitudes and practice preferences Assess impact of guidelines Drs knowledge and management of PU Questionnaire – 8 page, 34 items Part 1: pathogenesis, staging, sites, prevention max score : 43 Part 2: attitudes about training, effectiveness of treatment, importance of PU, role of GP in managing PU Part 3: 3 hypothetical case studies Pilot with 30 GPs Goal to achieve 10% sample of 1556 GPs in Minnesota academy of family physicians. Initial mail out to 304 randomly selected GPs (12 excluded)	Response bias: higher % of board certified (shown to correspond with knowledge scores) physicians than across the academy population All respondents from the same state Questionnaire validity and reliability not established
Cox et al 2013 Critical care physicians: attitudes, beliefs and knowledge about PUs	USA , Descriptive correlational design Survey developed for assessment of knowledge (adapted from PU knowledge tool (Pieper & Mott 1995) and attitudes adapted from Kimura & Pacala 1997	Attitudes – 5-point Likert Small sample size Participants enlisted by colleagues of the researchers who subsequently enlisted others
Athlin et al 2010 Factors of importance to the development of PUs in the care trajectory: perceptions of hospital and community nurses	Sweden, Qualitative interviews with RNs from two hospitals and community care Inclusion - >5yrs experience, experience of patients with PU in last 6 months Theoretical sampling from different locations Interview guides based on literature review and authors previous nursing experience	Limited generalisability Socially desirable answers although nurses highlighted differing practice from others

	Interviews based on discharge process, progress/regress of PU, obstacles to PU care Content analysis, discussion to reach consensus	
Rodrigues et al 2016 Knowledge and opinions of nursing professionals about PU prevention	Brazil, Aim to test knowledge of nurses with a view to undertaking an educational programme in the data collection hospital Quantitative using a knowledge test (Pieper & Mott 1995, adapted by Fernandes et al 2008) with staff from surgical ward, internal medicine wards (x2) and clinic for contagious diseases in one hospital. Sample: Nurses/ Nursing assistants/technicians convenience sample of N= 61 nurses, 105 NA/Ts with inclusion criteria – active participants in care for the duration of data collection	Aim to introduce an educational programme at the end of the study may have influenced the presentation of results. Not generalizable
Kaddourah et al 2016 Knowledge and attitudes of health professionals towards pressure ulcers at a rehabilitation hospital: a cross sectional study	Saudi Arabia, Cross-sectional in rehabilitation hospital Sample: Nurses, physio, OT, Physical medicine in Rehabilitation Drs with at least one year of clinical experience (n=120) PU prevention survey developed by authors for use in study, PU attitudes test (Moore & Price 2004) , PU knowledge test (Pieper & Mattern 1997) PU knowledge test >70% considered satisfactory	Not clear if the knowledge test is based on Pieper & Mott (1995) or Kallman & Suserud (2009) Individual profession attitudes not presented. Limited generalisability
Smith & Waugh 2009 An assessment of registered nurses' knowledge of PU prevention and treatment	USA, Descriptive study with convenience sample of RNs in a private, acute care hospital. Inclusion: All RNs included in patient care. 435 RNs approached PU knowledge test (Pieper & Mott 1995) used	Poor response rate (22%) Old knowledge test
Al Kharabsheh et al 2014 Exploring nurses' knowledge and perceived barriers to carry out PU prevention and treatment, documentation and risk assessment	Jordan, AIMS: Assess nurses' levels of knowledge using EPUAP guidelines Explore nurses' perceived barriers towards PU prevention and treatment, documentation, risk assessment Cross-sectional questionnaire with nurses providing care to patients with PU Inclusion – hospitals with >200 beds and having medical, surgical and critical care units. 11 hospitals met the criteria. 3 units chosen by use of a random number table Questionnaire based on Panagiotopoulou & Kerr 2002 and EPUAP Validation process by 10 researchers and expert nurses Pilot undertaken with 40 nurses 45 item questionnaire assessed for content validity by 3 expert nurses	No balance of positive and negatively worded items could lead to response bias

	Variables for questionnaire determined by univariate analysis.	
Dilie & Mengistu 2015 Assessment of nurses' knowledge, attitude and perceived barriers to expressed PU prevention practice in Addis Ababa Government hospitals, Addis Ababa, Ethiopia	Ethiopia, Cross-sectional design Three hospitals with nursing population of 1129 Sample size determined using single population proportion formula n=217 Simple random sampling used to select the three hospitals, proportional allocation to size for three hospitals Questionnaire adapted by reviewing literature of similar studies and guidelines for PU prevention. Tool tested for validity and reliability by an expert and piloted with 10% of the total sample of one of the hospitals. Adequate knowledge set at 80%	Possible response bias
Iranmanesh et al 2011 Critical care nurses' knowledge about PU in southeast of Iran	Iran, Conducted in 5 hospitals Based on Pieper & Mott (1995) 41 items English to Farsi with forward-back translation method Content validity and rater-reliability established through discussion by experts in statistics and nursing Internal consistency: $\alpha = 0.88$ 3 week test-retest = 0.73 Acceptable reliability Piloting	(P>0.05) Did not use PU knowledge tool directly as only 41 of 47 items
Kennerly et al 2012 A nurse-led interdisciplinary leadership approach targeting PU prevention in long term care	USA, AIM: Description of a project conceptualised by an interdisciplinary team of researchers that examined a nurse led approach to improving the quality of outcomes in LTC (Project title: Turn everyone and move) MDT approach including nurses, social workers, chaplains, LTC admins, PT, OT, dietary staff, maintenance staff for a better outcome than would have been possible with a single-disciplinary approach.	Single report mainly surrounding nursing leadership necessary to facilitate team working for a reduction of PUs

Appendix C Research permission from NHS trust

5 May 2015

Paul Clarkson
 Clinical-Academic Research Fellow
 University of Southampton
 Faculty of Health Sciences, Level A, Room AA97
 South Academic Block, Mail Point MP11
 University Hospitals Southampton NHS Trust
 Tremona Road
 SOUTHAMPTON SO16 6YD

Dear Paul

Study Title	Exploration of healthcare professional's involvement and perceptions of pressure ulcer prevention in a community setting		
REC Reference	University of Southampton Ethics ID:10973	Trust Project N^o	SHT150
Protocol N^o	Version 2.2	EudraCT No	N/a

This letter provides the formal approval required for your project to commence. Your project is now registered on the R&D database with identification number **SHT150**. It would be helpful if you could use this number on all correspondence with the R & D Office.

Please note that this Trust approval (and your ethics approval) only applies to the current protocol. Any changes to the protocol can only be initiated following further approval from the REC via a protocol amendment; the R&D office should be informed of these changes.

This approval is conditional on members of the research team being substantively employed by the Trust or having appropriate Honorary Research contracts in place before they start data collection. Please contact the R&D office to confirm requirements for any new members of the research team.

In the event that you have applied to have this study adopted to the UKCRN Clinical Research Portfolio, may we take this opportunity to remind you of your responsibility for uploading accrual data for the research site. If you have any difficulty with this process please let us know.

We would like to remind you that as Principal Investigator you are responsible to ensure that the study is conducted within the Research Governance Framework (RGF) and we encourage you to become fully conversant with the RGFHealth and Social Care document. Any breaches of the RGF constitute non-compliance with the RGF and as a result Trust approval may be withdrawn and the project suspended until such issues are resolved.

Please do not hesitate to contact us should you require any additional information or support. May I also take this opportunity to wish you every success with your research.

Yours sincerely

Director of R&D



Appendix D Participant information sheet – Questionnaires



Participant Information Sheet (Questionnaires) v.1

Study Title: An exploration of healthcare professionals' involvement and perceptions of pressure ulcer prevention in a community setting

Researcher: Paul Clarkson

Ethics number:FOHS-ETHICS-2015-10973

Co-Investigators: Dr Peter Worsley, Prof Lisette Schoonhoven, Prof Dan Bader

Please read this information carefully before deciding to take part in this research. If you are happy to participate you will be asked to sign a consent form.

What is the research about?

This research aims to understand the context of pressure ulcer prevention as a multi-disciplinary issue, in a community setting. More specifically the research aims to explore attitudes, perceptions, knowledge and multi-disciplinary interactions in this area. This may elicit new insights into the potential for a truly multi-disciplinary approach to pressure ulcer prevention and contribute to the future development or selection of strategies to ensure improved practice. This research is being undertaken as part of a clinical-academic doctoral fellowship towards the award of a Doctor of Philosophy (PhD) degree. The researcher is a physiotherapist and doctoral student with an interest in tissue viability and in particular the prevention of pressure ulcers. This research is jointly funded by the University of Southampton and [the trust].

Why have I been chosen?

As part of this research project, all members of staff from [the trust] with access to email and in contact with patients as well as members of [the trust] management are being asked to complete two questionnaires surrounding their knowledge of, and attitudes to, pressure ulcer prevention.

In order to gain further insight into the responses of this survey, a proportion of those who undertook the questionnaires are being asked to consider taking part in focus groups. Initially, this will be within their own professional group and, if agreeable, subsequently within a mixed professional group.

What will happen to me if I take part?

Requests have been sent to all members of staff in [the trust] with access to email to undertake two questionnaires exploring their knowledge and attitudes to pressure ulcer prevention. As these questionnaires were originally designed for completion by nursing staff, if you are a member of staff from an allied health background, you will also be asked to answer some further statements that relate more closely to your profession. All participants will also be asked to complete some generic information including age, gender area worked, job title, banding and previous experience in this area. For

clerical/administrative members of staff, it is recognised that the knowledge assessment questionnaire may be outside of your scope of training. As such, it is suggested that for this group, only the attitudes to pressure ulcer prevention questionnaire is undertaken.

Are there any benefits in my taking part?

There is no direct benefit in taking part in this research. However, participant's responses may indirectly influence the future development of strategies for improved practice. Taking part in this research may also be of benefit to participants continuing professional development.

Are there any risks involved?

There are no direct risks involved with taking part in this research. However, some participants may find some of the questionnaire content to cause the recall of previous experiences in their own clinical practice, which could be distressing. Participants are free to withdraw from undertaking the questionnaires at any point during the process.

There are no identifiable risks to taking part in the study. Staff who are asked to participate in the study will be asked to give up their time on a voluntary basis. Data collection has been designed to be flexible to limit this burden.

Will my participation be confidential?

Confidentiality and anonymity will be maintained through compliance with the University of Southampton guidelines available at as well as the Data Protection Act 1998. All digital data collected will be password protected and held on a password protected computer. In order to maintain a linked anonymity all participants will be coded, rather than using names with all reported data being linked only to this code. Once completed and analysed, anonymised results will be presented to [the trust]. These results will also be written up, published and presented with anonymity maintained.

What happens if I change my mind?

All participants have the right to withdraw at any point without their legal rights being affected.

What happens if something goes wrong?

Should there be any concern about the conduct of the research or complaints participants can contact the Research Governance Manager on the following detail:

Research Governance Office
George Thomas Building 37
Room 4079
University of Southampton
Highfield
Southampton
SO17 1BJ
02380 598848
rgoinfo@soton.ac.uk

Where can I get more information?

Further information can be obtained from:
Paul Clarkson, Room AA97, South Academic Block, University Hospital Southampton,
Tremona Road, Southampton, SO16 6YD, 02381 206549, Pdc1e10@soton.ac.uk

Appendix E Participant information sheet: Focus groups



Participant Information Sheet (Focus groups) v.1

Study Title: An exploration of healthcare professionals' involvement and perceptions of pressure ulcer prevention in a community setting

Researcher: Paul Clarkson (Clinical-Doctoral Fellow)

Co-Investigators: Dr Peter Worsley, Prof Lisette Schoonhoven, Prof Dan Bader

Ethics number: FOHS-ETHICS-2015-10973

Please read this information carefully before deciding to take part in this research. If you are happy to participate you will be asked to sign a consent form.

What is the research about?

This research aims to understand the context of pressure ulcer prevention as a multi-disciplinary issue, in a community setting. More specifically the research aims to explore attitudes, perceptions, knowledge and multi-disciplinary interactions in this area. This may elicit new insights into the potential for a truly multi-disciplinary approach to pressure ulcer prevention and contribute to the future development or selection of strategies to ensure improved practice. This research is being undertaken as part of a clinical-academic doctoral fellowship towards the award of a Doctor of Philosophy (PhD) degree. The researcher is a physiotherapist and doctoral student with an interest in tissue viability and in particular the prevention of pressure ulcers. This research is jointly funded by the University of Southampton and [the trust].

Why have I been chosen?

As part of this research project, all members of staff from [the trust] with access to email and in contact with patients as well as members of [the trust] management will have been asked to complete two recent questionnaires surrounding their knowledge of, and attitudes to, pressure ulcer prevention. In order to gain further insight into the responses of this survey, a proportion of those who undertook the questionnaires were asked to consider taking part in focus groups. You have been contacted further because you have indicated that you may be interested in further discussions following the pressure ulcer questionnaires you completed for us. The discussions you have expressed an interest in consist of focus groups for single professional groups (i.e. physiotherapist, occupational therapists, nurses, managers). However, a further focus group is planned as a multi-professional group.

What will happen to me if I take part?

If you are willing to take part in this study you will be asked to complete a consent form in duplicate. The focus group will then be organised for a time and place of convenience to you

and your colleagues. Each group will contain between 6-12 participants, some of which may be known to you. During the focus group you will be asked to discuss some topics that have been developed from the trust-wide responses to the recent questionnaires on pressure ulcer prevention. Topics may include: role and responsibility for prevention, attitudes, barriers and facilitators to prevention, confidence and background in pressure ulcer prevention and management, as well as other areas that have arisen from questionnaire responses. Two members of the research team will be present; one in the role of moderator, whose job it is to encourage discussion of these topics allowing all present to have a voice if they wish to contribute. The second research team member will act as an assistant moderator and organise the practicalities such as seating, refreshments and will also make some notes on what participants are saying. The focus group will be audio recorded to allow for later review and will last no longer than one hour. The researchers will undertake three profession specific focus groups (although you will only be invited to one of these within your own profession). These will be for nursing staff and health care support workers, allied health professionals and associated staff and clerical/admin/virtual ward administrators. Following these profession specific focus groups, there will additionally be one further mixed professional focus group. If you would be interested in taking part in this group please indicate your agreement to be contacted in the future on the consent form. This will take a similar format to the previous focus groups, lasting one hour and being audio recorded.

