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Research Article

Examining nurses' knowledge, attitudes, and perceptions when caring for people with dementia in hospital: a mixed methods study

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Short Title: **Examining nurses' knowledge, attitudes, and perceptions when caring for people with dementia in hospital: a mixed methods study**

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Abstract

Introduction: Nurses in Saudi Arabia lack sufficient training in dementia care, a challenge compounded by cultural beliefs that frame dementia as fate rather than a medical condition. This gap in knowledge and skills hinders nurses' ability to provide appropriate support to people living with dementia in hospital settings.

This study investigated Saudi Arabian hospital nurses' knowledge (cognitive expertise), attitudes (feelings and behaviors), and perceptions (thoughts, concerns, and interpretations of behaviors) of caring for people living with dementia to inform future training programs.

Methods: The study used a sequential explanatory mixed-methods design, conducted in six hospital settings in Jeddah, Saudi Arabia. Data were collected between March and July 2018. Quantitative data were gathered using two validated tools: the Dementia Attitude Scale and the Dementia Knowledge Assessment Tool Version 2. Qualitative data consisted of diary entries for ten working days followed by semi-structured interviews. Data integration was performed using the Pillar Integration Process.

Results: A paper survey was completed by 710 nurses, with 17 keeping a diary and 18 participating in interviews. The survey identified themes of knowledge-attitude links, work environment impact, cultural and educational influences, low confidence levels, and gaps in dementia care knowledge. Diary-interviews revealed themes such as knowledge acquisition, attitude-driven behaviors, perceptions of dementia care, professional challenges, and suggestions for improving care. The Pillar Integration Process highlighted five key findings: (1) a lack of knowledge is linked to low confidence in nursing people with dementia, (2) nurses are eager to learn but face limited access to resources, (3) attitudes, emotions, and communication challenges influence care delivery, (4) stigmas and cultural norms negatively impact dementia care, and (5) organizational factors hinder care quality.

Conclusion: Saudi Arabian nurses face significant challenges in dementia care, including inadequate knowledge, resource constraints, and negative attitudes. These findings emphasize the need for targeted training and policy interventions to improve dementia care quality.

This study highlights nurses' emotional strain and practical difficulties in dementia care, providing insights for global improvements in dementia care practices and support for nurses' wellbeing.

Introduction

Nurses around the world are expected to be knowledgeable about dementia and understand the needs of people with this condition [1]. Providing nursing care to people with dementia can be challenging for several reasons including a lack of awareness that the person has dementia, as well as a lack of competencies and resources to support the person in an individualized way [2]. Governments are encouraged to put national plans in place, which prioritize diagnosis and post-diagnostic care and support, particularly in hospital settings [3]. At the time of writing, 48 countries, including Iran and Qatar, have developed a national dementia plan. Such plans clarify a country's response and priorities in respect of supporting people with dementia in hospital. However, in countries where there are no national plans, such as the Kingdom of Saudi Arabia (KSA), and where diagnostic procedures and public services for dementia are not widely available [4], the nature of responsiveness is less clear. This is a concern given the prevalence of dementia in KSA is higher than the worldwide figures. This paper reports on a mixed methods study conducted in KSA, which aimed to examine Saudi nurses' knowledge of, attitudes towards, and perceptions of caring for people with dementia in KSA hospitals. It is believed to be the first study of its kind conducted in this region.

Knowledge is key to improving the quality of nursing care for people with dementia [5]. Evidence shows a positive relationship between knowledge of a health condition (such as dementia) and the formation of healthy attitudes towards people with that condition [6]. Hence, healthcare organizations and policymakers regard training and educational programs an effective way of developing positive attitudes toward people with dementia among nurses [5].

Nurses in KSA receive minimal training on dementia care, due to several cultural and religious influences. First, cultural perceptions of dementia as a fate-driven experience (Qadar), rather than a neurological condition render the idea of training, illogical. Second, gender segregation in KSA influences caregiving dynamics, limiting interactions between genders and affecting professional development opportunities [10]. Third, healthcare in the KSA operates on a family and spiritually centered care model [8], with Islamic principles promoting a healthy lifestyle through personal hygiene, exercise, prayer, and moderation [9]. With this model, families are traditionally considered responsible for supporting their relatives' care needs, as opposed to health professionals. A responsibility reinforced by a saying of Prophet Mohammad, emphasizing guardianship over family, community, and belongings [7].

The cultural emphasis on family duty means that in the KSA and the broader Eastern Mediterranean (EM) region, long-term care facilities for people with dementia are limited. Placing a relative into a long-term care facility is considered an abandonment of family duty, deeply rooted in Islamic and cultural values. That said, long-term care facilities are not completely absent. For families without adequate resources or support, hospitals may become substitutes for long term care. Indeed, despite reservations about placing older adults in nursing homes, there is a rising admission to hospitals and nursing homes in KSA [11, 12].

As of 2020, Saudi Arabia had approximately 15 nursing homes facilities [13, 14]. These facilities are distributed across various regions, with Riyadh hosting four facilities with 670 beds, Makkah having three facilities with 426 beds, and the Eastern region containing four facilities with 190 beds. Given the country's aging population and increasing life expectancy, there is a recognized need to expand nursing homes services [13]. The Saudi government is actively addressing this need by encouraging investments in nursing homes and long-term care services, aiming to enhance the quality of life for its older adult's population.

Demographic shifts, such as urbanization and a transition to nuclear families are also affecting the workforce in this region. These shifts exacerbate the nursing shortage, leading to increased reliance on foreign-trained nurses, especially from India and the Philippines. Challenges in public perception of the nursing profession hinder recruitment, compounded by poor identity and awareness issues [15]. The profession faces various challenges, including concerns about professional working

environments. Disagreements over care quality in hospitals prompt discussions among Saudi researchers, emphasizing the need for effective communication, collaboration, and leadership. Inadequate staffing remains a concern, hindering the effective delivery of care and support services to patients [11, 16]. The shortage is intensified by a lack of local training facilities and increasing migration of qualified staff to Western countries for further training and better job opportunities. Therefore, nurses working in hospital settings may not have the appropriate knowledge and skills required to support people with dementia.

In this study, *knowledge* in nursing is conceptualized as cognitive expertise, recognizing that nursing knowledge is not a singular, coherent entity but a complex and nuanced collection of information. For the purposes of this study, knowledge specifically refers to nurses' propositional cognitive expertise derived from learning and reflects their role in delivering nursing care [17]. Attitudes in nursing are crucial for understanding how nurses respond to and manage various situations in patient care, guiding their considerations of appropriateness. In this study, *attitudes* encompass feelings, beliefs, and intentions towards specific topics or situations, distinguishing between affective and cognitive attitudes and behavioral attitudes that drive actions. Finally, *perceptions* in this context refer to thoughts, concerns, and interpretations of behaviors related to dementia care in hospital settings. Despite challenges in theoretical integration, this study explores nurses' beliefs and interpretations of dementia care, shedding light on how nurses in the KSA provide support to individuals with dementia in hospital settings.

Methods

Aim

The aim of the study was to examine Saudi nurses' knowledge of, attitudes towards, and perceptions of caring for people with dementia in KSA hospitals.

Design

This was a sequential explanatory mixed-methods design, where quantitative (survey-questionnaire) data were generated first, and then qualitative (diary-interviews) data. Data were analyzed separately and integrated using the Pillar Integration Process [16]. A process that involved listing, matching, and checking survey and diary-interview data, and then pillar-building (formulating findings) based on both datasets. The technique was used to maximize synthesis and minimize bias.

Participants and study setting

English-speaking Registered Nurses (RNs) who had worked in a hospital department, which admits people with dementia, for at least one year, were invited to participate in the study. A large and diverse sample of nurses was gained by recruiting from six hospitals across Jeddah, including two main large medical hospitals (KFGH and KAH), two newly developed hospitals (EJGH and KAMC), a psychiatric hospital (PSY), and a rural hospital (ALT).

Data collection

Quantitative data

Quantitative data were collected using the survey method between March and July 2018. One thousand participant information sheets and questionnaires were distributed manually to participating hospitals via regional nurse education centers. Participants were invited to complete a survey that included questions about demographic background and two validated instruments–- the Dementia Attitude Scale (DAS) and the Dementia Knowledge Assessment Tool Version 2 (DKAT2). The DAS gauges healthcare professional' attitudes using a tripartite aspect, measuring affective, behavioral, and cognitive dimensions. It utilizes a seven-point Likert scale, scores range from 20 to 140, with higher scores indicating positive attitudes [19]. The DKAT2 evaluates professional' and caregiver' knowledge with 21 true/false/do not know questions, scoring from 0 to 42 [5]. were used to assess nurse'' knowledge and attitudes towards dementia.

