**The trouble with footwear following stroke: A qualitative study of the views and experience of people with stroke**.

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**ABSTRACT**

*Purpose*: Foot problems and suboptimal footwear are risk factors for falls among the elderly. Footwear choice may therefore be important for people with balance impairment following stroke, but little is known about their experience. This study explored foot problems experienced following stroke, factors influencing footwear choices and views of footwear in use.

*Methods*: Semi-structured interviews with 15 people with stroke, purposively sampled from respondents to a screening survey.

*Results*: Participants typically experienced impaired mobility with balance problems and felt at risk of falling. Stroke related foot problems, including altered sensation, oedema, and foot drop, predominantly on the stroke affected side, influenced footwear priorities. Footwear choices prioritised comfort, security and convenience, sometimes in tension with concern about appearance. Challenges included choosing appropriate indoor footwear and finding shoes to accommodate their orthoses and oedema. Participants highlighted perceived lack of footwear advice from health care professionals and variable experience of shoe shopping.

*Conclusions*: Foot problems, as well as gait and balance impairment, have implications for footwear priorities following stroke but people felt unsupported in making healthy footwear choices. Health care professionals could be trained to routinely deliver footwear assessment and advice and facilitate referrals to podiatrist when appropriate.

**Keywords:** Shoes, Footwear, Stroke, Rehabilitation

**Background**

Each year approximately 17 million individuals around the world [1] and 152,000 people in the UK are affected by stroke. [2] By the age of 75, 1 in 5 women and 1 in 6 men in the UK will have a stroke [3] and there are over 1.2 million stroke survivors. [4]

Stroke has a greater disability impact on an individual than other chronic diseases.[5] One consequence may be altered gait and instability; falls are common and may lead to injuries with a consequent loss of confidence and independence.[6, 7]. In a 12-month period three-quarters of those with stroke living in the community will have fallen at least once in comparison to one third of the general population over 65 years. [8]. Furthermore, recent research interviewing both people with stroke and caregivers found that alongside walking and improving balance, the prevention of falls was identified as a key goal of rehabilitation and a main mobility related consequence of stroke [6].

There is evidence from studies with the older population that foot problems affect balance [9,10] and whilst shoes have a role in protecting foot health and facilitating propulsion [11], certain footwear characteristics may also affect balance and be associated with increased risk of falls and fractures. [12,13] Although there is limited research investigating foot impairments experienced by the stroke population, one recent qualitative study provided some insights based on interviews with 13 community dwelling stroke survivors who had self-reported foot and ankle impairments.[14] Findings were that foot and ankle impairments such as pain, altered somato-sensory input [inter-related sensations of touch, body position, temperature, and pain] and weakness may substantially contribute to problems with community ambulation, balance and fear of falling in people with stroke.

Outside of the field of stroke, wider studies in the field of falls prevention suggest that features such as excessive heel height and reduced friction on the soles of footwear lead to increased risk of falls in older people. [15, 16] Sherrington and Menz [17] evaluated footwear worn by 95 older people at the time of fall-related hip fracture and found that whilst only 2% were wearing high heels, 75% wore shoes, including slippers, with at least one theoretically suboptimal feature. These features included excessively flexible soles and heel counters (the plastic insert used to reinforce the heel cup) and lack of fixation. They proposed that footwear advice provided to older people at risk of falling should focus on potential hazards of shoes with inadequate fixation. Their findings are consistent with studies which found that older people [18] and patients with gout [19] primarily base footwear choices on comfort rather than safety.

Footwear choice may therefore be important for people with gait or balance impairment following stroke, but there is limited information about footwear characteristics linked with instability and increased risk of falls among this population. One Australian study measured gait and balance in a group of 30 people with stroke undergoing gait rehabilitation and found that footwear has an effect on gait in individuals recovering from stroke. [20] The results showed better performance in closed fitting shoes compared with slippers or walking barefoot but an effect of footwear on a test of dynamic standing balance was not shown.