Are there any benefits in my taking part?

There is no direct benefit in taking part in this research. However, participant's responses may indirectly influence the future development of strategies for improved practice. Taking part in this research may also be of benefit to participants continuing professional development.

Are there any risks involved?

There are no direct risks involved with taking part in this research. However, some participants may find recalling previous experiences of pressure ulcer prevention and management in particular circumstances to be distressing. If any distress does arise you will be free to leave the focus group at any point.

Will my participation be confidential?

Confidentiality and anonymity will be maintained through compliance with the University of Southampton guidelines available at: <http://www.calendar.soton.ac.uk/sectionIV/research-data-management.html> as well as the Data Protection Act 1998. This will be achieved by all physically collected data e.g. notes, consent forms being kept in a locked cabinet and separated from personal contact details. As it is possible that some of the other participants in the focus groups may be known to you, each participant will be asked to adhere to a set of ground rules at the start of each focus group. One such rule will be that confidentiality of discussion points is maintained within the group and not discussed outside of this setting. All digital data collected such as audio recordings will be password protected and held on a password protected computer. In order to maintain a linked anonymity all participants will be coded, rather than using names with all reported data being linked only to this code. During the process of this research focus group recordings will only be shared amongst the research team (named above). However, once completed and analysed anonymised results will be presented to [the trust]. These results will also be written up, published and presented with anonymity maintained.

What happens if I change my mind?

All participants have the right to withdraw at any point without their legal rights being affected.

What happens if something goes wrong?

Should there be any concern about the conduct of the research or complaints participants can contact the Research Governance Manager on the following detail:

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Where can I get more information?

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Tremona Road, Southampton, SO16 6YD, 02381 206549, Pdc1e10@soton.ac.uk

Appendix F Consent form: Focus groups



CONSENT FORM (*Version 1.1*)

Study title: An exploration of healthcare professionals' involvement and perceptions of pressure ulcer prevention in a community setting

Researcher name: Paul Clarkson

Co-Investigators: Dr Peter Worsley, Prof Lisette Schoonhoven, Prof Dan Bader

Study reference: FOHS-ETHICS-10973

Ethics reference:

Please initial the box(es) if you agree with the statement(s):

I have read and understood the information sheet (January 2015 v2 (questionnaires) or v1 (Focus groups) and have had the opportunity to ask questions about the study.

I agree to take part in this research project and agree for my data to be used for the purpose of this study

I agree to the use of audio recording devices, with the possible use of anonymised quotation when the study is published

I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected

I am happy to be contacted following the initial focus group in order to undertake a further mixed professional focus group

I am happy to be contacted regarding other unspecified research projects. I therefore consent to the University retaining my personal details on a database, kept separately from the research data detailed above. The 'validity' of my consent is conditional upon the University complying with the Data Protection Act and I understand that I can request my details be removed from this database at any time.

Data Protection

I understand that information collected about me during my participation in this study will be stored on a password protected computer and that this information will only be used for the purpose of this study and future research.

Name of participant (print name).....

Signature of participant.....

Name of Researcher

Signature of Researcher.....

Date.....

Appendix G Participant information sheet: Interviews



Participant Information Sheet (Interviews) v.1

Study Title: An exploration of healthcare professionals' involvement and perceptions of pressure ulcer prevention in a community setting

Researcher: Paul Clarkson (Clinical-Doctoral Fellow)

Co-Investigators: Dr Peter Worsley, Prof Lisette Schoonhoven, Prof Dan Bader

Ethics number: FOHS-ETHICS-2015-10973 (current ethics approval)

Please read this information carefully before deciding to take part in this research. If you are happy to participate you will be asked to sign a consent form.

What is the research about?

This research aims to understand the context of pressure ulcer prevention as a multi-disciplinary issue, in a community setting. More specifically the research aims to explore attitudes, perceptions, knowledge and multidisciplinary interactions in this area. This may elicit new insights into the potential for a truly multidisciplinary approach to pressure ulcer prevention and contribute to the future development or selection of strategies to ensure improved practice. This research is being undertaken as part of a clinical-doctoral fellowship towards the award of a Doctor of Philosophy (PhD) degree. The researcher is a physiotherapist and doctoral student with an interest in tissue viability and in particular the prevention of pressure ulcers. This research is jointly funded by the University of Southampton and [the trust].

Why have I been chosen?

As part of this research project, all members of staff from [the trust] with access to email and in contact with patients as well as members of [the trust] management were asked to complete two recent questionnaires surrounding their knowledge of, and attitudes to, pressure ulcer prevention. In order to gain further insight into the responses of this survey, a proportion of those who undertook the questionnaires were asked to consider taking part in focus groups. Three initial focus groups were undertaken with nurses and healthcare support workers, physiotherapists and occupational therapists, and management staff & non-caseholding clinicians. This was followed up with a larger multidisciplinary focus group including all roles from the previous three groups. You have been contacted as we were unable to recruit any tissue viability nurses for the focus group discussions and it is important to gain your opinions as part of this research.

What will happen to me if I take part?

If you are willing to take part in this study a date, time and location suitable for you will be arranged over email. Before conducting the interview you will be asked to complete a consent form in duplicate. The interview will be conducted by one of the co-investigators (LS or PW) with the researcher (PC) also present. During the interview you will be asked open questions relating to pressure ulcer prevention, to which there are no right or wrong

answers. Topics will include areas that have arisen from both the questionnaires and focus groups, including professional identity, current practice pathways, role and responsibility, fear, organisational factors, ideological messages. The interview will be audio recorded to allow for later review and will last no longer than one hour.

Are there any benefits in my taking part?

There is no direct benefit in taking part in this research. However, participant's responses may indirectly influence the future development of strategies for improved practice. Taking part in this research may also be of benefit to participants continuing professional development.

Are there any risks involved?

There are no direct risks involved with taking part in this research. However, some participants may find recalling previous experiences of pressure ulcer prevention and management in particular circumstances to be distressing. If any distress does arise you will be free to leave the interview at any point.

Will my participation be confidential?

Confidentiality and anonymity will be maintained through compliance with the University of Southampton guidelines available at: <http://www.calendar.soton.ac.uk/sectionIV/research-data-management.html> as well as the Data Protection Act 1998. This will be achieved by all physically collected data e.g. notes, consent forms being kept in a locked cabinet and separated from personal contact details. All digital data collected such as audio recordings will be password protected and held on a password protected computer. In order to maintain a linked anonymity all participants will be coded, rather than using names with all reported data being linked only to this code. The interview recordings will only be shared amongst the research team (named above). However, once completed and analysed anonymised results will be presented to [the trust]. These results will also be written up, published and presented with anonymity maintained.

What happens if I change my mind?

All participants have the right to withdraw at any point without their legal rights being affected.

What happens if something goes wrong?

Should there be any concern about the conduct of the research or complaints participants can contact the Research Governance Manager on the following detail:

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Appendix H Consent form: Interviews



CONSENT FORM (*Version 1*)

Study title: An exploration of healthcare professionals’ involvement and perceptions of pressure ulcer prevention in a community setting

Researcher name: Paul Clarkson

Co-Investigators: Dr Peter Worsley, Prof Lisette Schoonhoven, Prof Dan Bader

Ethics reference: FOHS-ETHICS-20097

Please **initial** the box(es) if you agree with the statement(s):

I have read and understood the information sheet (Interviews – April 2016) and have had the opportunity to ask questions about the study.

I agree to take part in this research project and agree for my data to be used for the purpose of this study

I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected

I agree to the use of audio recording devices, with the possible use of anonymised quotation when the study is published

I am happy to be contacted regarding other unspecified research projects. I therefore consent to the University retaining my personal details on a database, kept separately from the research data detailed above. The ‘validity’ of my consent is conditional upon the University complying with the Data Protection Act and I understand that I can request my details be removed from this database at any time.

Data Protection

I understand that information collected about me during my participation in this study will be stored on a password protected computer and that this information will only be used for the purpose of this study and future research.

Name of participant (print name).....

Signature of participant.....

Name of Researcher

Signature of Researcher.....

Date.....

Appendix I Attitudes to PU prevention questionnaire

(Beeckman et al 2010a)

Attitudes to Pressure Ulcer Prevention (APUP) Tool	Strongly Agree	Agree	Disagree	Strongly Disagree
Personal competency				
I feel confident in my ability to prevent pressure ulcers				
I am well trained to prevent pressure ulcers				
Pressure ulcer prevention is too difficult. Others are better than I am				
Priority of pressure ulcer prevention				
Too much attention goes to the prevention of pressure ulcers				
Pressure ulcer prevention is not that important				
Pressure ulcer prevention should be a priority				
Impact of pressure ulcers				
A pressure ulcer almost never causes discomfort for a patient				
The financial impact of pressure ulcers on a patient should not be exaggerated				
The financial impact of pressure ulcers on society is high				
Responsibility of pressure ulcer prevention				
I am not responsible if a pressure ulcer develops in my patients				
I have an important task in pressure ulcer prevention				
Confidence in the effectiveness of prevention				
Pressure ulcers are preventable in high risk patients				
Pressure ulcers are almost never preventable				

Appendix J PU Knowledge assessment tool (Beeckman et al 2010b)

Knowledge Assessment Tool (Beeckman et al 2010b)	
Aetiology & Development	
Which statement is correct?	a, Malnutrition causes pressure ulcers b, A lack of oxygen causes pressure ulcers c, Moisture causes pressure ulcers
Extremely thin patients are more at risk of developing a pressure ulcer than obese patients	a, Correct. The contact area involved is small and thus the amount of pressure is higher b, Incorrect. The pressure is less extensive because the body weight of those patients is lower than the body weight of obese patients c, Incorrect. The risk of developing a vascular disorder is higher for obese patients. This increases the risk of developing a pressure ulcer
What happens when a patient, sitting in bed in a semi-upright position (60°), slides down?	a, Pressure increases when the skin sticks to the surface b, Friction increases when the skin sticks to the surface c, Shear increases when the skin sticks to the surface
Which statement is correct?	a, Soap can dehydrate skin and thus the risk of pressure ulcers is increased b, Moisture from urine, faeces, or wound drainage causes pressure ulcers c, Shear is the force which occurs when the body slides and the skin sticks to the surface
Which statement is correct?	a, Recent weight loss which has brought a patient below his or her ideal weight, increases the risk of pressure ulcers b, Very obese patients using medication that decreases the peripheral blood circulation are not at risk of developing pressure ulcers c, Poor nutrition and age have no impact on tissue tolerance when the patient has a normal weight
There is no relationship between pressure ulcer risk and:	a, Age b, Dehydration c, Hypertension
Classification and observation	
Which statement is correct?	a, A pressure ulcer extending down to the fascia is a grade 3 pressure ulcer b, A pressure ulcer extending through the underlying fascia is a grade 3 pressure ulcer c, A grade 3 pressure ulcer is always preceded by a grade 2 pressure ulcer

Which statement is correct?	<p>a, A blister on a patient's heel is always a pressure ulcer of grade 2</p> <p>b, All grades (1, 2, 3 and 4) of pressure ulcers involve loss of skin layers</p> <p>c, When necrosis occurs, it is a grade 3 or a grade 4 pressure ulcer</p>
Which statement is correct?	<p>a, Friction or shear may occur when moving a patient in bed</p> <p>b, A superficial lesion, preceded by non-blanching erythema is probably a friction lesion</p> <p>c, A kissing ulcer (copy lesion) is caused by pressure and shear</p>
In a sitting position, pressure ulcers are most likely to develop on:	<p>a, Pelvic area, elbow and heel</p> <p>b, Knee, ankle, hip</p> <p>c, Hip, shoulder, heel</p>
Which statement is correct?	<p>a, All patients at risk of pressure ulcers should have systematic skin inspection once a week</p> <p>b, The skin of patients seated in a chair, who cannot move themselves, should be inspected every two to three hours</p> <p>c, The heels of patients who lie on a pressure redistributing surface should be observed minimum a day</p>
Risk assessment	
Which statement is correct?	<p>a, Risk assessment tools identify all high risk patients in need of prevention</p> <p>b, The use of risk assessment scales reduces the cost of prevention</p> <p>c, A risk assessment scale may not accurately predict the risk of developing a pressure ulcer and should be combined with clinical judgement</p>
Which statement is correct?	<p>a, The risk of pressure ulcer development should be assessed daily in all nursing home patients</p> <p>b, Absorbing pads should be placed under the patient to minimise the risk of pressure ulcer development</p> <p>c, A patient with a history of pressure ulcers runs a higher risk of developing new pressure ulcers</p>
Nutrition	
Which statement is correct?	<p>a, Malnutrition causes pressure ulcers</p> <p>b, The use of nutritional supplements can replace extensive preventive measures</p> <p>c, Optimising nutrition can improve the patients general physical condition which may contribute to a reduction of the risk of pressure ulcers</p>
Preventive measures to reduce the amount of pressure/shear	
The sitting position with the lowest contact pressure between the body and the seat is:	<p>a, An upright sitting position, with both feet resting on a footrest</p> <p>b, An upright sitting position, with both feet resting on the floor</p>

	c, A backwards sitting position, with both legs resting on a footrest
Which repositioning scheme reduces pressure ulcer risk the most?	a, Supine position - side 90° lateral position - supine position - 90° lateral position - supine position -... b, Supine position - side 30° lateral position - side 30° lateral position - supine position -... c, Supine position - side 30° lateral position - sitting position - 30° lateral position - supine position - ...
Which statement is correct?	a, Patients who are able to change position when sitting should be taught to shift their weight minimum every 60 minutes while sitting in a chair b, In a side lying position, the patient should be at a 90° angle with the bed c, Shearing forces affect a patients sacrum maximally when the head of the bed is positioned at 30°
If a patient is sliding down in a chair, the magnitude of pressure at the seat can be reduced the most by:	a, A thick cushion b, A doughnut shaped foam cushion c, A gel cushion
For a patient at risk of developing a pressure ulcer, a visco-elastic foam mattress...	a, Reduces the pressure sufficiently and does not need to be combined with repositioning b, Has to be combined with repositioning every 2 hours c, Has to be combined with repositioning every 4 hours
A disadvantage of a water mattress is:	a, Shear at the buttocks increases b, Pressure at the heels increases c, Spontaneous small body movements are reduced
When a patient is lying on a pressure reducing foam mattress...	a, Elevation of the heels is not necessary b, Elevation of the heels is important c, He or she should be checked for "bottoming out" at least twice a day
Preventive measures to reduce the duration of pressure/shear	
Repositioning is an accurate preventive method because...	a, The magnitude of pressure and shear will be reduced b, The amount and the duration of pressure and shear will be reduced c, The duration of pressure and shear will be reduced
Fewer patients will develop a pressure ulcer if...	a, Food supplements are provided b, The areas at risk are massaged c, Patients are mobilised
Which statement is correct?	a, Patients at risk lying on a non-pressure reducing foam mattress should be repositioned every two hours b, Patients at risk lying on an alternating air mattress should be repositioned every 4 hours c, Patients at risk lying on a visco-elastic foam mattress should be repositioned every 2 hours
When a patient is lying on an alternating pressure air mattress, the prevention	a, No specific preventive measures b, A pressure reducing cushion under the heels c, A cushion under the lower legs elevating the heels

of heel pressure ulcers includes:	
If a bedridden patient cannot be repositioned, the most appropriate pressure ulcer prevention is:	a, A pressure redistributing foam mattress b, An alternating pressure air mattress c, Local treatment of the risk areas with zinc oxide paste