Qualitative data

Qualitative data were collected using the diary-interview method between April and August 2018. Twenty self-selecting participants from the survey sample (2.8%) kept a written record of their experiences of caring for people living with dementia over ten working days and were then interviewed by the first author about their diary entries. Participants received a template to record care details for individuals with dementia over ten days. Prompts covered emotions, perceptions, confidence levels, cultural and educational influences, assumptions, and reactions. Subsequently, semi-structured interviews were conducted, addressing questions developed prior to data collection. Interviews prioritized participant safety and cultural considerations, ensuring a private and quiet environment.

Data analysis and integration

Quantitative data were analyzed using SPSS and then stored and coded with the qualitative data using NVivo 12.

The scores for the second section of the DAS were calculated within the range of 20 and 140, with positive attitudes being related to higher scores. A score of 1 indicates the most negative attitude, and 7 indicates the most positive. The third section's scores of the DKAT2 were labeled as 0 (for incorrect responses and "do not know" responses) and 2 (for a correct response). This was followed by adding the scores, which ranged from 0 to 42, with a higher score indicating greater knowledge.

The overall DAS and DKAT2 scores were summarized using the mean and standard deviation (or medians and quartiles, as appropriate) as well as a 95% confidence interval for the mean to estimate the knowledge and attitude scores of the sample. Individual questions were summarized using the frequencies and percentages of positive/correct responses to represent the statements with the most positive/correct responses and aid in identifying the gaps in knowledge and attitudes.

A multiple linear regression analysis was conducted to analyze the variables within the SPSS file. This analysis was performed to construct a model and understand the relationships between variables. Specifically, it examined the relationships between nurses' knowledge, attitudes, and various demographic factors, including age, years of experience, and level of education. Finally, a correlation analysis was planned as well to explore the relationship between the DKAT2 and DAS scores. The correlation analysis was used to quantify the association between two continuous variables, which in this study were knowledge and attitudes.

Qualitative data were analyzed using Braun and Clarke's six-phase technique [20]. Interviews were recorded to enable accurate transcription and analysis. The process began with getting familiar with the data through transcription, translation, and preliminary thoughts. Next, close reading assists in the initial and subsequent cycles of coding. Coding is objective, focusing on participants' responses,

survey narratives, and reflexive diaries to produce initial codes. The second cycle of coding ensures reliable and distinct themes are identified. These phases were conducted by the first author, with consultation and validation from the second author and another supervisor to ensure rigor and reliability in identifying and interpreting themes. The third phase involves interpretative reading and reflexive analysis to generate themes. Themes are reviewed and their relationships to the dataset are checked, resulting in a thematic map. Interpretative codes, generating concept themes, emerge during this cycle, while earlier coding phases are descriptive. Finally, each theme is named and defined clearly, followed by reporting and discussion of the analysis [21].

Data generated from the survey and diary-interviews were integrated in two stages. First, when questionnaire data were transformed from quantitative to qualitative using a qualifying technique, a data transformation technique was applied. Then, the results were merged into the themes identified. This was done to identify similarities and/or differences between the responses to a written survey and the diary-interviews of participants' views. Second, meta-matrixes were used to visualize the study's findings and to help in the dissemination. This methodological integration is meant to maximize the data contents of the current attitudes, knowledge, and perceptions of nurses caring for people with dementia.

Ethical considerations

Ethical approvals were obtained in two countries from two authorities: (1) the Ethics and Research Governance Committee at the University of Southampton, UK and (2) from the MOH in the Western region of KSA. Information sheets were sent to the MOH facilities via the MOH research center employee gatekeepers, who were physicians (medical consultants and specialists) and nurses who work with people with dementia and can access nurses working in such contexts. To collect data from the KSA MOH, ethical approval was needed from the Jeddah Health Directorate. As an incentive to join, participants were offered a certificate of appreciation from the University of Southampton and King Abdulaziz University as compensation for their time.

Rigor

Quantitative data collection used two previously validated tools. The final analysis of data used the Pillar Integration Process– a systematic four-stage technique that facilitates the integration of multiple data sources using a visualized cross-case matrix [18]. The process merges findings across datasets through a transformation technique and joint display, creating a structured integration of quantitative and qualitative data, enhances integration rigor and transparency [18]. The columns for both types of data are initially presented at opposing sides and then converge in the center to highlight themes. This methodological integration aims to maximize data contents regarding nurse'' knowledge, attitudes, and perceptions in dementia care, offering synthesis opportunities while reducing researcher bias. We sought to enhance the trustworthiness of qualitative data by using a carefully developed template for diary participants to complete.

Results

The study sample and response rates among the recruited participants, including the CONSORT flow chart is shown in Figure 1.

Initial survey findings

This study included a total of 710 RNs who were working with even distribution across eight different ward types within six hospitals. Most (57.6%) were young adults (21–40 years old), female (87.9%) bedside nurses (70.4%) from the central hospitals. The descriptive statistics confirmed that nurses' knowledge about people with dementia could be considered moderate (with scores ranging from zero to 38 on a scale of 0 to 42) and that their attitudes towards them are generally positive (with scores ranging between 53 and 129 on a scale of 20 to 140). For more demographical information refer to Table 1 and for mean and Standard Deviation refer to Table 2.

The concept map below demonstrates the main findings from the statistical analysis of the questionnaire that are discussed in this section (**Error! Reference source not found. Error! Reference source not found.**). The multiple linear regression analyses identified the important factors that influence nurses' knowledge of and attitudes towards dementia with a positive linear correlation between knowledge and attitudes scores present in the Bivariate Pearson Correlation Test; however, there are some instances where this is not the case. This is likely due to other contributing factors that led to differences in the results. For instance, working in a psychiatric ward is associated with higher knowledge about dementia but with more negative attitudes. The opposite applies to working in mixed wards, convalescence departments, and clinics, where nurses hold more positive attitudes but with lower knowledge levels.

The availability of resources at work, particularly evidence-based materials, influences nurses' knowledge and attitudes. The presence and usage of accessible evidence-based materials are associated with positive attitudes, even when nurses demonstrate lower knowledge. This may be due to insufficient training or the recent introduction of these resources into MOH facilities. Conversely, higher knowledge is observed in settings with accessible reading groups and computer-based learning, highlighting the benefits of structured and guided educational environments. Interestingly, internet access correlates with lower knowledge and more negative attitudes, which may be attributed to nurses encountering unverified or conflicting information online, leading to confusion and reduced confidence. Positive attitudes are also linked to nurses working in wards admitting various diagnoses, while emergency departments and surgical wards exhibit more negative attitudes and lower knowledge among participants.

Nurses with up to five years in the same ward have higher knowledge and positive attitudes, while those with more than six years but less than 11 years display lower knowledge and the most negative attitudes. The findings indicate that nurses working in the same ward for up to five years demonstrate higher knowledge and more positive attitudes than who worked in different wards. This could be attributed to their initial enthusiasm and engagement with the care process. However, spending more than six years in the same ward correlates with lower knowledge and more negative attitudes, potentially due to routine and repetitive tasks leading to diminished interest or burnout. In contrast, nurses with over 11 years of overall nursing experience show improved knowledge and attitudes, likely due to accumulated exposure to diverse situations and ongoing professional growth. These patterns emphasize the potential influence of work environment dynamics, professional development opportunities, and exposure to new challenges on knowledge and attitudes.

Administrative nurses show the highest knowledge and positive attitudes, in contrast to community nurses. Lower knowledge is linked to nurses experienced in dementia care or having a family member with dementia. Despite professional dementia care experience leading to positive attitudes, those with family members with dementia have more negative attitudes. Knowledge and attitudes are elevated with formal dementia education, and other variables like working experience, gender, and education levels may contribute to these results.

Educational and cultural backgrounds influence nurse' knowledge and attitudes. Significant links between positive attitudes and high dementia knowledge exist among Filipino and Indian nurses, and Eastern-Mediterranean nurses score higher than Saudi nurses. The study sample, with fewer Saudi nurses holding bachelor's and master's degrees, shows a statistical significance relating to more positive attitudes and higher knowledge. To clarify, nurses with higher education degrees, regardless of nationality, demonstrated more positive attitudes and higher knowledge. Among Saudi nurses specifically, those with higher education degrees, exhibited more positive attitudes and knowledge scores than those with lower education levels.