Studies using qualitative research methods have illuminated the experience of people with rheumatoid arthritis [RA] in relation to the experience of foot problems associated with the condition and footwear choice. Such studies highlight polarity and tension between the priorities of comfort and functionality and concerns about appearance, status and identity as reflected in shoe choices. [21-25] Naidoo et al. [24] interviewed eleven women with RA to explore perceptions regarding choice of retail footwear. The results of the study show that as choices were limited as a consequence of the disease this impacted negatively on the women’s emotions, wellbeing and self-perceived quality of life. Silvester et al. [25] reported that when faced with wearing unattractive prescribed orthopaedic footwear that would assist in reducing pain, most participants preferred to comply with fashion.

In contrast to the body of research concerning the experience of patients with RA, the nature of foot problems experienced, footwear choice, and factors impacting that choice in people with stroke have not been thoroughly explored and there are only a small number of studies. For example, Gorst et al. [14] found that foot and ankle impairments following stroke were associated with perceptions of standing out, feeling disabled and a loss of normality, feelings driven in part by lack of footwear choice and the need to accommodate an ankle and foot orthosis. In addition, Ng et al. [20] noted with concern that participants preferred to wear slippers indoors and few were aware of specific footwear advice. However, there appears to be a lack of detailed understanding about what guides and motivates people with stroke in selecting footwear and making changes with respect to footwear habits and choices. Given the large number of people affected by stroke and the associated fall and balance problems, this is considered an important area of research that will have important implications for clinical practice [6]. Therefore, the current study explores the perspectives of people with stroke and the challenges they face in relation to making footwear choices and is part of phase 1 of the multidimensional SHOES study.

**Methods**

***Study Design:*** This was a qualitative study employing semi-structured interviews. As part of Phase 1 of the SHOES study, this embedded qualitative study was preceded by a questionnaire survey which collected basic demographic data and details of: foot problems; foot care support; falls history; and types of footwear worn in and outdoors.

***Sample***

The Phase 1 questionnaire survey of footwear use targeted people with confirmed diagnosis of stroke. Questionnaires were distributed via health professionals and stroke clubs within the Southampton area (May 2014-May 2015). A total of 145 people with stroke [73 (50%) female] returned completed questionnaires of whom 84 [47 (56%) female] indicated interest in a subsequent personal views interview and provided contact details.

For this qualitative study a sample of 15 People with stroke was drawn from the pool of 84 potential participants who had stated that they would be happy to be contacted again to take part in an interview. This involved adopting a purposive sampling strategy to achieve variation in terms of age, gender and current level of mobility - factors which might influence views about desirable characteristics of footwear and experience of choosing footwear. We designed a sample matrix showing the prescribed sample criteria broken down into categories. Age categories were selected for relevance to the patient group. To categorise current level of mobility we drew on four items of information from the previously completed survey responses so that we would include people with or without: history of falls in previous 12 months; utilized walking aids to assist balance or walking; relied on assistance from other people to walk; able to walk more ¼ mile. We used this sampling technique and the sample matrix to contact participants who had expressed an interest to take part in the interview and continued to identify people until we had 15 participants. Participants who were not identified to take part in the study but had expressed an interest were sent a thank you letter.

***Ethical Considerations***

Full ethical approval was granted (LREC: 14/SW/0078); the study was sponsored by University Hospitals Southampton National Health Service (NHS) Foundation Trust (R&D: RHM MED 1169).

***Data Collection***

In depth semi-structured interviews were conducted between September 2014 to April 2015 in participants’ homes by one experienced qualitative researcher [JR] following telephone contact to confirm willingness to take part. The qualitative researcher had no previous relationship with the participants and no role in conducting other elements of the larger study. Participants were not compensated for their time but subsequently invited to attend a study dissemination event free of charge.

Participants were asked to make available for discussion items of footwear currently being worn indoors and out. Participants signed the informed consent at interview including consent for the researcher to photograph the shoes discussed. Interviews lasted between 28 and 74 minutes, were audio recorded with participants’ consent and fully transcribed verbatim through a professional transcribing service (i.e. not voice recognition equipment). In five cases a spouse was on hand to assist recall of details of shoe purchases. Table 1 indicates the topics explored in interview.