Appendix K Interview topic guide

An exploration of healthcare professionals' involvement and perceptions of pressure ulcer prevention in a community setting

Interview three (3) with Tissue Viability Advanced Clinical Nurse Specialist

– [the trust]

1. Introduction

["Thank you for taking the time to undertake this interview"]

["This interview will be recorded for research purposes"]

Introductory round

- Moderator introduction
- Participant introduction – name, role, years' experience

["Can we use your first names during the interview"]

Introduction to the topic and aim of the interview

["This interview is part of a study aimed at ultimately improving the prevention of pressure ulcers. It follows on from questionnaires across the trust exploring knowledge and attitudes of staff to PU prevention and four focus groups, conducted with individual professional groups and an MDT. We are interested in exploring what currently happens in practice for PU management across multidisciplinary groups and your experience in this area. We would also like to explore further some of the themes that emerged from the questionnaires and focus groups. By management, we mean both treatment and prevention. By community setting, we mean out in the community, community hospital, but it is also okay to talk about previous experiences in different settings.

Aims:

- To understand how PU management currently works in the community, what are the barriers to current MDT practice and what might facilitate future practice
- To understand knowledge and attitudes of various professional groups to PU management

Role of moderator: [“I invite you to speak your mind and mention all issues that facilitate or hinder pressure ulcer management in practice. We are interested in your own views and experiences and there are no right or wrong answers.

This interview is being recorded, this is done to make sure we do not miss any of your remarks and to analyse the information afterwards. Your name will not be mentioned in the analysis or write up.

Notes will be taken throughout. This is being done to support the recordings and will be used in our analyses. We may refer to these at the end of the interview to confirm your thoughts on particular areas.

Are there any questions before we start?”]

Topic guide

- 1. Can you tell us a little about your role with PU in the community?**
 - Called for treatment over prevention? Difficult to get in to see some teams
 - Who calls you in?
 - Bespoke training following SIRI – training tailored to audience
- 2. What does current preventive practice look like? Who’s involved, what’s involved?**
 - Care planning – prevention or treatment, bespoke
 - Equipment
 - Gosport tool – preventive tool or to make unavoidable?
 - Shared approach or professional silos – do therapists see a role within their own practice or if they do engage – why – assist nurses, towing party line, reduce harm, not to go to panel, personal interest, preventive mind-set
 - Other groups – podiatry, nutrition, GP, practice nurses
 - Are staff confident to prevent?
 - Do some staff feel they are inevitable?
- 3. Education**
 - Pre-registration “Not even heard of a PU until coming into the community setting”
 - Establishing roles
- 4. Some teams work well together, why?**
 - Long standing members of staff, team working, communication, smaller caseload, leadership, locality,
- 5. Reporting process**
 - Changes to un/avoidable, but is unavoidable to goal?
 - Blame culture
 - Fear to go to panel
- 6. Public perception**
 - Co-owning prevention

- Public health campaign
- Perceptions of professional's roles
- Non- concordance -

7. What would an ideal world look like to you?

Appendix L Coding manual for behaviour change techniques

(de Bruin et al 2009; Abraham & Michie 2008, EPOC 2014, 2016) Reproduced with permission

Knowledge

1. Provide General Information.

Basic information about HIV, the medicines, the role of adherence, and how much adherence is enough.

Tailored: Information can be tailored to the current level of knowledge of the person

Individualization: The person is prompted to have personal questions answered.

NB: Information about Negative consequences of target behaviours: technique #3 “Risk communication”.

Information about Positive consequences of target behaviours: technique #15 “Persuasive communication”

All three techniques can be used concurrently.

2. Increase memory and/or understanding of transferred information.

Use of images or metaphors, or prompts for rehearsing or repeating information in own words, and similar strategies.

Also Group discussion: Prompt participants to ask questions, clarification, and elaboration. Participants must be prompted to do so, merely a group setting is not sufficient. Expert presence is required.

NB: 1-on-1 communication (person and professional): prompts for questions, clarification, and elaboration would be an instance of individualization under technique #1 “Provide general information”.

Awareness

3. Risk communication.

Information about costs/risks of action or inaction with respect to target behaviours. Also entails risk-communication

strategies such as scenario-based risk information and fear appeals.

Tailored: to the person’s risk status (e.g. current behaviour, clinical profile).

NB: Information about Positive consequences of target behaviours: technique #15 “Persuasive communication”

Messages not including information on + or - outcomes: Technique #1 “General information”.

4. Self-monitoring of behaviour

Person keeps a record of specified behaviours. E.g. a diary or a questionnaire of behaviour over multiple time points between two intervention contacts (minimum duration e.g. 1 week), or patients makes notes of when and in what situation (s)he experienced problems correctly executing the target behaviour.

NB: Different from Self-report (#5): assessment of behaviour through self-report does not require previous self-monitoring.

Always choose either technique #4 or #5, not both.

5. Self-report of behaviour (!Not an actual change technique, but coding can be informative!)

Without prior instances of self-monitoring (technique #5), the person is asked to self-report behaviour. The self-report should at least concern the last 3 days. An electronic monitoring device that requires pressing a button at every intake, would also count as an instance of self-report.

NB: Different from technique #4 in that self-reports do not involve reporting self-monitored data.

6. Electronic monitoring of behaviour (!Not an actual change technique, but coding can be informative!)

Person is asked to monitor medication intake using an electronic monitoring device (MEMS-cap, SMART-cap) that automatically records “medication intake”.

NB: If the electronic device requires the person to press a button to register medication intake, it would be an instance of technique #5 “Self-report of behaviour”.

In case the person uses a SMART-cap (or, MEMS-view cap) to monitor behaviour, this would automatically also imply use of technique #9 “Direct feedback on behaviour”.

7. Reflective listening: direct feedback of cognitions and emotions

Feedback of cognitions and emotions through reflective statements during 1-on-1 communication with the

professional intended to increase awareness of ideas, reasoning and emotions.

Scoring requires explicit mention of this technique.

NB: Reflective statements can include reflecting ambivalence between important goals and values in life and current behaviour. Reflecting ambivalence would be an instance of technique #14 “Re-evaluation, self-evaluation”.

Different from techniques #8 and #9 as these concern feedback of behaviour.

8. Feedback: Delayed feedback of behaviour

Includes providing an overview of recorded behaviour. For that, behaviour has to be recorded daily using either technique #4, technique #5-electronically (so not just a 3-day self-report), or technique #6. Code whether behaviour was recorded subjectively (technique #4 & #5-electronically) or objectively (#6).

NB: Difference between #8 (a) & (b) is that the latter only concerns an indication of behaviour over the last 3-7 days. Thus these data do not give an overview of behaviour. When feedback is linked to previously formulated goals instead of objective reference (#8b), it is an instance of technique #30 and not this technique. But both techniques can be used in one intervention.

9. Feedback: Direct feedback of behaviour

Involves a system designed to make people aware of their (lack of) behaviour (forgetting dose) soon after (<24 hours) planned execution: e.g. a dosette box with medication organized for every day of the week, or a so-called SMART-cap with a display showing medication container openings per day.

NB: Different from technique #8 that involves a person providing feedback with an overview of recorded data or by providing objective reference of self-reported behaviour. If this technique #9 is used with the purpose to facilitate technique #4, also score that technique.

10. Feedback of clinical outcomes

Concerns feedback provided to the person about clinical outcomes, i.e. CD4 and viral load.

NB: When therapeutic drug levels are fed back, it would be an instance of technique 8(b) and not this technique.

Social influence**11. Provide information about peer behaviour (“Peer passive”)**

Information about what peers do and think in relation to the target behaviour or preparatory behaviours. This can be provided verbally or by using detailed case studies in text or in video.

NB: Different from technique #12 that involves a group setting.

Different from technique #13 that involves a social norm of Important others instead of a norm from peers.

Not with the purpose of technique #18 “Modelling i.e. to increase self-efficacy. Focus is on providing social reference, not on how to perform behaviour.

12. Provide opportunities for social comparison (“Peer active”)

Group sessions with peers in which discussion and social comparison can occur. Not with the purpose of modelling or transmission of information: focus is on providing social reference for the behaviour. Only score this technique in case discussion of adherence and/or preparatory behaviours is prompted, or experiences with these behaviours are shared (personal stories).

13. Mobilize social norm (“Important others”)

Involves exposing the person to the social norm of important others in relation to the target or preparatory behaviours. Important others may be family members, partners, friends, but also healthcare professionals (on the condition that they are important, i.e. a valued and trusted expert).

NB: Different from technique #11 and #12 that explicitly focuses on peers, not on important others.

Attitude**14. Re-evaluation of outcomes, self-evaluation.**

Prompts to go through a process of (re)evaluation of outcomes of current behaviour and alternative behaviours, and how these behaviours and outcomes relate to self-identity and/or important goals and values in life. Includes comparison of **desired behaviour** with **actual behaviour** (self-regulation theory), and **reflections of ambivalence** between current behaviour and important goals/values in life (often used in Motivational Interviewing). Also includes **Environmental re-evaluation**: come to realize the impact of ones’ behaviour on their environment.

NB: In case **actual behaviour** (following monitoring or self-report) is compared to **previously formulated behavioural goals**, it would be an instance of technique #27 and not of this technique.

15. Persuasive communication, belief selection

Messages designed to strengthen positive beliefs about the outcome of the target behaviour / behaviour change, and/or weaken negative beliefs about behavioural change. New beliefs may be induced and/or new information may be offered with the purpose to create new beliefs.

Tailored: beliefs about the target behaviour are explored after which the information is tailored to current belief structure.

NB: Different from technique #19 which is aimed at increasing beliefs about self-efficacy.

16. Reinforcement on behavioural progress, provide contingent rewards,

Includes praise and encouragement as well as material rewards, but the reward/incentive must be explicitly linked to the achievement of specified goals. Also includes use of self-reward strategies.

NB: Different from technique #17 in the sense that this technique reinforces **behavioural progress** while technique #17 concerns reinforcements of **motivational progress**.

17. Reinforcement on motivational progress, provide contingent rewards, affirmation,
Includes praise and affirming remarks as well as material rewards following statements of the person indicating movement towards increased motivation or confidence to change. Also includes reinforcement of efforts to actively participate in the intervention program. Affirmation is a core-component of Motivational Interviewing, but scoring requires explicit mention of this technique.

NB: Different from technique #16 in the sense that technique #16 reinforces **behavioural progress** while this technique #17 concerns reinforcement of **motivational progress**.

Self-efficacy

18. Modelling

Involves showing the person how to correctly perform a behaviour, e.g. by face-to-face demonstration of the

behaviour by a professional, in a group class, or by showing a role model in a video.

NB: Different from techniques #11 and #12 that focus on providing social reference while this technique aims to show how to correctly perform a behaviour.

19. Verbal persuasion

Messages designed to strengthen efficacy/control beliefs related to execution of the target or preparatory behaviours (e.g. information about often-used successful strategies and general tips). New beliefs may be induced and/or new information may be offered to create new control beliefs.

Tailoring: control beliefs about target behaviour are explored after which the information delivered is tailored to the person's current belief structure and/or personal situation and/or capabilities.

NB: Different from technique #15 that focuses on persuasive arguments about the outcomes of the behaviour to alter attitudinal beliefs.

When tips are used, these must be relevant for the behaviour of the individual at that moment. Therefore, presenting a list of tips that may at some time become useful, would not be an instance of this technique but of technique #1 "Provide General Information".

Different from technique #21 that focuses on first analysing anticipated problems for successful behavioural execution followed by formulation of strategies specifically designed to overcome these barriers.

20. Practice, guided practice

Prompt the person to rehearse the behaviour or preparatory behaviour various times; OR have the person practice the behaviour after which the exercise is discussed and the professional provides feedback.

21. Plan coping responses

Determine potential barriers and ways to overcome these. Barriers may include competing goals in specified situations, i.e. prioritizing between goals in favour of the target behaviour. May be described as "problem solving" and if this is in relation to performance of behaviour, then it is an instance of this technique. Prompts to perform self-regulatory behaviours can be considered as an instance of planning coping responses

but should at least exist of self-monitoring of adherence followed by having the person develop and implement solutions for problems.

Participation: prompt the person to both determine barriers and ways to overcome these. No participation would look like instructions.

NB: Closely related to technique #26 and technique #32, but the present technique involves a focus on solving specific obstacles to performance. Instructions on what to do when no specific problems have yet arisen would count as an instance of technique #1 “Provide general information”.