Participant' ratings of their knowledge and readiness to learn about dementia reflect in their knowledge and attitudes scores, with nurses who rate their knowledge as high tending to have more negative attitudes. This finding is influenced by educational and cultural backgrounds. Nurses with higher self-reported knowledge may lack practical experience, leading to frustration or negative attitudes. Additionally, cultural norms and increased awareness of care challenges may contribute to this dynamic.

Nurses' self-confidence and comfort levels impact the results, with unfamiliarity with dementia leading to negative attitudes about their own care provisions. Some nurses avoid agitated people with dementia, and approximately a quarter of the sample lacks confidence, feels uneasy around people with dementia, and does not want to care for or touch them. These figures indicate a negative attitude regarding nurse'' affective and behavioral aspects, while the cognitive aspect is considered more positive, with participants somewhat uncertain about the coping skills and creativity of people with dementia.

Initial diary-interview findings

A total of 23 self-selecting survey respondents initially agreed to take part in the diary-interview phase. Of these, 17 participants completed a diary and were interviewed, in addition to one participant who agreed to be interviewed but did not keep a diary. Diaries were collected between April and August 2018. Participants were asked to keep a diary for one week; however, the duration ranged from 6 to 112 days (39.4 ± 30). The extended timeline for some participants was due to variability in ward routines, the frequency of caring for people living with dementia, and the availability of relevant cases in their wards. Participants in wards where patients with dementia were less frequently admitted required additional time to capture their caregiving experiences. This flexibility ensured participants could provide richer and more contextually relevant data, capturing meaningful insights when caring for people with dementia became applicable in their clinical setting. Interviews were conducted between May and August 2018 at the participants' convenience and as soon as practically possible after the diary entries phase. The duration of each interview was between 20 and 40 minutes. See Table 3 for demographics and environmental characteristics and Table 4 for experience and education characteristics of diary-interviews participants.

A mind map and matrix were generated within NVivo 12, which summarizes the codes and each code's key findings to better understand the data and search for themes. See the table below (Table 5).

From the previous table, five themes were identified. (1) Acquisition of knowledge and the belief systems of nurses, (2) Attitudes informing nurses' behaviors, (3) Nurses' perceptions towards living with and caring for people with dementia, (4) Socio-cultural factors affecting nursing practices, and (5) Nurses' ideas for enhancing dementia care.

The data extracts show that nurses are aware of their lack of knowledge, but they are nevertheless able to draw on their personal experiences and cultural beliefs to provide appropriate support for people with dementia. Moreover, all three aspects of attitudes – affective, behavioral, and cognitive – inform nurses' behaviors and their knowledge, as well as their perceptions towards caring for people with dementia. Socio-cultural factors, such as society and social norms, negatively impact nurses' perceptions and dementia nursing care. Lastly, all nurses called for organizational changes and for actions aimed at meeting the healthcare requirements for people with dementia, as well as enhancing their well-being and improving nursing care practices within KSA hospitals.

Another significant finding from the diary-interviews data was that nurses' emotions, notably sadness, love, and anger, were influential factors in the care they provided. These emotions are of note since participants had previous negative experiences and were not confident about the care they provided. For instance, participants from all wards have expressed anger because of patients' aggressive behavior towards them, as well as the shortage of and inaccessibility to healthcare facilities. This is suggested to be linked to communication difficulties and a patient's inability to make decisions for him/herself [22].

Another finding relates to patients' behaviors and participants' perceptions, which were found to affect care practices. Nurses perceived a person with dementia as neither alive nor dead, a stranger to oneself, and being in a place that cannot accommodate them. Therefore, participants viewed the care for people with dementia as being difficult and challenging, consequently affecting their stability and mood swings, which were exacerbated by patients' inability to express their feelings or needs and being demanding of others. Moreover, some patients' aggressive behaviors caused added stress among some nurses, indicating that extra care and special ways of communication were needed to deliver the care. However, workplace routines and policies, along with staff shortages, were considered barriers to providing this proper nursing care.

Societal and cultural norms are other factors that impacted the participants' knowledge, attitudes, and perceptions. For instance, nursing care is performed much more easily when family members show high levels of awareness about people with dementia. The participants' diaries revealed instances where families in the KSA negatively impacted both nurses and patients, often due to their lack of awareness and negative attitudes. Some Saudi participants reported that families were increasingly tending to abandon their relatives in hospitals for days, sometimes months, without taking them home or answering their phones, particularly when the person with dementia had neither a spouse nor children. A participant said:

"They [the family] are not even answering their phones. They know the hospital numbers and they are not answering […] their families are refusing to take them out because they are difficult to deal with at home, so they prefer to leave them here to be taken care of" (P21 INT)

Another participant added: *"when they do not have a strong family bond, they will just leave the patient for the care of the rehabilitation"* (P23 INT). All extended convalescence medical wards and psychiatric wards nurses contend that the presence of a person with dementia or with suspected dementia at these wards was likely an indicator of abandonment by their families. Of course, this not only adds to the emotional challenges of caring for people with dementia, but it also adds increased administrative burdens.

The last finding relates to organizational pressures, specifically staffing levels. The nurse-to-patient ratio was seen by all participants as the main reason for stress and an inability to provide optimal nursing care. Bedside nurses claimed that they care for seven to ten patients, one or two of whom will have some form of dementia. They said, this negatively impacts overall care by placing an emotional strain on nursing staff. Nursing supervisors who participated in the study claimed that when a person with dementia is admitted the ratio changes to one nurse to three patients. However, all other participants stated that they never cared for fewer than six patients at a time, even with the presence of a person with dementia. Hence, participants universally called for action, with some

recommending having a primary nurse or nursing assistant to support people with dementia. Thus, it is important to have knowledgeable nurses with higher degrees while at the same time increasing staff sizes to enhance patients' well-being and maintain healthcare environments for both nurses and patients.

Final integrated findings

The researcher's conceptualized insight is illustrated by integrating and connecting survey and diary-interview data. Each identified pillar holds the integrated themes from each row. After all the pillars were presented in the table, the researcher was able to weave pillars together into more meaningful descriptions from the survey and diary-interviews integration (see Table 6 below).

A lack of knowledge is associated with a lack of confidence when providing nursing care for people with dementia.

The survey revealed low-moderate knowledge scores (mean of 24 out of 42), emphasizing a positive association between knowledge and attitudes. Qualitative data from diary entries and interviews affirmed the pivotal role of dementia knowledge acquisition in enhancing nurse'' cognition.

Nurses' knowledge acquisition significantly influenced their confidence levels, shaping their present knowledge and cognition about dementia. A participant highlighted the lack of institutional motivation, stating, "*To be honest, they were not teaching us these things (caring for people with dementia); unfortunately, nothing was given… No one motivated us to learn or called to train us unless you had the courage to do it yourself*" (P04 INT).

The survey identified low self-confidence related to nurses' cognitive abilities about dementia, impacting their comfort level in providing care. Factors such as age, experience, and nursing degree influenced this theme. Approximately 15% were undecided about comfort, with only a quarter feeling relaxed and confident around people with dementia.

Younger nurses, lacking exposure to dementia care, expressed lower confidence levels. The rising prevalence of dementia necessitates increased nurse-patient interactions, affecting both new and experienced nurses. Diary-interviews revealed a gradual increase in confidence, with one participant expressing, "*We studied about it; however, it was just an idea, dementia and that's it. When we started working, we were supposed to forget about it and start all over again to gain knowledge with experience*" (P03 INT). Another participant emphasized the curiosity sparked by diary reflections, stating, "I *feel that I became more curious about this subject. I was looking for these patients to investigate the differences and to know how they behave. I benefited from writing diary*" (P19 INT).

Nurses are willing to learn about nursing care for people with dementia, but information and resources are not always available.

While half of the participants lacked in-depth knowledge of dementia complications, 15 participants expressed a desire to understand the condition, its progression, complications, and nursing care approaches. One participant emphasized the importance of knowing "different actions that could be done, how to change, and ways of communicating and providing care" highlighting the need for practical knowledge (P03 INT).

Participants' eagerness to learn about dementia was hindered by limited resource availability. The survey revealed higher knowledge scores when reading groups (5.2%) and computers (37.2%) were

accessible at nurse' workplaces. Many relied on internet search engines, such as Google, for information, citing ease of use compared to evidence-based materials. A participant noted, "*I believe that if a person is well educated, reads a lot, looks for information, and gains knowledge […] it may minimize or reduce the occurrence […] of using Google*" (P05 INT).

Participants' self-rating of knowledge and readiness to learn correlated positively with their knowledge and attitude scores. However, those who rated their knowledge high tended to exhibit more negative attitudes. Despite their basic knowledge, participants acknowledged the need for hands-on information on the correct handling of people living with dementia and caring for their specific needs. One participant expressed, "*I feel that what I know is still a drop in the ocean. Dementia is a huge subject. I would like to know more about it*" (P08 INT).