*Please insert table 1 about here*

It was not the intention to make an inventory of participants’ shoe collections. By eliciting views and accounts of experience in relation to choice and purchase of individual footwear items we hoped to gain a better understanding of features that people look for and value in their shoes; unsatisfactory characteristics of shoes in use; difficulties encountered in choosing and sourcing suitable footwear; and the strategies employed and resources drawn on to overcome these challenges.

***Data analysis***

Facilitated by QSR International NVivo 11 software [http://www.qsrinternational.com/what-is-nvivo] data were managed and analysed thematically using Framework Method, which is a systematic, staged approach suited to applied health research. [26]. In the first stage topics were identified for an initial analytic framework, relevant to addressing the research questions, based on prior understanding of the issues and from concepts arising from close reading and indexing of the transcripts. In the second stage participants’ accounts were condensed on a case by case basis from the verbatim transcripts into charts according to the framework topics. The third stage involved working through the data in detail to draw out themes or categories of experience that captured the full range of perspectives identifying commonalities and differences within and between participants. The researcher [JR] and co-applicant [MDH], both experienced qualitative researchers, conducted the analysis working separately at the initial stages of identifying themes and through regular meetings to discuss and refine ideas, to ensure consistency, optimise rigour and reach a consensus regarding the key themes (JR used the NVivo software and MDH coded by hand).

**Results**

***Participants***

The sample selected comprised 15 people, 8 men and 7 women ranging in age from 52-84 years; mean age 71 years; median age 73 years, with varying levels of mobility indicative of disease severity. Details of each participant are shown in table 2 Time elapsed since stroke [stated at interview and not a sampling criterion] ranged from 4 months to 14 years.

*Please insert table 2 about here*

Themes were identified linked to four categories derived from the analysis framework as shown in table 3.

*Please insert table 3 about here.*

 ***Category 1: Impact of stroke and foot problems***

*Theme 1: Impact of stroke on mobility and balance*

Participants typically described impaired mobility as a consequence of stroke. It was found that 11 out of the 15 participants had impaired mobility with walking being affected by residual weakness and loss of or altered sensation in leg, foot or toes on the stroke affected side, sometimes accompanied by oedema. Enduring balance problems were manifest as feeling unsteady, inclined to trip or stumble – sometimes exacerbated by fatigue. These balance problems were described by 12 out of the 15 participants.

Over half of the participants (i.e. eight out of 15 participants) recalled falling at least once and two described a loss of confidence and decision to limit activities as a consequence of repeat falling. Participants described falls occurring when ‘over reaching’, trying to turn or do something too quickly, catching a foot on the carpet due to foot drop, or otherwise ‘losing balance’.

*My balance is not very good and I would fall over if I had to move on my own. I have fallen. I always call out when I think I’m losing my balance, even if I’m holding on to the trolley. If I lean too far on the right, I feel I’m falling & when you fall it’s not easy to get up…* Betty, 64

A minority had managed to avoid or limit the number of falls by adopting *“careful”* strategies including walking with a stick for support, taking things slowly, ensuring they had something to hold on to and attending a balance exercise class.

*I’m pretty good at counteracting you know. You get very aware all the time, you very rarely take your mind off you’ve got to hold or be near something…* Edna, 78

*Theme 2: Foot problems (related and unrelated to stroke)*

Most participants described foot problems perceived to result from their stroke, typically exclusively, or mostly, in the stroke affected limb. One third of the participants experienced numbness, loss of or altered sensation including what was described as pins and needles. Other problems were: foot drop [an acquired muscular weakness or paralysis that makes it difficult to lift the front part of the foot and toes]; a tendency to burning cramps [on waking in one case]; and fluid retention evident in swelling in the stroke affected leg and foot; loss of flexibility in toes; problems with toes becoming misshapen or clawed and loss of toenails. The majority also described foot problems perceived to be unrelated to stroke, sometimes longstanding, and compounding stroke related problems. Bunions and corns were the most common, followed by fallen arches, flat feet and pain and deformity associated with arthritis.