22. Set graded tasks, goal setting

Movement towards complex/difficult goals is broken down in simple (but still challenging) steps.

Participation: The person determines whether or not the task is too complex and in which steps the task should be broken down to be manageable. No participation would look like instructions.

NB: Might follow from technique #26 “Specific goal setting”, but key difference lies in planning to perform a sequence of preparatory actions that increases in difficulty over time, OR breaking down a complex task in manageable subtasks- as opposed to simply planning out a sequence of actions in detail.

23. Reattribution training, external attribution of failure

Help person reinterpret (previous) failure in terms of either unstable and/or changeable attributions and previous successes in terms of stable attributions, OR attribute failure to an external but controllable/avoidable factor so that person remains confident to attempt executing the behaviour in the future.

Intention

24. General intention formation

Involves setting a general behavioural goal for the person, e.g. take all medication on time, or formulating the desired outcomes of the behaviour, e.g. undetectable viral load. It may sometimes be difficult to distinguish this technique from technique #1 “Provide general information”, e.g. when written “Goals of treatment are explained”. If such a-specific information is presented during an “action planning phase” in the intervention, it is an instance of this technique #24. Otherwise, it can be considered as an instance of technique #1.

Participation: Encourage the person to set a general goal or make a behavioural resolution. In case of no

participation, solutions formulated with this technique would look like instructions.

NB: Distinguished from technique #26 “Specific goal setting” by the general nature of the goal. Technique #24 **does not involve** planning exactly what will be done or when the behaviour/action sequence will be performed.

Different from technique #25 that only concerns planning the time of the day for taking the medication, not any intentional expressions like “I intent to take all medication on time”.

25. Develop medication intake schedule

Involves development of a schedule (time) of when to take the medication.

Tailored / Participation: Person is actively involved in determining when the medication intake is planned. May also be referred to as “tailored medication plan”.

Medication schedule in writing: Schedule is written down for the patient for the person to take home. Can be combined with pictures of medication/time of intake.

NB: Different from techniques #26 as this technique #25 concerns basic planning of medication intake while techniques #26 concerns **goals to change or facilitate adherence** on top of, or after, primary medication intake planning has occurred.

Linking medication intake to daily habits or other cues would also be an instance of technique #30.

26. Specific goal setting

Involves planning what the person will do including, at least, a definition of the goal-directed behaviours that should result in improved adherence, decrease in required efforts to adhere, or undetectable viral load. This may include the specific contexts in which the behaviour will be performed. Without illustration of this level of detail, i.e. formulation of sub-behaviours or preparatory behaviours that should lead to improved levels of adherence, there is not instance of specific goal setting, but rather of General intention formation. The terms “Goal setting”,

“Personal/action plan” do suggest that goal-directed behaviours are formulated.

Participation: Encourage the person to develop behavioural goals that fit his/her lifestyle and intentions best. Jointly developed or tailored action plans suggest participation. In case of no participation, solutions formulated look like instructions.

Goals in writing: Goals can be written down in an action/personal plan for the person to take home.

NB: In case the goal-directed behaviours have been further specified in terms of “**When, where and how or with whom to act**”, it is also an instance of implementation intentions in technique #30.

Use of this technique #26 does not automatically imply that technique #24 “General intention formation” has been used.

Different from technique #25 as this technique relates to action plans to increase or facilitate adherence on top of, or after, basic medication intake planning has taken place.

27. Review of general and/or specific goals

Involves reconsideration of previously set goals or intentions following previous goal setting, and an attempt to act on those goals. This technique therefore requires an indication of behavioural performance resulting from Self-monitoring, Self-report or Electronic monitoring of behaviour.

Participation: Encourage person to reflect on previously set goals and intentions, and think about whether or not these still suffice. In case of no participation, such reflections are from the professional.

NB: In case **actual behaviour** (following period of monitoring) is compared to desired behaviour; it would be an instance of technique #14 and not of this technique.

28. Agree behavioural contract

Commitment to certain (behavioural) goals formulated in such a manner that non-adherence to these goals would have undesired consequences for the person, e.g. public commitment/signed contract. The person must be aware at the moment of commitment/signing that these intentions will be evaluated in the future.

NB: Different from sub-techniques #25-26 “Medication schedule/goals in writing” because these techniques do not need to involve public commitment or explicit signing. Thus, written personal/action plans would be an instance of technique #26 and not of this technique.

29. Use of social support

Involves prompting the person to think about how others could change their behaviour to offer help and/or provide (instrumental) social support and/or provide emotional support. This could also take the form of providing support system as part of the intervention/care (e.g. a “buddy” system).

NB: This could (but does not need to) involve technique #21 “Plan coping responses”- where behaviour of people in the environment is perceived to be a barrier to successful performance.

Action control

30. Use of cues

Teach or stimulate person to identify environmental prompts which can be used to remind of the behaviour. This could include times of the day, alarm devices, stickers, doses of medication at visible location, particular contexts or elements of contexts, but can also take the form of **Implementation Intentions** by formulating specific goals in terms of “Where, when and how or with whom to act” (requires mental imagery).

NB: Without clear illustration of the level of detail described for implementation intentions, instances are regarded as applications of technique #26 “Specific goal setting”. Thus, terms like “Goal setting”, “Personal or Action plan” are not enough to ensure inclusion of this technique.

When implementation intentions are used, it automatically implies use of technique #26 “Specific goal setting” but not technique #24 “General intention formation”.

When people in the direct environment are asked to help remember intake of medication, the technique to be scored would be #29 “Prompt use of social support”.

Cues other than implementation intentions can be used independently or in conjunction with technique #26 “Specific goal setting”.

31. Self-persuasion

Encourage the person to use self-motivating strategies to increase motivation and confidence during periods of behavioural action. This often takes the form of self-talk, i.e. prompt the person to talk to themselves (aloud or silently) before and during planned behaviours to encourage and support action.

Maintenance

32. Formulate goals for maintenance of behaviour

Includes at least method described in #26 “Specific goal setting”, may involve techniques #24 “General intention formation”, but both focused on maintenance of behaviour after change occurred.

Participation: encourage person to develop behavioural goals that fit his/her lifestyle and intentions best. In case of no participation, solutions formulated with this technique would look like instructions.

33. Relapse prevention

Following behavioural change, apply the same method as used in technique #21 “Plan coping responses” but now applied to (long-term) maintenance of behaviour.

Participation: prompt the person to both determine barriers and ways to overcome these. In case of no participation, solutions formulated with this technique would look like instructions.

Facilitation of behaviour

34. Provide materials to facilitate behaviour, or provide facilities to perform the behaviour

Supportive materials are provided to the participants (e.g. reminder devices; dosette box; SMART-cap). Function of the material must be directly related to improvement of the target or preparatory behaviours, not for study-related purposes.

NB: In case the material exists of written goals/instructions/medication schedule, it would be an instance of the sub techniques “..X... in writing” #25-26.

In case the intervention itself delivered with different materials (e.g. leaflet with information, video, workbook), it is **not** an instance of this technique. Instead, note the use of different intervention materials at the bottom of the table.

35. Continuous professional support

Involves sending letters, making telephone calls, and opportunities for unplanned visits or follow up meetings after the major part of the behaviour change intervention has been completed. If these contacts are an intrinsic part of the behaviour change intervention, these in themselves do not count as an instance of this technique. Includes the possibility for persons to contact their physician, nurse or other intervention professional in case of any problems.

NB: In case the contacts are intended to serve as cues for behaviour or as reminders of formulated goals, it would be an instance of technique #30 and not of this technique.

In case support relates to side-effects, it would be an instance of technique #37.

In case people have the possibility to drop in for unplanned visits during the “behaviour change-part” of the intervention, it would be an instance of macro-technique “Tailoring of number of visits”.

36. Individualize regimen

In case it is **explicitly mentioned** that regimen type (number of doses, number of pills per doses) is tailored to the needs of the patient, it would be an instance of this technique.

NB: Different from technique #25 “tailored medication plan” which involves tailoring when medication is taken, but not of the regime itself.

37. Cope with side-effects

Physician informs for side-effects and takes steps to deal with these like switching medicines, or providing additional medication to suppress side-effects. Includes descriptions of prompts to contact healthcare professional between visits in case side-effects are experienced.

NB: When people can contact healthcare professional at any time to deal with side-effects, it would be an instance of this technique and not of technique #35.

38. Reduce environmental barriers

Activities aimed at reducing/solving problems that compete for attention with the target behaviour, e.g. dealing with unemployment, legal issues, lack of food and housing, etc.

Effective Practice and Organisation of Care (EPOC) 2014

Organisational Interventions

Provider orientated interventions:

Revision of professional roles (Also known as professional substitution, boundary encroachment, and includes the shifting of roles among health professionals. For example, nurse midwives providing obstetrical care; pharmacists providing drug counselling that was formerly provided by nurses and physicians; nutritionists providing nursing care; physical therapists providing nursing care. Also includes expansion of role to include new tasks).

Clinical multidisciplinary teams (Creation of a new team of health professionals of different disciplines or additions of new members to the team who work together to care for patients)

Formal integration of services (Bringing together of services across sectors or teams or the organisation of services to bring all services together at one time also sometimes called seamless care)

Skill mix changes (Changes in numbers, types or qualifications of staff)

Continuity of care (including one or many episodes of care for inpatients or outpatients) – arrangements for follow up, case management (including coordination of assessment, treatment and arrangement for referrals)

Satisfaction of providers with the conditions of work and the material and psychic rewards (e.g. interventions to boost morale)

Communications and case discussion between distant health professionals (e.g. telephone links, telemedicine; there is a television/video link between specialist and remote nurse practitioners)

Other

Patient orientated interventions:

Mail order pharmacies (e.g. compared to traditional pharmacies)

Presence and functioning of adequate mechanisms for dealing with patients' suggestions and complaints

Consumer participation in governance of healthcare organisation

Other

Structural Interventions

Changes to the setting/site of service delivery (e.g. moving a family planning service from a hospital to a school)

Changes in physical structure, facilities and equipment (e.g. change of location of nursing station, inclusion of equipment where technology in question is used in a wide range of problems and is not disease specific, for example an MRI scanner)

Changes in medical records systems (e.g. changing from paper to computerised records, patient tracking systems)

Changes in scope and nature of benefits & services

Presence & organisational of quality monitoring mechanisms

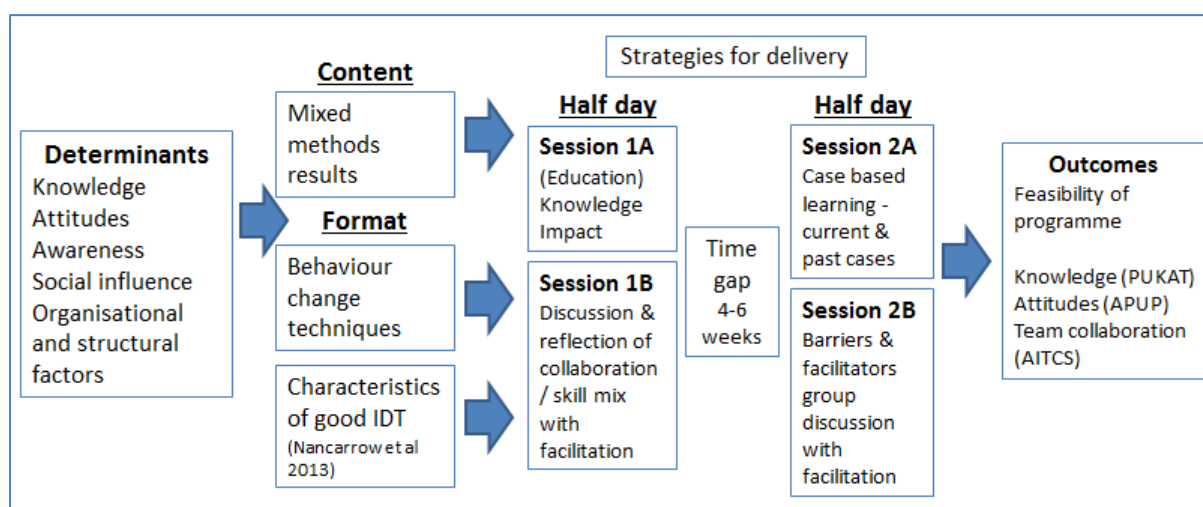
Ownership, accreditation, and affiliation status of hospitals and other facilities, Staff organisation

Other

Appendix M Programme manual

Background

The content and format of this programme is based on data collected from NHS community staff. A variety of healthcare staff undertook questionnaires on knowledge and attitudes, focus groups and interviews. These data were then coded to determinants of behaviour change using two coding manuals relating to individual/team and organisational/structural factors. A systematic review on the characteristics of a good interdisciplinary team has also been used to establish the programme's format. While consideration is given to the organisational and structural factors these are outside of the scope of this project. Therefore, this programme predominantly reflects the individual and team related factors. These elements have enabled the development of a framework for the structure of this programme, shown below.



Purpose of this manual

The purpose of this manual is to provide a practical guide to implementing this programme. This manual is intended to be a reference tool for the planning and delivery of the programme, both for the purposes of feasibility and implementation into practice. The manual provides detail on the format and content of the programme, but also the practicalities necessary for delivery. Each section provides information on the learning objective, content, methods for delivery and is backed up by the rationale for these approaches based on the determinants, techniques and other evidence used.

Tailoring

It is important to tailor and individualise the programme to the needs of the team taking part and the facilitators, although the overall approach should not be lost. It may be necessary to meet with the team leader prior to undertaking the programme to establish the characteristics and motivations of the team so that the programme can be adapted accordingly.

The programme

The programme should be conducted over two non-consecutive half-days, with each half-day separated into two sessions (1A/1B, 2A/2B). This approach to delivering an intervention over several days is suggested to be more effective than delivering all the content in a single day (Wensing et al. 2013b). There are also practical reasons for conducting the programme over two separate days, such as enabling a greater proportion of clinical team members to attend the training. Group composition is an important factor in the success of the overall intervention as it enables greater integration of the outcomes into daily practice (Beaudry 1989). It also minimises the potential for apathy or obstruction to new ways of working that may be associated with training single professional groups alone (Lynton and Pareek 2000a).