The study underlines nurses' willingness to learn about dementia, emphasizing the scarcity of available information. Recommendations from participants highlight the need for training, research, and education to improve dementia nursing practice. Despite possessing foundational knowledge, nurses seek more hands-on, experience-based information to efficiently meet the specific needs of people living with dementia and integrate effective care protocols.

Nurses' attitudes, emotions, and perceived communication difficulties affect their delivery of dementia care.

Nurses' attitudes toward people living with dementia were examined across cognitive, affective, and behavioral aspects, revealing varying responses. Positive cognitive attitudes were prevalent, with 80% acknowledging the importance of understanding the patient's history. However, challenges in communication emerged, identified as a major barrier in dementia nursing care. One participant emphasized, "*Never disregard the psychological status of the patient to boost his own contribution to the care and communicate properly with him*" (P04 DIA).

Conversely, affective, and behavioral attitudes were predominantly negative, with over half admitting unfamiliarity with dementia. Approximately 41% expressed frustration and lack of confidence, leading to avoidance of agitated people living with dementia. Diaries and interviews validated these sentiments, linking frustration and sadness to nursing care. One participant shared, "*There are aspects of daily routines for dementia patients that I will never get used to, and it will always irritate you from time to time*" (P13 DIA).

Nurses' comfort and confidence levels were influenced by their knowledge levels, reflecting in emotional responses during patient care. Many participants reported fear when supporting people living with dementia, citing time constraints and patient's comorbidities as contributing factors. This sentiment was echoed in diaries and interviews, illustrating the emotional toll of caregiving. A participant expressed, "*It is not their fault, and you must help them even if you have no time and are stressed. One day we may be like them! So, how you care and how you treat them will come back to you DOUBL*" (P15 INT).

The study "highlights the integral role of nurses' attitudes in navigating communication barriers and emotional challenges when caring for people living with dementia. These difficulties, spanning cognitive, affective, and behavioral aspects, are intertwined with nurse' knowledge levels, cultural beliefs, and organizational roles.

Stigmas, cultural norms, and perceptions associated with dementia can harm the nursing care for people with dementia.

The survey data was expanded and explored by the diary-interviews data. Almost 18% of the survey participants indicated that they had a family member with dementia; of those, 44% who participated

(n=8) in the diary-interviews had a family member with dementia. Half of them chose not to say when asked, that they had a family member with dementia when they were recruited for the study. During the interview, the study researcher asked study participants if they had a family member with dementia when they referred to their families. One participant said: "*She is my grandmother from my mother's side, not my father's. She is in Ta'ef (a city in south-east Jeddah*)." (P04 INT). When the family member with dementia was from the mother's side, there was more regret. All eight participants felt ashamed of the diagnoses and isolated their family members from their extended families. Some participants were reluctant to disclose a diagnosis of dementia to nurses, probably because of the social stigma associated with this condition. One said that "*though her son and daughter were hiding this (dementia diagnosis) we had not been told (by administrative/education nurses) this clearly*." (P19 INT).

Educational and cultural backgrounds also influence nurses' knowledge levels and attitudes. A statistically significant link was found between positive attitudes and high dementia knowledge in Filipino (25.8%) and Indian (26.8%) nurses. Additionally, other Eastern-Mediterranean participants (2.3%) scored higher in their knowledge and attitudes than Saudi nurses. A statistically significant relationship was found between participants having bachelor's and master's degrees and their having more positive attitudes and higher knowledge. It is worth mentioning that most diploma holders are Saudi, with fewer Saudi nurses holding bachelor's and master's degrees. These survey findings were confirmed by the diary-interviews. there is a slow recognition in the KSA of the need to train nurses in dementia care. The nursing curricula in the KSA seem to be different than it is in India and the Philippines. Therefore, the differences in knowledge scores are suggested to be related to the nursing curricula.

The cultural composition of the study sample included approximately 45% Saudi nurses, with the remaining participants primarily from India and the Philippines. This reflects the reliance on expatriate nurses within Saudi healthcare settings. In Indian and Filipino cultures, strong family bonds and caregiving responsibilities are culturally ingrained. Filipino nurses often draw on Catholic values, emphasizing compassion and caregiving, which might explain their higher positive attitudes and knowledge regarding dementia care. Indian nurses, representing diverse religious backgrounds (Hinduism, Islam, Christianity), share a common cultural norm of elder respect and familial caregiving, which can contribute to more positive attitudes toward dementia care. Research suggests that Indian and Filipino nurses possess higher dementia care competence due to their cultural upbringing and professional training [24, 25].

It was also acknowledged that the stigma and cultural norms associated with dementia impact nursing care for people with dementia, and that these mainly impact Eastern-Mediterranean nurses, including Saudis. Hence, cultural beliefs have an impact on the care provided for people with dementia. One participant said: "*The term is hard for some families, and they never believe it even if the doctors tell them that he has dementia, Alzheimer's, Kharaf, or whatever the word is. They don't believe in the disease*." (P15 INT). Another participant added: "*Because the patient's daughter has no idea of her mother's disease, there is no knowledge and no cooperation at all*." (P03 DIA).

Organizational factors can negatively impact the nursing care for people with dementia

Workforce issues and organizational roles have a significant impact on nurses providing care for people with dementia. Nurses in specialty wards, especially those with high nurse-to-patient ratios, are notably affected, as affirmed by one participant: "*They need to increase the number of staff nurses, provide equipment, or at least provide a specialized ward for them. If they cannot provide a specialized hospice for them as it may cost a lot, at least a specialized ward or department, adding entertainment to the ward and providing them with entertainment stuff*" (P16 INT).

Working in emergency and surgical wards is associated with more negative attitudes and lower knowledge, possibly due to the acute nature of these departments as some participants disclosed. The availability of evidence-based resources and accessibility to reading groups and computers is linked to positive attitudes, while internet access is associated with lower knowledge and negative attitudes. Psychiatric wards, on the other hand, are linked to higher knowledge but more negative attitudes.

Participants stressed the importance of spending more time with people living with dementia, with one participant stating: "*We need to spend more time on such patients as compared to the other, regular patients*" (P14 DIA). Another emphasized the need for a 1:1 nurse-to-patient ratio, stating: "*Care for this patient needs a single nurse, which means a 1:1 ratio. The patient should be handled by one nurse*" (P12 DIA). Concerns were raised about the challenges faced in male wards due to a lack of same-gender nurses: "*In the morning, there are approximately six nurses, the majority are females, not males. This is a problem as the ward is a male ward. The female nurse is not going close to the patient; they care from a distance!! When a patient is hurt, falls or there is an incident, they call a male colleague from the office to assist*" (P05 INT).

Regarding workforce issues, participants highlighted the significance of nurse'' experience and teamwork. One participant explained: "*Of course, the years of experience have a positive impact on you and the patient in terms of how we deliver medical care to the patient. The more experience you have, the more cases you care for. Normally this will be better for you and the patient*" (P04 INT). Positive experiences were linked to more opportunities to care for people living with dementia. Additionally, teamwork and a multidisciplinary approach were emphasized, with one participant stating: "*To deliver high-quality care, all members of healthcare must co-operate well*" (P14 DIA). Another participant suggested: "*They should make one policy: like, for each patient, there should be one family member. So, they will listen more to the family member, and they will not feel loneliness*" (P12 INT). Many nurses recommended assigning particularly trained nurses for people living with dementia upon admission, stressing the need for specialized care.

Discussion

This study integrated quantitative and qualitative data to advance knowledge of Saudi nurses' knowledge of, attitudes towards, and perceptions of caring for people with dementia in KSA hospitals to inform the development of dementia nursing education in this region.

This study found that sadness and love were strong emotions influencing nursing care. people living with dementia are treated with honesty and love and their families are always told about their health condition and are treated accordingly. The patients are considered a part of the extended family, and they receive care according to the collective decisions of the patient's close family members. It has been noted from the participants that feelings of love, including showing mercy and empathy and being comfortable around the person with dementia were the most common emotions. Sadness was also a common emotion that participants have when they provide nursing care for people with dementia and is commonly interpreted as having feelings of empathy towards the mental health condition of the person with dementia. What may be unique to this study, however, is that these emotions were found to be heavily influenced by cultural biases and do not seem reflective of studies of nurses' emotions based in healthcare settings in other countries and their respective cultures.