***Category 2: Footwear choices and priorities***

*Theme 3: A focus on comfort, security and confidence*

Participants were asked about footwear currently worn both in the home and when they went out. Whilst the majority [11/15] chose to discuss between 3 and 6 pairs of footwear [Median 5] the range was between 2 and 12, a total of 76 pairs with 12 out of 15 participants discussing slippers. .

Comfort, convenience and security were the key features that emerged from participant’s accounts of what they look for or value in their shoes, as illustrated in table 4. Comfortwas typically the principal priority, perceived to depend on: a good fit, typically with generous width; padding or cushioning; and a lightweight construction. Convenienceresulted from shoes being easy to put on and off and to fasten, ideally without the need for personal assistance. Key to this was a wide enough opening for the foot to enter the shoe easily. When coupled with flexible fastening this also meant that footwear could accommodate some size fluctuation over the course of the day. Velcro was commonly seen as a convenient option for those who needed a wide opening or had difficulty tying laces. Security depended on footwear staying in place with secure fastening, giving support and having anti-slip properties. There were mixed views on merits of different kinds of fastening in terms of security. A minority had a poor experience with Velcro fastenings, being too short and coming undone when under pressure, for example from a swollen foot or a foot turning over. Preferred alternatives for some were buckles or elasticated straps.

*Please insert table 4 about here*

*Theme 4: The importance of preserving identity*

For over half of the participants and included both men and women, shoes appeared to contribute to their sense of personal identity. How they believe they look, and others respond to them, remains a matter of concern and influences both their choices and their evaluation of the merits of their shoes.

*People say I like your shoes, they’re smart. So I think well good, somebody’s noticed my shoes. It’s quite nice. I like to be fashionable…*Joan, 76, brown suede closed shoes, two Velcro fastenings.

Another aspect of pre-occupation with appearance was a concern to have appropriate footwear for different social occasions or to accompany clothing of different styles and colours. In situations when it was unnecessary to walk any distance some were prepared to sacrifice comfort or mobility in order to feel appropriately dressed:

*When A had her wedding, I had to get [these], because of the colour but I mean I wouldn’t walk far with this. I know it’s not brilliant…* Barbara, 52, patent leather Mary Janes, strap across instep.

*Theme 5: Changed priorities and choices: compromise and trade-offs*

Compared to the female participants, the male participants typically felt little need to change footwear choices following stroke, reporting that they were already wearing wide fitting, supportive and securely fastening shoes….

*I’ve never had trouble with my feet. I’ve always worn sensible shoes, you know, rather than shoes for the look of them. I don’t do that, I like to make sure on comfort. There’s nothing worse than walking about if you’ve got terrible shoes, is there?* Tom, 80

In contrast, the majority of female participants were clear that their footwear habits and choices had changed post stroke. For example, they had typically exchanged heels for flat, or flatter, shoes or had given up wearing certain styles, such as flip-flops and court shoes as they were more difficult to keep on the foot, and sandals as they could not accommodate orthoses or splints.

*I’m more used to going for a court shoe, a slip-on shoe… but I can’t wear them now because I would walk out of them… I have to be very careful now what I wear, because I can’t afford to have an accident…* Evelyn, 73.

Several female participants had also changed their habits in relation to wearing slippers due to the risks associated with support and a higher risk of falls.

*I’ve rarely worn them…..Because they have no support and you know they slip off, a little bit…* Maureen, 80, blue velour slip-on slippers, cotton lining, worn with orthotic insoles

Participants varied in the extent to which they regretted the changes that their illness had brought. One man simply voiced bitter regrets at being unable to wear regular trainers with a splint; others’ accounts reveal struggles to reconcile understanding of what is practical with a strongly internalised sense of how they want to look.

Would you have worn heels before your stroke? Even with your bunion? *Yes. I did, yes I wore them, which I shouldn’t have done I suppose.* So would you say you missed wearing heels? *I do miss them, yeah. Well you don’t feel very smart…not that I can wear straight skirts much, but when you wear straight skirts, you feel more smart you know…* Joan, 76

Such accounts indicate that in making footwear choices satisfying one desirable criterion might mean compromising on or sacrificing another – consciously making trade-offs, usually between comfort or functionality and appearance. One kind of trade-off was compromising on appearance to achieve comfort:

*I thought they’d be sensible and comfortable…They’re not very pretty but it’s comfort you look for when you’re old I’m afraid…* Edna, 78, brown leather lace ups.