Timing – Session 1A and 1B

1 hour Knowledge and attitudes questionnaires, AITCS

45 minutes Session 1A: Knowledge and Impact

15 minutes Break

1 hour Values clarification tool and group discussion

Timing – Session 2A and 2B

20 minutes Quiz to consolidate the learning from the previous sessions

40 minutes Case based learning session

15 minutes Break

1 hour Results of values clarification tool and group discussion

1 hour Knowledge and attitudes questionnaires, AITCS

SESSION 1A KNOWLEDGE				
<p>Aims:</p> <ol style="list-style-type: none"> 1. Increase knowledge of pressure ulcer prevention with particular focus on the themes that received poor scores from the knowledge assessment 2. Increase awareness of the impact of pressure ulcers for patients, the NHS and healthcare staff <p>Learning objectives</p> <ol style="list-style-type: none"> 1. Provide general information on pressure ulcer prevention and treatment using international guidelines (NPUAP et al. 2014a). Particular focus should be given to aetiology and development and risk assessment of pressure ulcers for unregistered healthcare staff and evidence-based preventive measures to all healthcare staff in the team. 2. Deliver information on the impact of pressure ulcers for patients, focusing on the increase in pain, reduction in quality of life, physical, mental and social well-being. For the NHS, in terms of costs and for healthcare staff in terms of time and rehabilitation potential. 				
Specific objective	Content matter	Teaching learning activities	Determinants / Techniques for delivery	Characteristics of a good interdisciplinary team
Define a pressure ulcer	'localised injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear' (NPUAP et al. 2014a)	Didactic delivery using powerpoint	Basic information	Personal rewards, training and development
Define intrinsic causes	Reduction in tissue oxygenation, impaired lymphatic drainage, cell deformation (NPUAP et al 2014a)			
Classification & observation (NPUAP et al 2014a, 2016a)	Category 1-4, Medical device related pressure ulcers, deep tissue injury Cat 1: "Intact skin with non-blanching redness of a localised area usually over a bony prominence. Darkly	Didactic delivery using powerpoint Participants to be tested using photos of PUs of	Basic information Use of images	Prompts for rehearsing and repeating information

<p>Skin response and inspection (NPUAP et al 2014a)</p>	<p>pigmented skin may not have visible blanching; its colour may differ from the surrounding area”.</p> <p>Cat 2: “Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serum filled blister”.</p> <p>Cat 3: “Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscles are not exposed. Slough may be present but does not obscure the depth of tissue loss. May include undermining and tunnelling”.</p> <p>Cat 4: “Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Often includes undermining and tunnelling”.</p> <p>MDRPU: Pressure injury as a result of devices applied for diagnostic or therapeutic purposes. Injury usually matches the shape of the device.</p> <p>DTI: “Purple or maroon localized area of discoloured intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or shear”</p> <p>Skin changes Variation in skin changes with skin type and wound Skin temperature, oedema, change in tissue consistency in relation to surrounding tissue (NPUAP et al 2014a) Skin around medical devices – respiratory masks, catheters, collars, lines, tubes</p>	<p>various categories</p> <p>(Represented second lowest scoring category in knowledge questionnaire)</p> <p>Didactic delivery using powerpoint Participants to use own skin site to test for blanching/non-blanching erythema</p>	<p>Basic information Use of images</p>	
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	<p>Assess localised pain as part of every skin assessment (NPUAP et al 2014a) Use finger or disc method to assess if skin is blanchable or non-blanchable</p> <p>Frequency of skin inspection Conduct a comprehensive skin assessment as soon as possible, but within 8 hours of admission or at first community visit As part of every risk assessment Increase frequency in response to any deterioration in overall condition (EPUAP) Inspect the skin under and around medical devices at least twice daily for the signs of pressure related injury on the surrounding tissue. Consider carers, family members for areas that the patient cannot check themselves</p>			
<p>Risk assessment (NPUAP et al 2014a)</p>	<p>Location of PUs Key locations, over bony prominences Conduct a structured risk assessment, refined through the use of clinical judgement, as soon as possible (but within a maximum of 8 hours after admission or at first visit in community settings) to identify individuals at risk of developing PUs Repeat risk assessment as often as required by the individual's acuity Undertake risk assessment if there is significant change in the individual's condition Document all risk assessments Do not rely on a total risk assessment score alone as a basis for risk based prevention</p>	<p>Didactic delivery using powerpoint Risk assessment tool (Braden) can be on tables for participants to look at</p>	<p>KNOWLEDGE Basic information Use of images Tailoring</p> <p>AWARENESS Risk communication Information about risks of inaction</p>	

<p>Risk factors for PU development (NPUAP et al 2014a)</p>	<p>Assess activity and mobility</p> <p>MECHANICAL BOUNDARY CONDITIONS: LOAD, MAGNITUDE, DURATION Type of load: Pressure, Friction, Shear (Common postures where these occur) Time duration and magnitude of load, inverse relationship</p> <p>SUSCEPTIBILITY & TOLERANCE of the individual General health status and status of the skin (EPUAP) Perfusion, oxygenation, nutritional status, skin moisture (EPUAP)</p> <p>Direct causal factors (Coleman et al 2014) Immobility, Skin/PU status, Poor perfusion</p> <p>In-direct causal factors (Coleman et al 2014) Poor sensory perception and response including diabetes, Moisture, Poor nutrition, Low albumin (other haematological factors), Older age, Medication, Pitting oedema, Chronic wound, Infection, Acute illness, Raised body temperature</p> <p>Consider bedfast or chair fast individuals to be at risk of PU development (EPUAP) Consider the impact of mobility limitations on PU risk (EPUAP)</p>		<p>KNOWLEDGE Basic information Use of images Tailoring</p> <p>AWARENESS Risk communication Information about risks of inaction</p>	
<p>Preventive measures (NPUAP et al 2014a)</p>	<p>Preventive skin care Keep skin clean and dry Use a pH balanced skin cleanser Do not massage or rub skin at risk of a PU</p>	<p>(Represented lowest scoring category in</p>	<p>KNOWLEDGE Basic information</p> <p>AWARENESS</p>	

	<p>Develop and implement an individualised continence plan Cleanse skin promptly following episodes of incontinence Protect the skin from excessive moisture with a barrier product to reduce risk of PU Consider a skin moisturiser to hydrate dry skin</p> <p>Repositioning (NPUAP et al 2014a) Reposition all individuals at risk of or with a PU, unless contraindicated Consider the repositioning support surface in use when determining the frequency of repositioning To determine repositioning frequency, consider: Tissue tolerance, level of activity and mobility, general medical condition, overall treatment objectives, skin condition, comfort Establish schedules that prescribe the frequency and duration of weight shifts Pressure relief lifts or other pressure relieving manoeuvres Regularly reassess to see if repositioning regime is effective Limit time spent in the chair without pressure relief Continue to turn and reposition regardless of support surface in use and establish frequency based on characteristics of support surface Minimise seating time and consult specialist if PUs worsen on support surface If sitting is necessary, limit sitting to 3x/day in periods of 60 minutes or less</p>	<p>knowledge questionnaire)</p> <p>Repositioning represents a topic that scored poorly in the knowledge questionnaire</p>	<p>Risk communication Information about risks of inaction</p>	
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	<p>Use heel suspension devices to elevate and offload the heel completely, but without placing excessive pressure on the achilles tendon (ALL EPUAP)</p> <p>Equipment Describe process for obtaining equipment and clinical advisory team at the equipment stores</p> <p>Mattresses (NPUAP et al 2014a) Mattress and bed support surface considerations: Level of immobility & inactivity, need for microclimate control and shear reduction, size and weight of the individual, risk for development of new PU, number, severity and location of existing PUs Choose a surface that is compatible with the care setting Consider appropriateness and functionality of support surface on each visit to see the patient Identify and prevent potential complications of support surface use such as overlay use with bed rails (top of rail should be more than 220mm above uncompressed mattress) Additional items between the patient and support surface will reduce the effectiveness of the surface to reduce pressure Use a high-spec mattress for those at risk Consider replacing a mattress with a support surface that provides more effective pressure redistribution, shear reduction and microclimate control for the individual if he or she: -Cannot be positioned off the existing PU</p>	<p>Heel offloading with high-spec mattress should be emphasised as did not score well in knowledge questionnaire</p>		
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	<p>-Has PU on two or more turning surfaces that limit turning options -Fails to heal or demonstrates deterioration despite comprehensive care -Is at high risk of additional PUs -‘Bottoms out’ on the existing support surface Select a support surface with enhanced pressure redistribution, shear reduction, microclimate control for those with cat 3,4 PUs</p> <p>Seated support surfaces Use a pressure redistributing cushion for individuals whose mobility is reduced Individualise the selection of a seated surface based on body size and configuration, the effects of posture and deformity on pressure redistribution, mobility and lifestyle needs Minimise temperature and moisture at the buttock interface through selection of cushions Select a cushion that redistributes pressure away from the PU</p> <p>Other Do not leave moving and handling equipment under the individual after use, unless specifically designed for this purpose Avoid position directly on medical devices No ring or doughnut shaped cushions, synthetic sheepskin, fluid bags, water-filled gloves</p>	<p>Confusion over the appropriate choice of pressure relieving cushion in the knowledge questionnaire results</p>		
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	<p>Posture Avoid positioning on an area of erythema whenever possible Reposition in such a way that pressure is relieved or redistributed Avoid friction, shear forces by using manual handling aids Use 30 degree tilted side lying position, alternatively right, back, left, prone if individual can tolerate and medical condition allows Avoid 90 degree side lying position or the semi-recumbent position Limit head of bed elevation to 30degrees for an individual on bed rest unless contraindicated Use a knee break first (Max 30deg) to avoid friction and shear when elevating the head of the bed Use a prone position if tolerated, but check face and body for pressure, particularly face, breast, knees, toes, clavicle, toes, penis, iliac crest, symphysis pubis Position seated individuals to maintain stability and range of activities Select a position that is acceptable, but minimises pressure/shear Provide adequate seat tilt to prevent sliding forward in the wheelchair or chair and adjust footrests and armrests to maintain proper posture and pressure redistribution Avoid elevating leg rests if individual has inadequate hamstring length Avoid positioning in an erect posture for individuals with an ischial ulcer</p>	<p>Emphasise best possible postures for PU prevention as confusion demonstrated in knowledge questionnaire Link to MDT</p>		
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<p>Impact of PUs for:</p> <p>Patients</p> <p>NHS</p> <p>Healthcare professionals</p>	<p>PUs have been associated with the highest disability index of all dermatological conditions. Disability adjusted life years lost for men: 8.6, and for women: 8.3 per 100,000 across western Europe (Hay et al 2014)</p> <p>Impact on pain, quality of life, wellbeing, inability to work, treatment costs, poor living circumstances (Spilsbury et al 2007)</p> <p>Cost - £1400 - £14000 to heal a single PU dependent on category, €121m - €2.59 billion p.a. on national budgets (Demarre et al 2015b, Guest et al 2015)</p> <p>PUs as a barrier to rehabilitation and therapeutic outcomes Staffing time</p>		<p>AWARENESS</p> <p>Risk communication Information about costs, risks of inaction Information about negative consequences</p> <p>KNOWLEDGE</p> <p>Tailoring</p>	
<p>SESSION 1B KNOWLEDGE TRANSLATION TO SKILL MIX</p> <p>Aims:</p> <ol style="list-style-type: none"> 1. Gain an awareness of own values and beliefs around collaborative working 2. Apply knowledge of PU prevention to professional role and responsibility 3. Gain an understanding of how PU prevention can be applied to the day-to-day role of different professional groups <p>Learning objectives:</p> <ol style="list-style-type: none"> 1. Undertake the values clarification tool regarding collaborative working practice 2. Discuss and feedback on the knowledge gained from session 1A and professional guidelines linking PU prevention to different professional roles 				
<p>Specific objective</p>	<p>Content matter</p>	<p>Teaching learning activities</p>	<p>Determinants / Techniques for delivery</p>	<p>Characteristics of a good interdisciplinary team</p>