Conversely, anger and frustration were found to be emotions negatively influencing nursing care [23]. These emotions arose when nurses struggle to express themselves or provide comprehensive and honest information to patients, lacking emotional support. Managing anger in people with dementia is challenging, exacerbated by worsening anger issues over time. Understanding the causes and triggers of anger is crucial, with factors such as physical discomfort, poor communication, and

environmental elements contributing to aggressive behavior. Participants' anger varies based on daily work pressure, indicating multiple triggers beyond direct patient interactions, including communication barriers, dementia knowledge gaps, and external work-related challenges. This study underscores the importance of looking beyond direct care provision to comprehend the multifaceted influences on nurses' attitudes in dementia care.

This study uncovered unique cultural challenges affecting dementia care in Saudi Arabia. Some participants attributed dementia to fate (Gadar), viewing it as a divine test, hindering effective treatment. Cultural stigma and shame associated with dementia further complicate care, with individuals often concealing diagnoses. In addition, Arab people are often ashamed of a dementia diagnosis [12], meaning a dementia diagnosis and knowledge of the condition issues remain problematic in the KSA as in the general Eastern-Mediterranean region. This finding will need to be taken into consideration when developing dementia nursing care in the KSA, as nurses approach this care with the attached social stigmas that work against both the people with dementia and the nurses themselves. This will also have an impact on dementia nursing education in the future we will need to overcome this hindrance to learning.

The cultural composition of the study sample reflects the multicultural nature of the nursing workforce in Saudi Arabia. Approximately 45% of the participants were Saudi nurses, while the remaining 55% were primarily from Indian and Filipino backgrounds. This distribution aligns with the broader demographic profile of healthcare professionals in KSA, where a significant proportion of nursing staff are expatriates. The reliance on foreign nurses in Saudi Arabia is driven by a combination of factors, including rapid healthcare sector expansion, insufficient numbers of locally trained nurses, and the demand for specialized skills. Indian and Filipino nurses are commonly recruited due to their high level of training, English proficiency, and experience in providing compassionate care.

In terms of cultural perspectives, Saudi nurses are influenced by Islamic values, where caregiving is seen as a familial and moral responsibility. This often results in strong emotional ties and a sense of duty when caring for patients, including those with dementia. However, dementia is often perceived as a fate-driven condition (Qadar), which can impact attitudes toward professional dementia care. In contrast, Filipino nurses, influenced predominantly by Catholic values, emphasize compassion, caregiving, and family involvement. This cultural orientation aligns with a more positive attitude toward dementia care, as compassion and patience are highly valued in the Filipino community. Similarly, Indian nurses, representing diverse religious backgrounds (Hinduism, Islam, Christianity), place a strong emphasis on family responsibility and respect for elders, which is deeply rooted in traditional values. While Filipino and Indian nurses demonstrated more positive attitudes towards caring for people living with dementia, this may be influenced by cultural values emphasizing compassion and familial responsibility rather than formal education or training. In contrast, Saudi nurses, influenced by Islamic values and the perception of dementia as fate (Qadar), may experience lower knowledge scores and more negative attitudes, reflecting a need for targeted training and awareness programs.

Among the 20 participants in the qualitative diary-interview phase, several were of Indian and Filipino backgrounds. , Indian nurses generally demonstrated strong familial responsibility and respect for elders, contributing to more positive attitudes and higher knowledge toward dementia care. Filipino nurses, predominantly guided by Catholic values, emphasized compassion and caregiving, aligning with positive attitudes, but both groups expressed a need for more structured and culturally relevant training to address knowledge gaps. In contrast, Saudi nurses, shaped by Islamic values, often view dementia as a fate-driven condition (Qadar) and caregiving as a familial obligation, which may contribute to lower knowledge scores and more negative attitudes toward dementia care.

This diversity in cultural and professional backgrounds enriches the nursing workforce but also highlights the need for culturally tailored training programs to bridge differences in knowledge and attitudes towards dementia care.

The surveys did not inquire about these cultural beliefs, indicating the persistence of certain cultural convictions despite training. This underscores the necessity for enhanced nursing training programs and public awareness campaigns. The study offered participants a platform to articulate these cultural perspectives, underscoring the significance of such forums in managing emotional labor. Additionally, the stigma associated with dementia contradicts the cultural value of respecting elders, posing challenges in elder care. Economic pressures and evolving family structures result in older adults being placed in care facilities, exacerbating dementia care challenges. The increased recruitment of non-Saudi nurses introduces language and cultural barriers, impacting knowledge and attitude scores, highlighting the need for improved training in Saudi nursing programs.

However, as diary-interview phase included participants from both Indian and Filipino backgrounds, these nurses demonstrated higher levels of knowledge and positive attitudes, consistent with the quantitative findings. Their responses reflected a culturally rooted sense of duty and compassion, emphasizing the importance of family involvement and the emotional labor involved in dementia care. These participants often reported feeling personally responsible for the well-being of patients, regardless of workload constraints. Their willingness to engage in diary-keeping may reflect their high level of commitment to professional development and their cultural inclination towards caregiving. The qualitative data thus supports the quantitative results, indicating that cultural values influence both knowledge and attitudes towards dementia care.

Moreover, the study identifies a paradox among Saudi nurses as cultural perceptions of dementia as shameful conflict with the societal value of respecting elders. This shift in perception, coupled with economic burdens and changing family structures, leads to the migration of older adults into care facilities. The shortage of nurses in the KSA necessitates increased recruitment of foreign nurses, posing challenges related to language, cultural awareness, and collegiality among staff. Non-Saudi nurses, particularly Indian and Filipino nurses, exhibit higher knowledge and positive attitude scores, indicating the urgent need for improved training in KSA nursing programs. The global increase in Arab immigrants post-Arab Spring revolutions adds unforeseen challenges to healthcare systems, emphasizing the importance of understanding cultural nuances for effective dementia care and support. This study contributes to building a knowledge base in this critical area.

The cultural backgrounds of Indian and Filipino nurses significantly influence their knowledge and attitudes toward dementia care. In India, the family unit is central to caregiving, with a strong emphasis on filial responsibility rooted in cultural and religious values. Family members often perceive caring for elders with dementia as a moral obligation, guided by principles of respect and duty. However, studies indicate that individuals with dementia in India may experience societal stigma and neglect, suggesting a complex interplay between traditional caregiving values and societal perceptions of dementia [24]. Research focusing on nursing staff in Indian residential care facilities reveals limited knowledge about dementia, despite generally positive attitudes toward individuals living with the condition. This gap highlights the need for enhanced dementia education among Indian nurses to improve care quality [24, 25].

Similarly, Filipino culture places a high value on family cohesion and respect for elders, often resulting in the preference for home-based care for aging family members. The concept of "Bayanihan," or communal unity, underscores the collective responsibility in caregiving. However, there is a recognized lack of awareness and understanding of dementia within Filipino communities, which can lead to stigma and hinder appropriate care-seeking behaviors [26]. A scoping review on Filipino nurses' attitudes and cultural competency in caring for patients with mental illness suggests that while Filipino nurses possess cultural competencies, there is a scarcity of literature specifically addressing their attitudes toward dementia care. This indicates a need for further research and

targeted educational programs to equip Filipino nurses with the necessary knowledge and skills for dementia care [27].

Hence, the cultural values inherent in Indian and Filipino societies contribute to the generally positive attitudes of nurses from these backgrounds toward dementia care. However, the limited knowledge observed among these nurses underscores the necessity for culturally sensitive education and training programs. Such initiatives should aim to bridge knowledge gaps and address cultural stigmas, thereby enhancing the quality of dementia care provided by nurses in multicultural healthcare settings.

A final aspect of knowledge affecting nursing care is nurses' willingness to learn about nursing care for people with dementia; however, information and resources are not always available. This study, conducted in Saudi Arabia, unveils key concerns among nurses, encompassing nurse-to-patient ratios, time constraints, limited resources, gender-related obstacles, and diverse demands. The scarcity of time emerges as a critical issue affecting both dementia care and overall patient care, potentially leading to nurse distress, burnout, and internal conflicts regarding time allocation for dementia patients.

Addressing these challenges requires institutional-level changes, including the establishment of dedicated dementia nursing staff, improvements in nurse-to-patient ratios, and an increase in dementia diagnoses. The study emphasizes the necessity of considering various factors such as nurses' knowledge, attitudes, access to learning resources, cultural perceptions, and organizational dynamics when formulating effective policies for dementia care. Overcoming barriers, notably moral distress, and communication challenges, demands comprehensive support and an understanding of nurses' individual characteristics.