Conversely features such as comfort, fit or ease of access were in some circumstances sacrificed to preserve appearance:

 *I was actually after a pair of slightly tidier and less sloppy boots, to look presentable in. They’re not as comfortable, they don’t fit my feet as well as those brown ones but you know we’re slaves to fashion aren’t we!?* Tricia, 83, black suede ankle boot, zip fastening at inner ankle

***Category 3: Issues and challenges with footwear***

*Theme 6- Accommodating oedema and orthoses*

Some participants simply wanted wider fitting shoes to accommodate spreading feet and provide comfort. Others having oedema such that one foot is much larger than the other, or with feet of different sizes, faced the challenge of making a single pair of shoes work for both feet. They had typically met with little sympathy from shoe retailers and reported experiences including been told they should buy two pairs of different sizes or look elsewhere for bespoke footwear which they believed they couldn’t afford:

*They said well you’ll have to have your shoes made for you, because you’re one foot’s bigger than the other one. Sorry we haven’t got anything, everything we’ve got is out, displayed. Stupid, I don’t want to go and have… Where do I go to have shoes made?* Tricia, 83.

For participants without bespoke footwear the need to use orthotic insoles; and/or wear a brace/splint meant it was difficult to find shoes of the appropriate size and fitting that were easy to put on and comfortable to wear. Generally the need to have an orthotic insole restricted choice:

So you don’t wear sandals? *I can’t, because you can’t put this [orthotic insole] in. I mean I’ve tried, but no, you can’t because of this.* Barbara, 52.

Individuals who had shoes made or adapted by the NHS to accommodate a splint or brace identified drawbacks with the footwear. One participant found the shoes difficult to get on and uncomfortable to wear because of oedema and loss of sensation in his left foot:

*Well we can get them on, but then they start to rub underneath the ankle, they start to rub on the back of the heel. It’s a nightmare to struggle to get them on.* Matt , 59, trainer style shoes, three Velcro fastening straps to secure wide opening, rubber sole built up to accommodate fixing for splint, original straps replaced by longer ones to accommodate oedema

Bespoke NHS footwear made for another participant had to accommodate the large in situ splint on the left foot and incorporated a great deal of padding especially in the right shoe. Consequently she found them unattractively bulky in appearance and heavy to wear, which she had not expected from the information provided:

*When they [an NHS member of staff] showed me a catalogue for the shoes, they looked like this. And then ended up like that!!* Betty, 64, custom made leather shoes, trainer style, double Velcro fastening

*Theme 7 - Poor shopping experience*

Participants had widely differing experience of shopping for shoes. Those who had been uncertain where to source shoes to meet changed requirements had typically engaged in a process of trial and error. Several described visiting a number of retailers before finding the shoes they wanted:

*And of course we’d been into [department store] and we’d been in somewhere else. Nice shoes, but they never had what I wanted.* Evelyn, 73, eventually found suitable shoes in High St shoe retailer

A theme emerged of dissatisfaction with the approach of sales assistants in some retail outlets who were perceived to know little about the products on sale and may have little training or interest in helping customers with particular needs:

*I think possibly the staff on the whole, they’re busy, and it means extra time. And often they’re very young, so they’re wary about you know old people and disabled people*… Tricia, 83

There was consensus based on experience that sales assistants do not offer to measure adults’ feet and participants had not asked for this, either because it simply hadn’t occurred to them to do so or because they assumed this service was only for children. The lack of standardisation with sizing between manufacturers added uncertainty and frustration.

***Category 4: Strategies and sources of support***

*Theme 8: Advice about footwear from Health Care Professionals*

Three participants had been provided with a brace/splint for their stroke affected leg and ankle, with bespoke footwear or modification to retail footwear. However few participants recalled receiving advice from health care professionals regarding suitable retail footwear to address their foot health and mobility problems.