<p>Gain awareness of own values and beliefs related to collaborative working</p> <p>Application of knowledge from 1A to skill mix of the team and wider multidisciplinary team</p>	<p>Participants fill out the values clarification tool (Appendix to programme manual – values clarification tool) in order to develop a common vision and understand the barriers that exist on an individual and team level</p> <p>Data from these forms will be collated, with themes identified and used for discussions in session 2B (organisation of work to reflect the values held across the team)</p> <p>SKILL MIX OF OWN TEAM</p> <p>Question will be posed for discussion in groups: <i>How does your day-to-day role fit into PU prevention?</i></p> <p><i>How does your own profession link to PU prevention?</i></p> <p><i>Use resources available, including slides from previous session, professional guidelines, AHPs into action document</i></p> <p>Feedback from the individual groups to main group in own words</p> <p>Session leader puts up slide with quotes from professional guidelines linked to PU preventive activities and collaborative working during session</p> <p><i>“Maintaining and restoring maximum movement and functional ability”</i> <i>(World Confederation for Physical Therapy 2014)</i></p>	<p>Two mixed professional groups with large format paper/pens discuss and relate content from previous session to their own skill mix</p> <p>Participants will also have printed resources available:</p> <ul style="list-style-type: none"> -Presentation slides from session 1A -Professional guidelines for RCN, HCPC, CSP, COT -AHPs into action document <p>Each group will be moderated by either a TVN or clinical advisor AHP to prompt for questions,</p>	<p>ATTITUDE</p> <p>Evaluation of outcomes and how they relate to self-identity and important goals and values in life</p> <p>KNOWLEDGE</p> <p>Increase memory and understanding of transferred information</p> <ul style="list-style-type: none"> -Prompts for repeating information in own words -Group discussion -Individualisation – person is prompted to have personal questions answered <p>ORGANISATIONAL</p> <p>Skill mix changes</p> <p>Revision of professional roles</p>	<p>Individual characteristics</p> <p>Reflexive practice, desire to work on the same goals</p> <p>Individual characteristics</p> <p>Respecting and understanding roles</p> <p>Understanding how day to day roles fit with PU prevention</p> <p>Knowing strengths and weaknesses</p> <p>Desire to work on the same goals</p> <p>Respecting and understanding roles</p> <p>Sharing power</p> <p>Joint working</p> <p>Autonomy</p>
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	<p><i>“Be able to change their practice as needed to take account of new developments or changing contexts”</i> <i>(Health & Care Professions Council, Standards of proficiency 2013)</i></p> <p><i>“Helping people of all ages overcome the effects of disability...”</i></p> <p><i>“Advice on approaching a task differently, using equipment or assistive technology, adapting living or working environment...”</i> <i>(College of Occupational Therapists 2011)</i></p> <p><i>“Podiatrists prevent and correct deformity, keep people mobile and active, relieve pain and treat infections”</i> <i>(The Society of Chiropodists and Podiatrists 2008)</i></p> <p><i>“Prevent and facilitate the healing of ulcers”</i> <i>(The British association of prosthetists & orthotists 2017)</i></p> <p><i>“Understand biomechanical principles and the appropriate application of forces to the human body following prescription and supply of a prosthesis or orthosis in a manner which makes the application of such forces safe and effective in an episode of treatment”</i> <i>(Health & Care Professions Council, Standards of proficiency 2013)</i></p> <p>WIDER MDT DISCUSSION Highlight other areas from previous session that relate to MDT skill mix, but might not have been mentioned. (Session leader to be familiar with guidelines and therefore able to feedback on other areas)</p>	<p>clarification and elaboration (Group facilitators can talk about what peers do and think in other teams anonymously, facilitators should reinforce motivational progress through providing affirming remarks when participants talk about increased motivation or confidence to undertake PU preventive role</p> <p>Led by session leader picking up on any of the feedback from groups related to wider MDT roles</p>	<p>Clinical multidisciplinary teams</p> <p>ATTITUDE -Reevaluation of outcomes, self-evaluation, strengthen positive beliefs</p> <p>SOCIAL INFLUENCE -Provide information about peer behaviour -Provide opportunities for social comparison -Mobilise social norm (MDT)</p> <p>Awareness</p>	
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	<p>Consider TVN, clinical advisor AHP, dietician, GP, hospital teams, podiatry, Challenge participants to develop the knowledge from session 1A and 1B into practice Participants will be requested to feedback experiences in practice during session 2A, including barriers, facilitators and outcomes of their own practice, related to the new knowledge Test new behaviour, assess effectiveness and modify behaviour for yourself (Lynton and Pareek 2000b)</p> <p>Participants provided with case study sheets to record cases for feedback in group</p>	<p>Call to action by session leader</p>		<p>Individual characteristics Reflexive practice</p>
<p>4 week break</p>				
<p>Normal clinical practice – working to implement knowledge into practice – Email to team midway through to remind them to work as an MDT and record it on case study forms (Appendix to programme manual – case study template)</p>				
<p>Session 2A: Quiz, Case-based learning</p> <p>Aims:</p> <ol style="list-style-type: none"> 1. Reinforce the learning from the previous session 2. Demonstrate the application of new knowledge into practice 3. Gain an understanding of how different professional roles can integrate together to achieve improved patient outcomes <p>Learning objectives (Barrows and Tamblyn 1980; Barrows 1986; Schmidt 2000)</p> <ol style="list-style-type: none"> 1. Answer questions in a quiz based on content from previous sessions 2. Report on case studies from 4 week break to integrate knowledge and practice 3. Develop intrinsic and extrinsic motivation to allow individualised learning 4. Encourage self-evaluation and critical reflection 				

Specific objective	Content matter	Teaching learning activities	Determinants / Techniques for delivery	Characteristics of a good interdisciplinary team
<p>Quiz to consolidate learning from previous sessions</p> <p>Case-based learning</p>	<p>Participants will be split into two groups, with questions asked from the front using slides Content to include a focus on risk assessment, risk factors preventive measures (equipment, seating, posture, repositioning, mobility)</p> <p>Participants will be asked to feedback on cases either individually or jointly regarding PU prevention, using the case study template provided at session 1B (Appendix to programme manual – case study template)</p> <p>Focus on positive and negative consequences What was the impact and outcomes? What difference did the professions involved make to the patient?</p> <p>Case-based learning allows participants to develop a collaborative, team-based approach to their education</p> <p>Feedback and discussion of case/s</p>	<p>Session leader</p> <p>Session facilitated by clinical advisor AHP, who has experience of case-based learning (“The role of the facilitator is to assist the participants through the facts and to engage in analysis and the development of</p>	<p>KNOWLEDGE Increase memory and understanding of transferred information (Repeating information in own words) AWARENESS Risk communication</p> <p>KNOWLEDGE Tailoring to real life scenarios</p> <p>ATTITUDE Reevaluation of outcomes</p> <p>SOCIAL INFLUENCE Social comparison to peers</p>	<p>Personal rewards, training and development Learning, training and development</p> <p>INDIVIDUAL CHARACTERISTICS Knowledge, experience, initiative</p> <p>Personal rewards, training and development Learning, training and development</p> <p>Climate Interprofessional atmosphere, valuing contributions</p>

	<p>If participants unwilling or unprepared to feedback then facilitator to present both a pre-prepared positive and negative case study to the group and facilitate comments/discussion</p> <p>Facilitator to present case, then allow participants to work in groups to go through adapted sections on the case study template (Appendix to programme manual – case study template)</p> <p>What issues or problems does the case study address? Summary of the intervention – what would you do? What would the outcomes be?</p>	<p>possible solutions or strategies” (Williams 2005)</p>		<p>Respecting and understanding roles Sharing power Joint working Autonomy</p>
Break				
<p>Session 2B Themes from values clarification tool, Group discussion of barrier and facilitators to collaborative practice for PU prevention</p> <p>Aims</p> <ol style="list-style-type: none"> 1. Identify both individual, team and organisational barriers to collaborative working 2. Identify facilitators to collaborative practice <p>Learning objectives:</p> <ol style="list-style-type: none"> 1. Using the results from the values clarification tool (from session 1B) to identify barriers to collaborative working 2. Determine individual, team and organisational factors 				
Specific objective	Content matter	Teaching learning activities	Determinants / Techniques for delivery	Characteristics of a good interdisciplinary team

<p>Define the barriers and facilitators to collaborative working</p> <p>Split these into individual, team and organisational responsibility</p>	<p>Use the values clarification tool data – collated by facilitator in 4-6 week interim period into themes (Appendix to programme manual – values clarification tool)</p> <p>Present themes from data. Have any changed since you tried collaborative working in the six weeks?</p> <p>What stops you from working collaboratively? [barriers to practice] Think in terms of individual, team and organisation</p> <p>Tell participants that organisational factors will be feedback to [the trust] management Team – team leader and area lead, TVN Individual – sharing with each other so all on the same page for practice delivery</p> <p>Gain feedback from participants? [facilitators] Structures and processes necessary to enable collaborative practice</p> <p>How can these be achieved? What are the individual and team factors that could be changed to achieve collaborative practice?</p>	<p>Presented from front on screen with flipcharts for individual, team, organisational responsibility</p> <p>Group work with facilitators in each group guiding discussion</p>	<p>AWARENESS Self report of behaviour</p> <p>ATTITUDE Reinforcing behavioural progress Achieving affirmation of the overall aims of the research</p> <p>ORGANISATIONAL STRUCTURAL Integration of skill mix Staff organisation Continuity of care – case management Formal integration of services (seamless care)</p>	<p>LEADERSHIP AND MANAGEMENT Shared power, Support/ Supervision Personal development Leader who acts and listens</p> <p>COMMUNICATION Ensuring there are appropriate systems to promote communication within the team</p> <p>APPROPRIATE RESOURCES AND PROCEDURES Structures e.g. organisational factors, team members, working in same location Ensuring appropriate procedures are in place to uphold</p>
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<p>Programme feedback (Feasibility)</p>	<p>Ask participants in each group to feedback on how they feel the programme has gone [Facilitators of groups to take notes] Some questions to think about: Does the programme meet the needs of the team? What was good? What would you change for the future? Timing of programme What was the main thing that you learned as part of the programme Effectiveness/translation into practice Increased awareness of role in PU prevention? Feasibility of professional role in PU prevention?</p>	<p>Still in groups, facilitators pose questions and guide discussion</p>		<p>the vision of the service CLARITY OF VISION Having a clear set of values that drive the direction of the service and the care provided.</p>
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EPUAP refers to content from the International Guidelines for PU prevention and treatment (NPUAP et al. 2014a)

Appendix to programme manual: Values clarification tool

Values and beliefs template (Adapted from Warfield and Manley 1990)

I believe the ultimate purpose of collaboration is:
I believe this purpose can be achieved by:
I believe that factors that help us achieve this purpose are:
I believe that factors that hinder us from achieving this purpose are:
Other values and beliefs I consider important in relation to collaboration are:

Appendix to programme manual: Case study template

What issues or problems does your case-study address?	
<p>Brief summary of the intervention:</p> <ul style="list-style-type: none"> - What you did? - Why you did it? - What were you aiming to achieve? - Who was it aimed at? 	
<p>Outcomes</p> <ul style="list-style-type: none"> - What was the result? - Can you evidence the impact of this intervention? - Who has benefited? - What has changed? - What are the long-term benefits? 	
<p><i>Feedback from the patient/Carer?</i> <i>What difference did you make to the patient?</i></p>	
Other comments	

Appendix to programme manual: Feedback form

Please record any further comments about the programme after session 2C:

A large, empty rectangular box with a thin blue border, intended for recording comments about the programme after session 2C.

Thanks for taking part

Appendix N Assessment of interprofessional team collaboration scale (AITCS) (Orchard et al 2012)

|-----|-----|-----|-----|

1 2 3 4 5

Never Rarely Occasionally Most of the time Always

Section one: Partnership	When we are working as a team all my team members....
1	...Establish agreements on goals for each patient we care
2	All team members are committed to the goals set out by the team
3	...Include patients in setting goals for their care
4	...Listen to the wishes of their patients when determining the process of care chosen by the team
5	Team members meet and discuss patient care on a regular basis
6	There is support from the organisation for teamwork
7	Team members coordinate health and social services (e.g. Financial, occupation, housing, connections with community, spiritual)
8	Team members use a variety of communication means (e.g. Written messages, email, electronic patient records, phone, informal discussion, etc)
9	There is consistent communication with team members to discuss patient care
10	All members of our team are involved in goal setting for each patient
11	...Listen to and consider other members' voice and opinions /views in regards to individual care plan process
12	When care decisions are made, the leader strives for consensus on planned processes
13Feel a sense of belonging to the group
14	Team members establish deadlines for steps and outcome markers in regards to patient care
15	Team members jointly agree to communicate plans for patient care
16	Team members consider alternative approaches to achieve shared goals
17	...Encourage each other and patient and their families to use the knowledge and skills that each of us can bring in developing plans of care
18	The focus of teamwork is consistently the patient
19	...Work with the patient and his/her relatives in adjusting care plans
Section two: Cooperation	When we are working as a team all my team members....

1	...Share the power with each other
2	...Help and support each other
3	...Respect and trust each other
4	...Are open and honest with each other
5	...Make changes to their functioning based on reflective reviews
6	...Strive to achieve mutually satisfying resolution for differences of opinion
7	...Understand the boundaries of what each other can do
8	...Understand that there are shared knowledge and skills between health professions
9	...Exhibit a high priority for gaining insight from patients about their wishes/desires
10	...Create a cooperative atmosphere among the members when addressing patient situations
11	...Establish a sense of trust among the team members
Section three: Coordination	When we are working as a team all my team members....
1	...Apply a unique definition of inter-professional collaborative practice to the practice setting
2	The goals that team members agree upon are equally divided among the team
3	...Encourage and support open communication, including the patients during team meetings
4	...Use and agree upon process to resolve conflicts
5	The leader for the team varies depending on the needs of our patients
6	...Select the leader of our team
7	Team members openly support inclusion of the patient in their team meetings

Appendix O Accepted publication in the Journal of Multidisciplinary Healthcare

An interprofessional approach to pressure ulcer prevention: A knowledge and attitudes evaluation

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Abstract: Pressure ulcers (PUs) are a major burden to individuals, impacting their physical, mental and social wellbeing. While PU prevention is traditionally regarded as a nursing issue, an interprofessional approach has been promoted as best practice. However, little is known about current practice or the knowledge and attitudes of the wider interprofessional team (IPT). Pre-designed questionnaires were used to explore knowledge and attitudes with healthcare staff in the community. Questionnaires were disseminated to all healthcare staff within a community healthcare trust predominantly via an online tool. Data were analyzed using descriptive and inferential statistics. The median values of all professional groups demonstrated satisfactory attitudes (>75%) and levels of knowledge (>60%) to PU prevention. However, there were differences within and between groups. Management staff demonstrated the most positive attitude to PU prevention (89%), followed by occupational therapists (OTs) and healthcare assistants (HCAs) (87%),

IQR: 75%→89%). OTs demonstrated the highest scores for knowledge (69%, IQR: 62%→73%), while healthcare and rehabilitation assistants scored the lowest (58%, IQR: 58%-64%). This study has demonstrated that the majority of healthcare staff in a UK community setting have satisfactory levels of knowledge and attitudes in relation to PU prevention overall. Nevertheless, there were some differences between groups, albeit non-significant. There were also differences between sub-themes of the questionnaires, indicating a greater focus of pressure ulcer treatment over prevention. While PU prevention is widely regarded to be a nursing issue, these findings provide some indication of the potential for an interprofessional approach.

Keywords: Pressure ulcer, interprofessional, knowledge, attitudes, community, questionnaire

Introduction

A pressure ulcer (PU), also known as bed sore, pressure sore, pressure injury or decubitus ulcer, represents 'localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear'.(NPUAP et al. 2014a) PUs represent a major burden to populations across the world and have been attributed the highest disability index in a study estimating global burden of skin disease, when compared to other dermatological conditions.(Hay et al. 2014) PUs have a detrimental effect on quality of life, impacting on emotional, physical, mental and social wellbeing.(Spilsbury et al. 2007) The financial impact of PUs is also significant for healthcare organizations and society, with a systematic review by Demarre et al reporting treatment cost estimates of between €121 million and €2.59 billion on individual country annual healthcare budgets in six European countries, the USA and Canada.