Finally, the study advocates for governmental intervention in Saudi Arabia, recognizing the pivotal role of policymakers. It provides evidence for initiatives that aim to raise public awareness about dementia, dispel inhibiting beliefs, and resource dementia care. The urgency of addressing these issues is underscored by the growing older adult population, emphasizing the need for proactive measures to ensure the well-being of both people living with dementia and healthcare professionals.

Limitation

The study relied on structured questionnaires and self-reported data. It is possible that participants interpreted questions incorrectly or provided selective answers to prompts. Additionally, only 2.8% of the survey respondents (20 out of 715) agreed to participate in the qualitative diary portion of the study. This small sample size limits the generalizability of the qualitative findings and reflects the challenge of engaging participants in diary-keeping, which is time-intensive and requires a high level of commitment. The low participation rate likely reflects the demanding workload of nurses in hospital settings and the time-intensive nature of maintaining a detailed diary for ten working days. Additionally, cultural and professional norms in Saudi Arabia may have influenced willingness to participate, as reflective practices like diary-keeping are not typically integrated into nursing routines. Regarding representativeness, the qualitative sample included participants from diverse nationalities, professional backgrounds, and years of experience, aligning with the broader study sample. While self-selection bias cannot be entirely ruled out, the diversity within the qualitative group helps mitigate concerns about representativeness. Nonetheless, those who chose to participate may have had a heightened interest in dementia care or personal motivation, which could differentiate them from the wider cohort.

Furthermore, the study was conducted for a doctorate, and one person (the first author) collected, analyzed, and interpreted the data in consultation with supervisors. We recognize that questions

from other viable perspectives might have been asked of participants and time constraints may have influenced data collection.

Conclusion

This study presents a novel perspective on dementia care in the Kingdom of Saudi Arabia (KSA), addressing a gap in academic exploration of nursing education issues within a non-Western context. It distinguishes itself by focusing on the cultural and communication challenges faced by nurses caring for people living with dementia in Jeddah, where a substantial number of non-native English or Arabic-speaking nurses are employed.

In this mixed methods study examining nurses' knowledge, attitudes, and perceptions in caring for individuals with dementia in hospital settings in Jeddah, KSA, a moderate level of knowledge was revealed, with a positive correlation between knowledge and attitude scores. The intricate interplay of determinants such as the work environment, resource availability, educational and cultural backgrounds, self-confidence, and comfort levels significantly influenced nurses' knowledge and attitudes, consequently shaping dementia nursing practices. Key findings highlighted the critical role of knowledge acquisition, emotional work, organizational policies, and cultural understanding in achieving a holistic care approach and ensuring a continuum of care for individuals with dementia. The integration of survey and diary-interview data provided a foundation for a potential roadmap to enhance dementia nursing care in the KSA, offering practical guidance for individual and organizational improvements. The study emphasizes the interconnectedness of factors, including patience, confidence, communication skills, and organizational policies, in fostering a supportive environment for dementia nursing care. Cultural factors specific to the region were identified as influential, and despite barriers, nurses demonstrated a commitment to improving dementia care, underscoring the importance of emotional work integration, cultural understanding, and knowledge-raising practices. We advocate for positive nursing care experiences for individuals with dementia, emphasizing continuous improvement and professional responsibility in enhancing their well-being throughout different points of the dementia journey.

Statements

More detailed information can be found at Publication Ethics and Editorial Policies | Karger Publishers.

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Statement of Ethics

Study approval statement:

This study protocol was reviewed and approved by two authorities in February 2018 from (1) the Ethics and Research Governance Online Version 2 (ERGO2) at the University of Southampton, submission number 29647, and (2) from the MOH in the Western region (H-02-J-002).

Consent to participate statement:

Written informed consent was obtained from participants to participate in the study.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

SY conducted the study, including design, data collection, analysis, and drafting of the manuscript. RB supervised the study and assisted with the design, data analysis, discussion, conclusion, and overall writing.

Data Availability Statement

The data that support the findings of this study are not publicly available due to ethical restrictions. Access to the data may be provided upon reasonable request and with appropriate approval from

the corresponding author in accordance with legal and ethical guidelines. Also, CONSORT 2010 checklist is available as a supplementary material.

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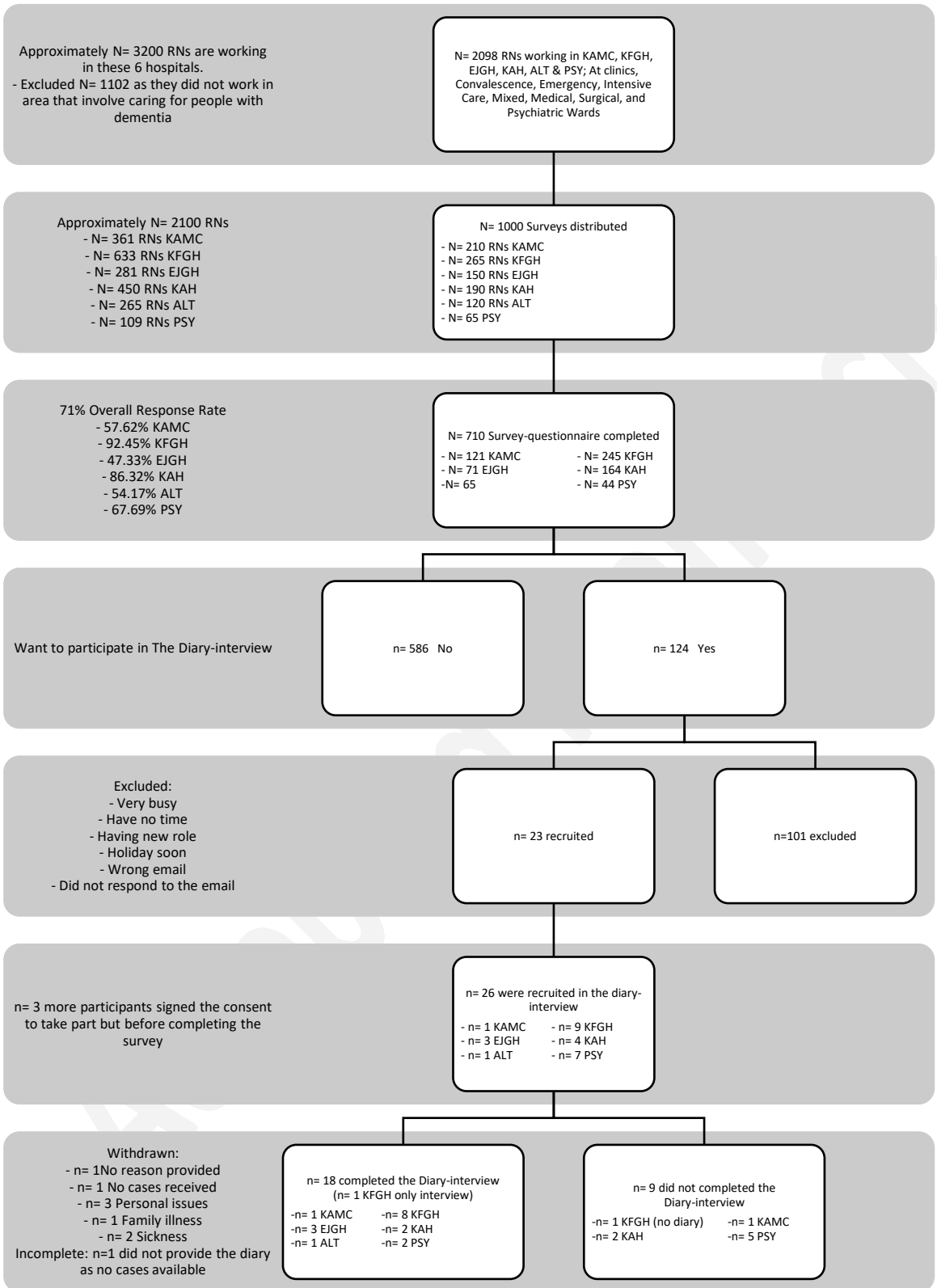
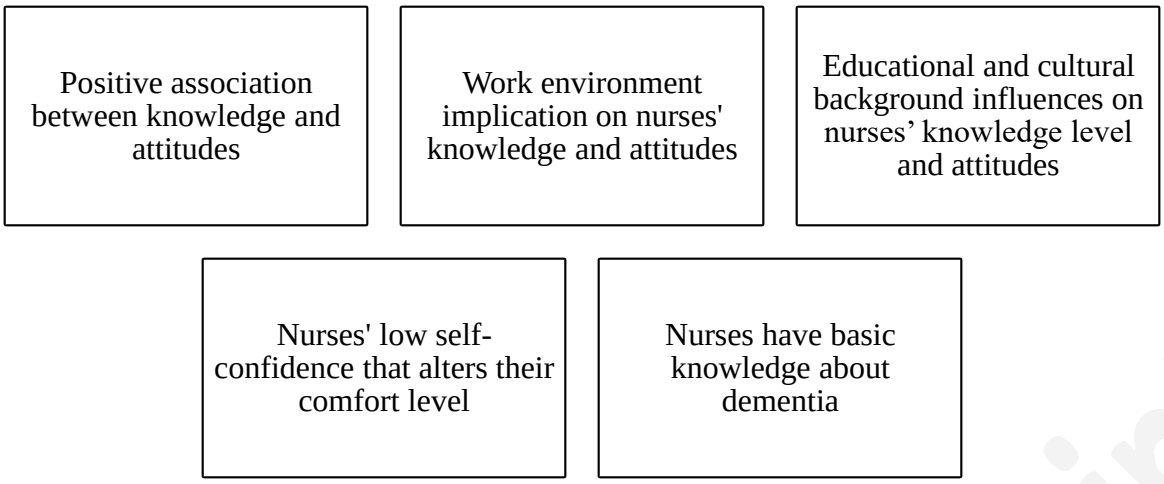
Figure Legends