Just one in three [i.e. 5 out of 15] received regular foot care [toe nail cutting, attention to corns, bunions, removal of hard skin], accessed and paid for privately, of whom only one recalled receiving advice about footwear in the form of details of an independent shoe retailer selling a recommended brand of shoes. The few [4 out of 15] who had seen a podiatrist or orthotist had been provided with insoles to address problems both stroke related [foot drop, badly curled toes] and non-stroke related [bunions and corns, fallen arches] but the participants concerned recalled no advice about suitable footwear to accommodate the orthoses provided.

Two female participants recalled that a physiotherapist treating them post-stroke had recommended a Velcro-fastened walking shoe of a named brand, in one case to give good ankle support with a wide opening to accommodate a splint and in the second case to provide a secure fastening. Both had followed the advice, and the shoes had become favourites, subsequently repeat purchased in different colours. Finally, one participant recalled hearing advice about footwear at a stroke patient & carer support group:

…*the falls nurse was there and she was talking about footwear, but I think mainly it was about safety. And she did have some samples of things with Velcro. …. which is convenient...* Phil, 66.

Given that they had a range of foot problems, related or unrelated to stroke, the perceived absence of discussion or advice about footwear from HCPs could be regarded as a ‘missed opportunity’, a view expressed by one participant who had spent a lot of time searching for inexpensive indoor and outdoor shoes with secure fastenings:

*When I was in the hospital having physio every day, nobody ever said anything about it, which I think they should have done, on reflection. I mean that should be part of physiotherapy I would have thought…*Evelyn, 73.

Accounts suggest that participants who demonstrated awareness of the risks associated with certain kinds of footwear including slippers and flip-flops may have absorbed this information through contact with HCPs without necessarily acknowledging or valuing it as constructive advice, perhaps because it focused on what to avoid rather than what to choose:

*I can’t wear flip-flops of course, because they’re blessed dangerous they are…. I used to wear flip-flops, I adored flip-flops, which I know everyone frowns on. The hospital say they’re the most dangerous, more accidents happen with flip-flops*… Joan, 76

Consequently participants perceived that they were largely drawing on their own resources and experience, both pre and post stroke, to identify criteria and make decisions about footwear to meet their needs through a process of trial and error. A few participants felt, moreover, that as they knew what was right for them they might not welcome being directed in their choices:

Do you think that at any stage you would have liked advice about footwear and choosing footwear? *Not really, no. I tend to know what’s comfortable and what suits me and I don’t think it makes much difference. I mean if somebody came along and said look, these are wonderful, wear these, and I didn’t like them I wouldn’t wear them and that’s it. I am a bit cussed...* Edna 78

*Theme 9 - Identifying brands and retailers: stick to what works*

When asked to identify good features in their footwear participants sometimes mentioned the brand name; it was clear that in their estimation a shoe of a particular brand could be relied upon to be a good choice.

 *‘I thought they’d be sensible and comfortable and I know [brand name] are, you put your feet in a new pair and if they’re the right size they’re like slippers, they’re very comfortable…..* Edna, 78, brown leather lace ups

Similarly an approach to shoe shopping that could be characterised as *“sticking to what works”*featured in accounts of the majority of participants.

*Once you’ve found something, and you know we’re all the same, you’ve found something, you like it, it’s comfortable, it works well, ticks all the boxes. Do you really bother to look any further? There could be something out there that suits her better, but we haven’t really gone that extra mile to try and find something different..* partner to Eileen, 72.

Finding a brand that suited sometimes depended on finding a good retailer.Best shopping experience was often in smaller specialist shoe shops where sales assistants had the patience to bring out many pairs of shoes for people to try. Several participants identified the value of having some idea what you are looking for in order to get the best from such a shopping experience,

*I mean it was nice when I went to [store name] and I told her what I wanted. I mean you’ve got to have some idea of what you want. I said it’s no good if it hasn’t got a back…* Joan, 76.