The overall prevalence of PUs shows wide variation between location and setting.(NPUAP et al. 2014a) A recent addition to such figures includes medical device related PUs (MDRPU), with one study highlighting that a third of all hospital-acquired PUs in US medical centers were of this origin.(Black et al. 2010)

Nevertheless, some authors have reported a declining prevalence in the acute sector.(Vangilder et al. 2008b; VanGilder et al. 2009; Goldberg 2012) One explanation for this may be an increasing emphasis on healthcare delivery in the community setting.(Edwards 2014) Consequently, an increase in community-acquired PUs might be predicted, yet little data exists to demonstrate this conclusively.(Inman and Firth 1998; Stevenson et al. 2013) In the UK community setting, prevalence values have been reported to range between 11% - 13%.(Stevenson et al. 2013; Hopkins and Worboys 2015)

An integrated team-based approach towards PU prevention has long been promoted as best practice,(Gottrup et al. 2001; Cramp et al. 2004; Bergquist-Beringer and Makosky Daley 2011) while conceptually interprofessional teamwork (IPT) is considered to foster interdependency amongst the team, optimizing patient care and improving staff satisfaction.(Xyrichis and Ream 2008) However, the implementation of an interprofessional team approach to PU prevention is poorly understood. This may be partly explained through the variation in practice that currently exists in relation to individual professional groups and PUs. For example, while occupational therapists (OTs) and physiotherapists (PTs) in the US, Canada and Australia are widely involved in both treatment and prevention of PUs, (McCulloch 1998; APWCA 2008; APTA 2010; Houghton et al. 2013; AWMA et al. 2014) involvement is more varied in other countries. Indeed, this is often limited to specific settings, such as spinal cord

injury(Coggrave and Rose 2003) or certain aspects of practice, such as equipment provision, mobilization or with MDRPUs,(Samuriwo 2012; Sving et al. 2012a; Worsley et al. 2016) and often in support of nursing practitioners. In many countries, nursing is the profession traditionally considered to be responsible for PU-related practice(Samuriwo 2012). However, the provision of daily care in relation to PUs is often delegated to healthcare assistants (Buss et al. 2004; Athlin et al. 2010; Samuriwo 2010a; Sving et al. 2012b).

Achieving an interprofessional team approach requires professional groups to have knowledge of the causative factors associated with PUs and strong attitudes towards prevention.(Pancorbo-Hidalgo et al. 2007; Beeckman et al. 2011) While there is no specific single definition for knowledge,(Bolisani and Bratianu 2018) it has been considered to encompass three attributes: ‘experiential’, ‘skills’ and ‘knowledge claims’.(Dombrowski et al. 2013) Indeed, knowledge is considered to be the foundation for healthcare practice(Beeckman et al. 2010b) and a mediator of behavior.(Ajzen and Madden 1986) Attitude has been defined as the “organization of interrelated beliefs” (Rockeach 1966; Beeckman et al. 2010a) (p.1433) and has been significantly correlated with taking preventive action for PUs.(Beeckman et al. 2011)

Both knowledge and attitudes have been explored previously, although predominantly within nursing.(Aydin and Karadag 2010; Strand and Lindgren 2010; Beeckman et al. 2011; Simonetti et al. 2015) For other professional groups, such as doctors, occupational therapists (OTs) and physiotherapists (PTs), knowledge has been reported to be dependent on setting and location.(Kimura and Pacala 1997; Worsley et al. 2016) This was particularly demonstrated in a US study exploring the

role of therapists in PU management for people with a spinal cord injury (SCI).(Guihan et al. 2009)

There is limited consensus related to IPT attitudes. In examining nurses' attitude to the IPT in PU practice, it was reported that although they were thankful for any assistance, they still adopted the traditional view that it was primarily their responsibility.(Samuriwo 2012) This compares with findings from a UK hospital study, reporting that OTs and PTs demonstrated a positive attitude to PU prevention, although, in practice, they did not consider it to represent their main priority.(Worsley et al. 2016) By contrast, OTs in Canada reported greater satisfaction with higher referral rates for PUs as this enabled them to become more involved in a collaborative approach to practice.(Giesbrecht 2006) However, it was also highlighted that poor communication and tensions over role identity were barriers to IPT working.(Rose and Mackenzie 2010; Macens et al. 2011)

While existing research provides some insight into current practice, no previous studies have explored the collective knowledge and attitudes across the interprofessional team in a community setting. Accordingly, this research aims to explore knowledge and attitudes amongst the IPT towards PU prevention

Material and methods

Study design

A quantitative methodology was adopted using questionnaires as part of a larger multiphase mixed methods design. A convenience sample of healthcare professionals were approached to establish the knowledge and attitudes of a variety of professional groups across the community setting.

Ethical considerations

Approval was gained from the University of Southampton School of Health Sciences Ethics committee (FoHS-ETHICS-10973/20097) and the research and development team in the community location.

Study population

The study sample comprised a variety of both registered and unregistered professional groups, predominantly from one community NHS Trust, including nurses, physiotherapists (PTs), occupational therapists (OTs), podiatrists, healthcare and rehabilitation assistants (HCAs, RAs), other allied health professionals, including speech and language therapists and associate practitioners, and management staff. The community setting in this context included both the provision of healthcare in a patient's home and in community hospitals. Community hospitals provide a variety of functions in the UK National Health Service (NHS), including inpatient and outpatient services, surgery, minor injury units and can be used by more than one healthcare organization.(Pitchforth et al. 2017) For this study, community hospital participants worked within inpatient and outpatient settings. The community organization where data were collected was split into three divisions – physical health, mental health and learning disability. A link to the questionnaires was sent out widely within each division. Consent was implied through completion of the questionnaires. Data were collected in January 2015.

Data collection

Two questionnaires were administered online and in paper form to explore knowledge and attitudes to PU prevention.(Beeckman et al. 2010a; Beeckman et al. 2010b) The link to the online questionnaire was sent out by senior managers, area lead clinicians and tissue viability nurses (TVNs), therefore limiting the ability to collect response rate data. A

series of demographic questions were included, comprising age, gender, role, clinical years' experience post registration and division of work.

Knowledge and attitudes questionnaires

The knowledge assessment tool (PUKAT) has 26-items, separated into six categories that represent different areas of knowledge in PU practice (Table 1) and has been demonstrated to have construct validity and good overall internal consistency with nurses (Cronbach's α : 0.77).(Beeckman et al. 2010b)

The attitude to pressure ulcer prevention questionnaire (APUP) represents a 13-item tool with content that encompasses five categories (Table 1) developed through literature review and double Delphi methodology.(Beeckman et al. 2010a) The APUP has been demonstrated with a nursing cohort to have adequate validity (CVI: 0.87-1.00), while also being reliable (Cronbach's α : 0.79, ICC: 0.88 (95% CI=0.84-0.91, $p < 0.001$).(Beeckman et al. 2010a) While both questionnaires were designed for nurses, they included topics that are relevant to the wider IPT. A small qualitative pilot was undertaken with a representative sample of staff (n=13) to ensure understanding and acceptability with a wider professional audience. Results indicated that the tools were generally coherent, even though the APUP tool used both positively and negatively worded items and lacked a neutral response as part of the Likert scale.

PU Knowledge assessment tool categories	Attitudes to PU prevention questionnaire categories
Aetiology and development	Personal competency to prevent PUs
Classification and observation	Priority of PU prevention
Risk assessment	Impact of PUs
Nutrition	Responsibility in PU prevention
Preventive measures to reduce amount of pressure and shear	Confidence in the effectiveness of prevention
Preventive measures to reduce duration of pressure and shear	

Table 1: PUKAT and APUP categories

Data analysis

Questionnaire results were included in the analysis if participants completed either or both of the questionnaires in their entirety. Data were analyzed using descriptive and inferential statistics (median, IQR, Kruskal-Wallis test). The scores were summed and converted to percentage values, with thresholds of 60% for knowledge and 75% for attitudes deemed satisfactory scores.(Beeckman et al. 2010a; Beeckman et al. 2010b)

Data are presented as median scores from the total possible score for the relevant questionnaire followed by the equivalent percentage score.

Results

In total, 119 participants answered the PUKAT questionnaire and 151 participants answering the APUP questionnaire. Of those who answered the APUP questionnaire 92% (n=139) were female, while 55% of participants were aged between 45 and 64 years of age. 144 participants opted to answer further demographics questions, with 62% indicating that they had more than 10 years' clinical experience. Over 69% of participants (n=105) indicated that they worked in the physical health clinical area, while approximately 16% were based in the learning disability sector. The remaining participants were from the mental health division or did not provide a response to this question. The six podiatrists who indicated 'Other' were from a different local Trust. Table 2 provides a breakdown of clinical years' experience and area of work for participants from both questionnaires. Insert table 2

APUP		Nurse		HCA		Physio		OT		Podiatrist		Other AHP		Rehab Asst		Management	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Clinical experience (years)	0-4 years	13	15.8%	6	46.2%	4	44.4%	3	17.7%	2	18.2%	1	50.0%	3	50.0%	0	0.0%
	5-9 years	14	17.1%	2	15.4%	0	0.0%	0	0.0%	1	9.1%	0	0.0%	1	16.7%	0	0.0%
	10-19 years	15	18.3%	5	38.5%	2	22.2%	10	58.8%	6	54.5%	1	50.0%	2	33.3%	4	100.0%
	20+ years	40	48.8%	0	0.0%	3	33.3%	4	23.5%	2	18.2%	0	0.0%	0	0.0%	0	0.0%
In which NHS division do you work	Health	62	79.5%	13	100.0%	6	66.7%	13	76.5%	3	33.3%	2	50.0%	5	83.3%	1	33.3%
	Learning Disability	13	16.7%	0	0.0%	3	33.3%	3	17.6%	0	0.0%	2	50.0%	1	16.7%	2	66.7%
	Other	3	3.9%	0	0.0%	0	0.0%	1	5.9%	6	66.7%	0	0.0%	0	0.0%	0	0.0%
PUKAT																	
Clinical experience (years)	0-4 years	15	21.7%	3	33.3%	3	21.4%	2	15.4%	1	14.3%	1	50.0%	3	60.0%	0	0.0%
	5-9 years	9	13.0%	1	11.1%	0	0.0%	0	0.0%	1	14.3%	0	0.0%	0	0.0%	0	0.0%
	10-19 years	13	18.8%	5	55.6%	10	71.4%	10	76.9%	4	57.1%	1	50.0%	2	40.0%	0	0.0%
	20+ years	32	46.4%	0	0.0%	1	0.0%	1	7.7%	1	14.3%	0	0.0%	0	0.0%	0	0.0%
In which NHS division do you work	Health	50	79.4%	8	100.0%	6	75.0%	11	78.6%	2	50.0%	2	50.0%	4	80.0%	0	0.0%
	Learning Disability	8	12.7%	0	0.0%	2	25.0%	1	7.1%	2	50.0%	2	50.0%	1	20.0%	0	0.0%
	Other	5	7.9%	0	0.0%	0	0.0%	1	7.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Table 2: Demographics data by questionnaire and profession

Knowledge

The overall median score achieved across the IPT for the knowledge questionnaire (PUKAT) was 17/26 (65%, IQR: 58% - 79%), representing an above satisfactory level (>60%). (Beeckman et al. 2010b) However, 26% (n=31) of participants did not reach this satisfactory threshold for knowledge. Descriptive statistics show variation between professional groups, with OTs demonstrating the highest score of 18/26 (69%, 65% - 73%), and HCAs and RAs achieved the lowest score of 15/26 (58%, 52%-67%) (Table 3). Nevertheless, when these data were collated into four groups, comprising allied health professionals (AHP), RAs, nurses and HCAs, no statistical difference was evident ($\chi^2(3) = 7.179, p = 0.066$). However, this does show a trend towards AHPs having greater knowledge than their nursing colleagues, with mean rank knowledge scores of 66 and 62, respectively.

Overall, participants with more than 20 years' clinical experience demonstrated the highest knowledge scores, although this trend was not significant ($p = 0.28$). Risk assessment and nutrition represented the highest scoring categories, with registered healthcare staff achieving a median score of 100%, while HCAs and RAs had lower scores (2/3, 67%). The results of the etiology and development sub-theme demonstrated that

OTs and PTs scored more highly than nursing, although this was not found to be statistically significant ($p = 0.433$).

Knowledge of preventive measures was generally poor, with a lower than satisfactory overall median score of 6/12 (50%), and no individual professional group achieving a median score (>60%).

Close examination of the answers to specific questions revealed that although all professions achieved satisfactory level scores (>60%) for the etiology and development category, 58% of participants could not identify that a lack of tissue oxygen was a major cause of PU development (Figure 1).