(Figure 1: CONSORT flow chart of the study)

(Figure 2: The survey's main findings)





quencies and percentages of the personal demographics

Variables		Frequency	Percentage
Age range (years)	21-25	68	9.6
	26-30	294	41.4
	31-35	190	26.8
	36-40	77	10.8
	41-45	43	6.1
	46-50	27	3.8
	51-55	8	1.1
	56+	3	0.4
Gender	Male	86	12.1
	Female	624	87.9
Nationality	Saudi	321	45.2
	Indian	190	26.8
	Filipino	183	25.8
	Other	16	2.3
Job title	Bedside nurse	500	70.4
	Clinic nurse	130	18.3
	Charge nurse	37	5.2
	Head nurse	27	3.8
	Supervisor	6	0.8
	Home care	10	1.4

ıns and Standard Deviation (SD) of the study's participants

			Mean	SD
Survey	**Rate own knowledge of dementia**	Min. 1 Max. 5	2.5845	0.70304
	Rate own confident to care for people with dementia	Min. 1 Max. 5	2.6859	0.83553
	Willingness to learn about dementia	Min. 1 Max. 5	3.1394	1.12617
	Willing to participate in the diary-interview	Yes	124	17.5
		No	586	82.5
	Recruited	Yes	23	3.3
		No	687	96.7
	DKAS score	Min. 0 Max. 38	24.1521	6.51174
	DAS score	Min. 53 Max. 129	93.9169	15.18425
	Total	710		
Diary-interview	**Rate own knowledge of dementia**	Min. 1 Max. 4	2.61	0.78
	Rate own confident to care for people with dementia	Min. 1 Max. 4	2.67	0.69
	Willingness to learn about dementia	Min. 1 Max. 5	3.39	1.15
	DKAS score	Min. 12 Max. 34	25.89	7.21
	DAS score	Min. 64 Max. 129	103	17.98
	Completed Diary-interviews	Recruited	17	94.5
		Interviewed	18	100
	Total	18		

ıographics and environmental characteristics of diary-interviews participants

ID	Hospital	Ward	Age range	Gender	Nationality	Type
P02	KAMC	Emergency	21-25	Female	Saudi	Bedside
P03	EJGH	Female Surgical	26-30	Female	Saudi	Bedside
P04	EJGH	Medical	31-35	Male	Saudi	Bedside
P05	PSY	Male acute psychiatric	36-40	Male	Saudi	Bedside
P08	PSY	Emergency	26-30	Male	Saudi	Bedside
P12	KFGH	Convalescence	26-30	Female	Indian	Bedside
P13	KFGH	Convalescence	26-30	Female	Filipino	Bedside
P14	KFGH	Convalescence	31-35	Female	Indian	Bedside
P15	EJGH	Clinics	26-30	Female	Saudi	Community
P16	KFGH	Neurosurgery	26-30	Female	Saudi	Community
P17	KFGH	Neurosurgery	46-50	Female	Saudi	Supervisor
P19	ALT	Emergency	26-30	Male	Saudi	Head nurse
P20	KAH	Emergency	26-30	Female	Saudi	Community
P21	KFGH	Convalescence	41-45	Female	Sudanese	Bedside
P22	KAH	Emergency	26-30	Female	Saudi	Bedside
P23	KFGH	Ear, Nose, and Throat	31-35	Female	Filipino	Head nurse
P24	KFGH	Neurosurgery	26-30	Female	Filipino	Bedside
P25	KFGH	Ear, Nose, and Throat	36-40	Female	Filipino	Head nurse

erience and education characteristics of diary-interviews participants

ID	Years of experience	Provided professional dementia care	Had a family member with dementia	Educational achievement	Degree from KSA	Had formal dementia education
P02	1–3	No	No	Bachelor	Yes	No
P03	1–3	Yes	No	Bachelor	Yes	No
P04	1–3	No	No	Diploma	Yes	No
P05	6–10	No	No	Diploma	Yes	No
P08	1–3	Yes	No	Bachelor	Yes	Yes
P12	1–3	No	No	Bachelor	No	Yes
P13	6–10	Yes	No	Bachelor	No	No
P14	1–3	No	Yes	Bachelor	No	No
P15	6–10	Yes	Yes	Diploma	Yes	Yes
P16	11+	Yes	Yes	Bachelor	Yes	No
P17	11+	Yes	No	Bachelor	Yes	No
P19	4–5	Yes	Yes	Bachelor	Yes	Yes
P20	4–5	Yes	No	Bachelor	Yes	No
P21	11+	Yes	No	Master	Yes	No
P22	1–3	Yes	No	Diploma	Yes	No
P23	6–10	No	No	Bachelor	No	No
P24	4–5	Yes	No	Bachelor	No	No
P25	6–10	Yes	No	Bachelor	No	No

5 Categories and codes with their descriptions from the diary and interview data

Category	Codes	Source	Description
Knowledge	- Knowledge acquisition - Degree (school/college) - Experience - Searching - This study	INT	Participants' learning processes and how they gained their knowledge during their study days, work/personal experience, own reading and research and this study. Participants were asked about their source(s) of information.
	- Belief system - Changes in the brain - Suspect/recognize dementia - What is Dementia?	DIA INT	What a participant knows/ believes dementia is. This includes their understanding about dementia, its symptoms, personal characteristics and causes, in addition to dementia diagnosis and how a participant suspects dementia.
Attitudes	- Emotions: Fear Anger Sadness Happiness Surprise Love	DIA INT	The emotions (affective attitudes) informing nursing care. They are categorized according to Robert Plutchik's classifications of feelings (fear, anger, sadness, happiness, surprise, & love) (Shaver et al., 2001).
	- Patience - Behavior - Desire to help	DIA INT	An action (behavioral attitude) that was expressed and/or detected in participants' talks about dementia, persons with dementia and the act of caring.
	- Beliefs - Mental versus physical care - Believe/Beliefs word query using NVivo tool	DIA INT	Participants' judgments, beliefs, thoughts and opinions (cognitive attitude) on psychological and physical care
Perceptions	- Life with dementia - Kids - Learning - Lies/not real - Living with dementia - Making decisions	DIA INT	Living with dementia, the person-with-dementia's learning/understanding abilities and decision-making abilities as perceived by the study participants
	- Barriers - Communication - Difficulties	DIA INT	Thoughts and opinions about barriers in providing care, learning and/or training several interactions like initial communication and workplace issues about the care environment including the hospital, current ward, routine and time declaimed by participants
	- Environment - Routine - Time	DIA INT	Thoughts and opinions about barriers in providing care, learning and/or training several interactions like initial communication and workplace issues about the care environment including the hospital, current ward, routine and time declaimed by participants
Socio-cultural factors	- Community - Culture and Society - Culture and Language - Experience - Religion - Rewarding - Dementia Lexicon	DIA INT	The influences of social norms, wording and religions on attitudes and perceptions and perceiving caring for people with dementia as a rewarding experience
	- Society - Co-workers - Family and relatives	DIA INT	Societal influences on the care provided to people with dementia, including immediate family and relatives and personal experiences with a family member with dementia and colleagues

Category	Codes	Source	Description
Recommendations	- Awareness - Training and research - Desire to know	DIA INT	Recommendations and ideas regarding improving dementia nursing practices
	- Nursing care - Policies - Psychological support - Ratio	DIA INT	Recommendations and ideas for enhancing dementia nursing practices that include developing policies and supporting nursing personnel and providing psychological care for patients
	- Positive experience - Accompaniment - Environment - Identification - Multidisciplinary team - Specialized care - Therapeutic intervention - Workplace	DIA INT	Ideas for evolving nursing dementia practices in terms of care, environment, experience and awareness. This includes wards, tools, equipment and identification, as well as teamwork and multidisciplinary collaboration.