Supportive relatives and friends facilitated the identification of brands and retailers by looking online or sourcing catalogues. They also appeared to optimise the shopping experience by: accompanying to retailers or outlets especially those not close to home; helping search through pairs available in stores where limited assistance was available from sales staff; and in some cases giving encouragement or *“permission”* to spend money on shoes that are more expensive than they might otherwise have chosen.

*They’re not cheap, but I think shoes, it’s worth paying. Take out a second mortgage. My husband said if you want them; have them, so I said right.* Joan, 76

Concern about cost featured often in discussion of experience of sourcing suitable footwear. The participants were a varied group with mixed views and habits with regard to spending on footwear. There was a general expectation, and for the most part a reluctant acceptance, that branded specialist footwear targeted at or appropriate for people desiring comfort, support and secure fastening will be more costly than standard footwear. Consequently participants derived a sense of getting ‘value for money’ when they had found footwear they wanted at a reduced price or if they felt that the good features of a pair of shoes justified the high price they had paid:

*They’re a very good shoe, and weren’t a bad price either. I think they were about £25. I was lucky there. I did look online, previously [for a similar pair] but most of them were up in £80 and I thought well that is a lot of money you know…*Evelyn, 73, black leather shoe, ankle strap and buckle fastening, branded shoe retailer

Internet or mail order offered a convenient option for people with limited mobility and difficulty getting to the shops. Whilst some had disappointing experiences, it worked well for people making repeat purchases of shoes of familiar brands, across the price range, where they could trust that the sizing would be as they expect.

*I bought them online and I thought well I’ll take a chance and order them, but I’m sure they’re going to be alright, because I’ve had from [chain store] in the past. And they were alright…* Evelyn, 73, sandal , closed back, wedge sole, elasticated strap

Looking out for special offers on-line or simply seeking out the less expensive styles meant some participants could wear the branded footwear they preferred without spending too much.

**Discussion**

Participants reported experiencing a variety of foot health problems and changes to their feet as a consequence of stroke which are consistent with those described by participants in the Gorst et al study of foot and ankle impairments following stroke [13]. The unique contribution of this study is our detailed exploration of the implications for footwear habits and choices. As a consequence of oedema and alterations to foot shape a wider fitting or larger size, preferably with flexible fastenings, may be required to accommodate swelling and size fluctuations. As recent research has shown that feeling safe was a priority for study participants experiencing balance problems and falls, altered sensation and muscle weakness mean additional support and more secure fastenings are needed [6,7]. . Orthoses prescribed to address foot health problems and support mobility may not fit easily into existing or readily available shoes. Pain (from arthritis) or common foot problems such as bunions and corns compound effects of stroke in ways that are specific to individuals. Some of these footwear issues are also faced by patients with other long term conditions including RA [27] and gout [19]. What is unique to patients with stroke is: the sudden shocking onset rather than a gradual deterioration; the fact that stroke typically affects one side of the body with the result that foot problems including altered sensation and oedema are asymmetrical; specific issues such as foot drop that affect gait in ways the people with stroke may not fully understand; and the impact on balance.

The impact of foot health problems and the implications for footwear habits and choices were perceived differently by the men and women in our study. Whilst comfort, support, security and convenience were post-stroke priorities for the group as a whole the men were more likely to feel that their existing preferred styles of indoor and outdoor footwear were appropriate and little change needed other than to pay attention to size. In contrast the women had typically felt the need to change footwear habits and choices opting for flatter shoes with features allowing easy access, good support and secure fastening. Our findings chime with those of studies of patients with RA, including Goodacre & Candy [22] and Naidoo [24], suggesting it may be problematic, for women in particular, to come to terms with wearing shoes that look different from what they are accustomed to, draw attention to their disability, limit choice, impact on the way they can dress, and threaten their identity. Our study participants, especially the women, experienced these issues to varying extents according to the nature of their disability, and differed in response including their readiness to accept compromises and to make trade-offs between appearance and functionality or comfort.