<i>Total PUKAT</i>	<i>Median</i>	<i>IQR</i>
Nurse n=71	17	15.0→18.5
HCA n=10	15.5	15.0→16.8
Physio n=8	17.5	16.8→18.5
OT n=13	18	17.0→19.0
Podiatrist n=7	17	15.5→18.0
Other AHP n=4	16	15.8→16.3
Rehab Assistant n=6	15	13.5→17.3
AHP (PT, OT, POD, Other AHP, RA) n=38	17	16→18

Table 3: Summary of the PUKAT by profession (maximum score of 26) (Other AHPs included Speech and Language Therapists and Associate Practitioners)

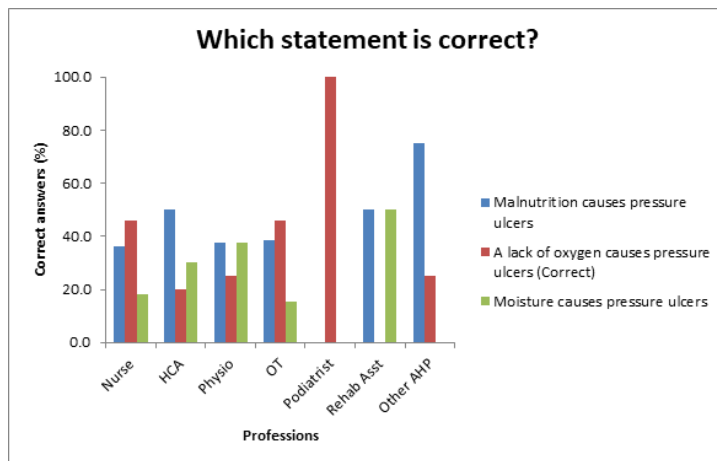


Figure 1: Results from PUKAT etiology and development category: Cause of pressure ulcers, by professional group

Attitudes

The overall median attitude score was 43/52 (83%, IQR 75% - 88%), representing an above satisfactory level (>75%).(Beeckman et al. 2010a) However, 21% (n=31) of participants did not demonstrate this level. The descriptive statistics also demonstrate distinct differences between professional groups (Table 4). Management staff (n=4) demonstrated the most positive attitude with a score of 46/52 (89%), while PTs and rehabilitation assistants (RAs) scored the lowest with a median of 41/52 (79%, IQR: 71% - 88%). There was a trend for nursing clinicians to have a more positive attitude than AHPs, although this difference between professional groups was not significant ($p>0.05$). Years of experience was associated with attitudes towards PU prevention, with nurses, AHPs and RAs with less than 2 years' experience having the lowest attitude score (73% - 75%) relative to more experienced groups.

<i>Total APUP</i>	<i>Median</i>	<i>IQR</i>
Nurse n=84	44	39.0→47.0
HCA n=15	45	39.0→46.0
Physio n=9	41	37.0→46.0
OT n=17	45	39.0→46.5
Podiatrist n=11	43	38.0→45.0
Other AHP n=4	42	35.8→43.8
Rehab Assistant n=7	41	41.0→44.0
AHP (PT, OT, POD, Other AHP, RA) n=48	42.5	38.8→45.3
Management n=4	46	.*

* IQR is not shown for the management group due to the small number of participants

Table 4: Summary of the APUP by profession (maximum score of 52)

Priority of PU prevention represented the highest scoring category overall (11/12, 92%).

There were differences between groups with nurses, OTs and HCAs feeling more responsible (10.5/12, 87.5%) than PTs, podiatrists and RAs (9/12, 75%). However, even within the nursing and OT cohorts, there was considerable variability in perceived responsibility (Figure 2).

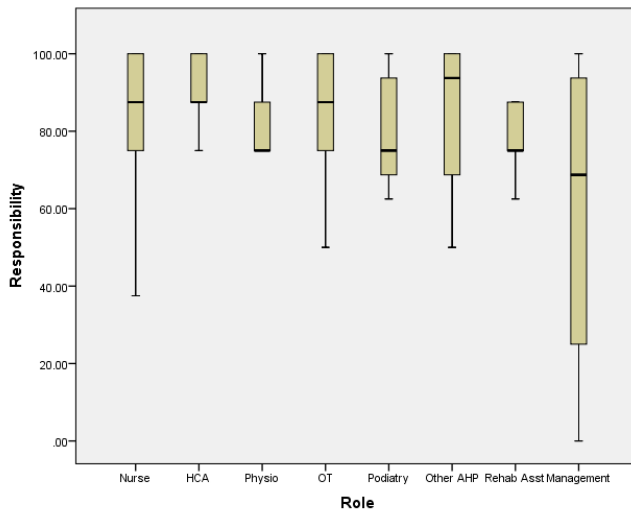


Figure 2: APUP responsibility category, by professional groups, representing percentage correct answers (median/IQR)

Nursing staff demonstrated the highest median score for the personal competency category (10/12, 83%), although there was a large range in the scores (50% - 100%). PTs, OTs, podiatrists, RAs and other AHPs demonstrated the lowest perceived competency values (9/12, 75%). Indeed, some participants were not confident in the effectiveness of PU prevention and demonstrated a belief that PUs are not preventable in high-risk patients. These views were expressed by over 32% of nurses, 11% of OTs and over 62% of HCAs/RAs, as indicated in Figure 3.

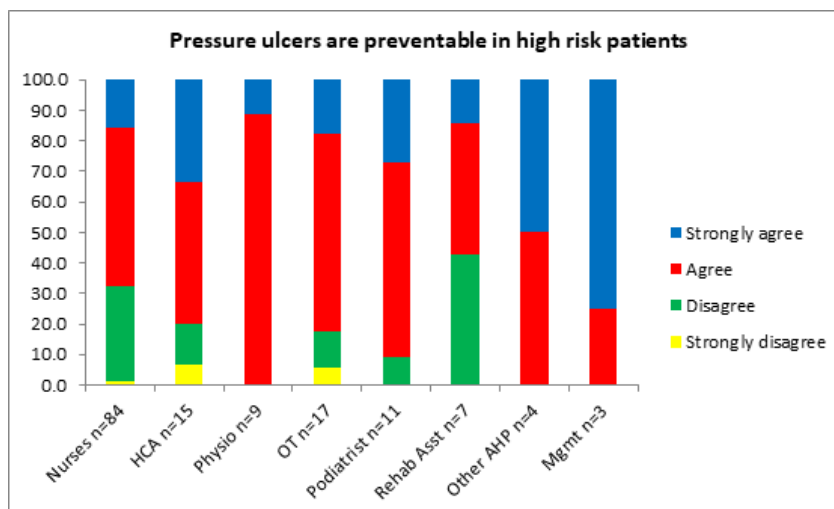


Figure 3: Results from APUP statement 'Pressure ulcers are preventable in high risk patients', by professional group, representing percentage scores for the four-item Likert scale.

Discussion

This is the first study to explore knowledge and attitudes to PU prevention with a variety of professional groups in a UK community setting. The descriptive results demonstrate an overall satisfactory level of knowledge and attitudes across healthcare staff in the community, although unregistered staff, such as HCAs and RAs, did not achieve satisfactory levels of knowledge.

The overall median score for knowledge (65%) represented a higher result than other studies that used the same assessment tool with nurses and nursing assistants. As an example, mean values of 49.6% and 58.9% were reported in Belgium (Beeckman et al. 2011) and Sweden, (Gunningberg et al. 2103b) respectively. As PU practice is traditionally perceived to be the domain of the nursing profession (Cramp et al. 2004; Samuriwo 2012) it might be predicted that their knowledge would be higher than other professions.

However, although small variations were seen between individual professions, overall comparison between nurses and AHPs indicated that they held similar levels of knowledge. The median scores for PTs and OTs in this study (67% – 69%) are similar to those reported by Worsley and colleagues (2016) in an acute setting with the same professions (69%). While these results may indicate a response bias in terms of only capturing interested AHPs, they may also collectively increase confidence that AHPs can play an active role in PU prevention. In doing so, professional stereotyping, considered to be an unfavorable perspective leading to insufficient communication between

professional groups,(Ryan and McKenna 1994) may be reduced and interprofessional teamwork promoted (West and Slater 1996).

Results from the knowledge categories appear to highlight a greater focus on treatment as opposed to prevention of PUs, with etiology and classification category scores being higher than preventative measures. Indeed, Panagiotopoulou and Kerr and Worsley et al both reported similar findings, with preventive strategies representing the lowest scoring category for nurses and OTs/PTs, respectively. Although individual healthcare staff undertook the questionnaires, the focus on treatment over prevention may reflect organizational culture, driven by policy recommendations. Indeed, a recent policy document review highlighted a greater focus on treatment than prevention.(Jackson et al. 2016) Given that wound care is currently defined as a nursing responsibility,(Spilsbury et al. 2007) this could impact on interprofessional teamwork.(Bloor and Dawson 1994; Nancarrow et al. 2013)

Although etiology and development were shown to be one of the highest scoring categories, 58% of participants could not identify that a lack of tissue oxygen was a major cause of PU development (Figure 1). Similar findings were also reported in previous studies involving nurses.(Beeckman et al. 2011; Gunningberg et al. 2013b) Indeed, Gunningberg et al suggests that there is confusion about the difference between the terms 'cause' and 'risk factors', with participants defining either malnutrition or moisture as a causative factor in PU development. The data from the current study demonstrated that podiatrists were the only professional group that identified tissue oxygen as the primary etiology (100% correct answers).

The overall median score for attitudes (83%) was similar to other studies that used the same questionnaire. For example, Beeckman et al (Beeckman et al. 2011) reported a

mean score of 71% with a sample of nurses and tissue viability nurses in Belgium, while in Sweden and Turkey, nurses demonstrated higher mean scores of 89% and 84%, respectively.(Florin et al. 2014; Aslan and Yavuz van Giersbergen 2016) The attitude score of the community nurses in the current study represented a median score of 85%, while three other professional groups demonstrated a more positive attitude, including management staff (89%) and OTs/HCAs (87%). These scores were higher than those reported for AHPs in a recent UK hospital based study using the same tool (median: 81%).(Worsley et al. 2016) The positive attitude scores demonstrated by the management staff may reflect their level of experience (10-19 years). A UK study including nurse managers reported similar findings, where greater experience lead to higher perceptions of value in relation to PU prevention.(Samuriwo 2010b) However, it is also possible that their attitude scores relate to a particular interest in this area of practice, a desire to reduce adverse events or an awareness of targets in relation to the incidence of PUs.

A less positive attitude was associated with lower levels of experience for nurses, AHPs and RAs. Samuriwo (Samuriwo 2010b) reported similar findings through semi-structured interviews with nurses, nurse managers and student nurses, finding that values in relation to PU prevention changed based on the experience of working with someone with a PU. HCAs demonstrated a positive attitude to PU prevention in the current study. However, their knowledge scores were among the lowest of all staffing groups (59.6%). This should represent a concern for current practice, as others have previously indicated that PU-related tasks are often delegated to HCAs.(Athlin et al. 2010; Sving et al. 2012b)

At the time of data collection, PU related training for staff was not mandatory and although courses were available; this relied heavily on community teams having the capacity to support staff to attend. Ensuring the appropriate cover to do so may have

been a challenge, given the previously reported gaps in both the nursing and AHP community workforce.(Dorning and Bardsley 2014; Pinkney et al. 2014) Given that PUs are traditionally viewed as a nursing domain, it is possible that fewer AHPs attended this training, which may have influenced both the uptake of the questionnaires and the results. Indeed, while AHPs collectively demonstrated the same knowledge as nurses in this study, they may only represent an interested sub-set of these professional groups.

Limitations

This study was conducted in a community NHS Trust with a relatively small sample of healthcare staff. This represents a limitation in terms of the analysis and generalizability of the results. However, the proportion of different staff was broadly representative of the clinical setting and the range of different professional disciplines can be considered a strength. While validation of the knowledge and attitudes assessment tools has only been undertaken with nurses,(Beeckman et al. 2010a; Beeckman et al. 2010b) the content was considered to be relevant for the wider IPT, confirmed by the pilot study. A greater number of participants undertook the attitudes questionnaire (n=151), than the knowledge questionnaire (n=119). While these were administered as a single online questionnaire, the attitudes section came first, so any participants who were limited by time constraints may have neglected the knowledge section. However, it is also possible that the knowledge-based questions were perceived to be more difficult to answer, creating bias in the data.

Clinical implications

PU prevention is considered to be a priority in clinical practice, yet participants demonstrated a lack of perceived personal competency or confidence in effective

prevention. It is, therefore, unsurprising that a proportion of participants considered that PUs were not preventable in high risk patients. Consequently, in light of the deficit in preventive knowledge, an associated impact on the provision of preventive measures in the community could be anticipated. However, this study has shown that knowledge and attitudes in the wider IPT can provide the basis for improved practice by integrating multifaceted knowledge from across professional groups.(Firth-Cozens 1998) Indeed, interventions for preventing PUs have been linked to the role of a variety of healthcare professionals.(Guihan et al. 2009) However, more research is needed to establish collaborative practice and interdependence between professions.(Skjørshammer 2001)

Conclusion

The findings of this study demonstrate that while PU prevention is considered to be the domain of the nurse, other professional groups exhibited both a strong knowledge and positive attitude toward this clinical challenge. These findings illustrate the potential for an interprofessional approach that utilizes knowledge from across the healthcare team to provide effective prevention. However, a lack of confidence or perceived competency in this area of practice may be limiting collaborative efforts. Future research should use qualitative methods with individual and interprofessional groups to provide further insight and context to these results.

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Community prevalence rates, country and reference

Study	Location	Methodology	Prevalence
(Ferrell et al. 2000)	USA, 41 home care agencies in 14 states	Survey conducted by nurses	9.1%
(Lewin 2007)	Western Australia, Silver Chain community care	Individuals identified as immobile or wheelchair bound through Barthel index. 344 identified, n=175 agreed to participate in a survey conducted over 10 days. Data from 2004.	19%
(Paquay et al. 2008)	Belgium, 5 Flemish provinces	Cross-sectional survey of prevalence with 2779 patients	6.8%
(Asimus and Li 2011a)	Australia, 45 community health sites in Hunter New England area	Cross-sectional survey. Random sample of community patients currently receiving. Excluded if only seeing physio or dietician	8.9%
(Stevenson et al. 2013) (Site 1)	UK, One NHS community site in the North of England (Pop. 240,038). Included home, residential home, rehabilitation unit, palliative care unit, nursing homes	>18 years of age, assessment of all patients on community nursing caseload	11% 0.77 per 1000
(Stevenson et al. 2013) (Site 2)	UK, One NHS community site in the North of England (Pop. 251,891). Including home, residential homes, rehabilitation units, palliative care units, nursing homes	>18 years of age, Assessments for patients on community caseload known to have an existing PU	0.40 per 1000
(Skerritt and Moore 2014)	Ireland, 16 health centres in urban and rural areas (Pop. 118,379)	Prevalence over 1 week. Use of wound prevalence and aetiology questionnaires	22%
(Hopkins and Worboys 2015)	UK, One London borough (Pop. 254,000). Included adult and children community nursing, practice nurses, 2 x	Prevalence over 1 week	13%

	nursing homes, residential homes, learning disability, 2 x walk-in centres		
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