Key: DIA: Diary
INT: Interview

6 Overview of the pillars

Survey (SUR= 710)		Pillar building	Diary-Interviews (DIA= 17, INT= 18)	
Data/ list	**Category/ themes**	**Themes**	**Category/ themes**	**Codes/ quotes**
- Participants scored between 0–38 on a 0–42 scale with a mean of 24.15 for their knowledge about dementia. - Diary-interviews participants' scores vary between 12 and 34 with a mean of 25.89. - Participants scored 53–129 on a 20–140 scale with a mean of 93.92 for their attitudes towards dementia. - Diary-interviews participants' scores vary between 64 and 129 with a mean of 103. - A positive and linear association between knowledge and attitudes scores is presented (R^2 0.1116).	Low to moderate scores were noted with a positive association between knowledge and attitude scores	**Pillar one: A lack of knowledge is associated with a lack of confidence when providing nursing care for people with dementia**	Dementia knowledge acquisition and current nurses' cognition about dementia	- "My source of information regarding dementia is this orientation of this hospital." (P08 INT). "We studied about it; however, it was just an idea; dementia and that's it. When we started working, we were supposed to forget about it and start all over again to gain knowledge with experience." (P03 INT).
Within the knowledge questionnaire, the comfort category had the most undecided statements and participants had the least knowledge on this point.	Nurses' low self-confidence is associated with their comfort level		Confident feeling and the link with nurses' comfort level	- Three participants expressed uncomfortable feelings when talking about caring for people with dementia during interviews. - Three participants wrote about comfort levels in their diary entries. - In the diaries, participants rated their confidence as confident to very confident and further claimed during the interviews that the more they know the patient the more confident they become.

Survey (SUR= 710)		Pillar building	Diary-Interviews (DIA= 17, INT= 18)	
Data/ list	**Category/ themes**	**Themes**	**Category/ themes**	**Codes/ quotes**
- A significant basic knowledge about dementia has been noted. - Most participants stated that dementia occurs in the brain, that it is progressive, and that Alzheimer's disease is one of its main causes (90.3%; 83.8%, and 63.2%, respectively). - Access to evidence-based resources at work relates to holding more positive attitudes.	Nurses' basic knowledge about dementia with minimal resources available	**Pillar two: Nurses are willing to learn about nursing care for people with dementia, but information and resources are not always available**	Nurses are keen to learn about dementia and dementia care	- Fifteen participants during the interviews said that they want to know about the disease itself, its stages, and complications, and, most importantly, nursing care and ways of approaching the patients and providing them nursing care. - "If there is any cure, I would like to know. Support system, environment, that long-term ... I do not know whether this kingdom has, like a facility." (P24 INT)
- On a scale of 1 to 5, the mean of survey participants who are willing to learn about dementia is 3.1 and the diary-interviews participants' mean was a bit higher than 3.4. - 124 (17.5%) participants provided contact details to participate in the study.	Nurses' own rating of their willingness to learn about dementia		All nurses acknowledged the need for training and for raising awareness about dementia and dementia care	- Recommendations and ideas regarding improving dementia nursing practice (DIA/INT), including training, research, and education (DIA/INT) were collected from 25 files and 70 references. Also, areas participants need to know more about were spotted (INT) from 15 files and 25 references. - "I feel that what I know is still a drop in the ocean. Dementia is a huge subject. I would like to know more about it." (P08 INT)
- 79% of participants acknowledged that a person with dementia has different needs. - 76.6% of participants believed that they could do a lot to improve the lives of people with dementia. - Almost 70% of participants acknowledged that	The cognitive aspect of attitude statements had the most positive responses	**Pillar three: Nurses' attitudes, emotions, and perceived communication difficulties affect their delivery of dementia care**	Difficulties faced by nurses when communicating with people with dementia and providing them with personal care	- Communication is perceived as the main barrier in providing dementia nursing care. - "Never disregard the psychological status of the patient or his ability to boost his contribution to his own care and communicate properly with him." (P04 DIA)

Survey (SUR= 710)		Pillar building	Diary-Interviews (DIA= 17, INT= 18)	
Data/ list	**Category/ themes**	**Themes**	**Category/ themes**	**Codes/ quotes**
difficult behavior is a form of communication for people with ADRD'.				
- 51% admitted that they are not very familiar with dementia. - 41.3% feel frustrated, as they are not confident about the care they are providing to people with dementia. - 40.8% 'I would avoid an agitated person with ADRD'.	The affective and behavioral aspects of attitude statements had the most negative responses		Frustrations and feelings associated with providing nursing care for people with dementia	- "Alzheimer's patients are very sensitive as everything around them is different; the disease hinders social relationships that cause their sensitivity. From my observation, they struggle to perform the easy tasks they used to do before and as a result, they become so nervous." (P22 DIA) - "At the time we needed them, they did not let us down. I hope this time we will pay them back—their standing next to us in our ups and downs; they were with us every step." (P20 INT)
124 of the study participants (17.5%) had a family member with dementia.	The study participant had a family member with dementia	**Pillar four: The stigma associated with a dementia diagnosis, as well as cultural norms and perceptions of dementia can harm nursing care for people with dementia**	Nurses' shame of a diagnosis in their own families	- Eight of the participants (44%) had a family member with dementia, and four preferred not to report that in the survey. - When the family member with dementia was from the mother's side, they were found to have more regret. - "Because the patient's daughter has no idea of her mother's disease, there is no knowledge and no cooperation at all." (P03 DIA) - "[…] Though her son and daughter were hiding this (dementia diagnosis), and we had not been told this clearly." (P19 INT)
- A statistically significant link was	Educational and cultural		Stigmas and cultural norms: societal	- "Usually, we have restrictions for the male

Survey (SUR= 710)		Pillar building	Diary-Interviews (DIA= 17, INT= 18)	
Data/ list	**Category/ themes**	**Themes**	**Category/ themes**	**Codes/ quotes**
found between positive attitudes and high dementia knowledge in Filipino (25.8%) and Indian (26.8%) nurses. - Most diploma-holding participants are Saudi with fewer Saudi nurses holding bachelor's and master's degrees - A statistically significant link was found between participants having bachelor's and master's degrees with more positive attitudes and higher knowledge.	backgrounds influence nurses' knowledge levels and attitudes		implications on the care provided	and the female; especially if you are a male providing care to a female. So, that greatly affects them because for these people, you need to assist them and when you speak to them, there are some restrictions on discussing a lot of things here in Saudi Arabia; so, it affects the care that can be provided." (P25 INT)
- Working in emergency departments (14.5%) and surgical wards (12.8%) significantly leads to more negative attitudes and lower knowledge among participants. - The availability of evidence-based resources at work (27.6%) is associated with positive attitudes and significantly lower knowledge. - Working in wards that admit different diagnoses is associated with positive attitudes but lower knowledge - Spending more than six years in a dementia ward (28.6%) was found to be strongly associated with the lowest knowledge and the forming of the most negative attitudes.	Work environment implications on nurses' knowledge and attitudes Nurses' experiences influence their knowledge and attitudes	**Pillar five: Organizational factors can negatively impact the nursing care for people with dementia**	Organizational roles and work environment impact nurses' perceptions of nursing care for people with dementia Workforce issues are perceived as deterring nursing care for people with dementia	- "They should make one policy: for each patient, there should be one family member. So, they will listen more from the family member, and they will not feel loneliness." (P12 INT) - "If you admitted him (patient with dementia) in a general area with other patients, the nursing staff have a lot of responsibilities. So, I think there should be special nurses for them." P17 INT - "Care for this patient needs a single nurse, which means a 1:1 ratio. The patient should be handled by one nurse." (P12 DIA) - "Of course, the years of experience have a positive impact on you and the

Survey (SUR= 710)		Pillar building	Diary-Interviews (DIA= 17, INT= 18)	
Data/ list	**Category/ themes**	**Themes**	**Category/ themes**	**Codes/ quotes**
- Lower knowledge was found to be linked to nurses providing care for people with dementia at hospitals (42.1%) even when having a family member with dementia (17.5%).				patient in terms of how we deliver medical care to the patient. The more experience you have, the more cases you care for. Normally this will be better for you and the patient." (P04 INT)