In this study footwear issues were explored exclusively through the experience of people with stroke. This focus informed our understanding of the nature and impact of stroke related foot problems, the implications for footwear priorities and choices and the challenges people with stroke face finding the footwear they want. Participants confidently expressed personal notions of what constitutes a good and bad shoe. It is unclear, however, where this knowledge stems from other than from life experience and we cannot tell from interviews if the choices participants make on the basis of their stated priorities optimise their foot health, mobility and balance.

Few people with stroke recalled receiving footwear advice from HCPs during their rehabilitation; in exceptional cases a suitable style or brand of shoes had been recommended by a physiotherapist and the advice followed. Paradoxically participants typically showed awareness of the shortcomings of slippers and certain other footwear characteristics, and their accounts suggest they may have absorbed this information in hospital or from HCP’s, without necessarily recognising it as constructive advice. Whilst some heeded warnings to avoid slippers or footwear with suboptimal features others rationalised the decision to disregard the advice in certain circumstances. Podiatrists had apparently dispensed orthoses without fully addressing the footwear issues that arise and this finding lends weight to the suggestion from Naidoo [24] that clinicians who provide foot orthoses need to be aware of the impact these devices can have on shoe fit and look to avoid further limiting shoe choice.

The immediate post stroke period represents a critical intervention point for many aspects of rehabilitation. Healthcare Professionals in community based rehabilitation teams are well placed to offer a footwear assessment and to educate and advise people with stroke about how the design of a shoe supports or hinders mobility. Providing Healthcare Professionals with appropriate training would enable them to tailor guidance and advice in terms of individual’s broader health issues and personal priorities as opposed to focusing simply on risk associated with certain footwear features and footwear types to be avoided. Some participants in our study were several years post stroke and had had time to identify changed priorities and seek out the best options for them but early professional input could have saved them time and provided a more effective solution earlier in the process. A greater transparency and knowledge of referral pathways into podiatry services for HCP’s and patients would give access to specialist treatment and advice where appropriate. Retail footwear brands that offer the features people with stroke may need are typically perceived as quite costly. Being on a low income limits the options available, yet some people had managed to find footwear they liked from budget shops or discounted on the internet so advice could take account of differing budgets.

Finally, suitably trained, sales assistants also have a key role in assisting people with stroke in choosing appropriate shoes. However, those retailers who already provide services such as measuring and fitting or discounts on second pairs where different sizes are needed may need to advertise this more widely. Our findings suggest that people with stroke may become loyal customers of retailers or brands that meet their needs.

**Conclusions**

Foot problems, as well as gait and balance impairment, have implications for footwear priorities following stroke but people with stroke feel unsupported in making healthy choices. Healthcare Professionals could be trained to routinely deliver an initial footwear assessment with advice and refer appropriately.

**WORD COUNT**

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Table 1. Interview topics

|  |
| --- |
|  Interview topics |
| Impact of stroke with particular reference to mobility and balance.Problems with feet – perceived to be related or unrelated to strokeFoot care received from health care professionals [HCPs] including advice about footwear*For each item of footwear currently worn indoors and/or out and brought to interview*:When, where and by whom purchased, purpose, cost, perceived positive and negative featuresReflections on: changes to footwear choices and priorities following stroke;Experience of sourcing and choosing footwear  |

Table 2 – Participant characteristics: age, gender, mobility and time elapsed since stroke

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Participant \* | Age | Sex | Falls during last 12 months | Uses a walking aid to support balance or walking | Needs physical help from other people to walk | Can walk ¼ mile or more | Time since stroke |
| 1 | Evelyn | 73 | female | no | yes | no | no | 3 years |
| 2 | Joan | 76 | female | yes 2+ | yes | no | no | 7 years |
| 3 | David | 65 | male | no | no | no | yes | 4 months |
| 4 | Hazel | 84 | female | yes 2+ | yes | no | no | 1 year |
| 5 | Edna | 78 | female | yes 1 | yes | yes | no | 4 years |
| 6 | Tom | 80 | male | no | yes | yes | no | 6 months |
| 7 | Barbara | 52 | female | no | yes | no | yes | 11 years  |
| 8 | Betty | 64 | female | yes 2+ | yes | yes | no | 14 years  |
| 9 | Bill | 67 | male | yes 1 | no | no | yes | 1 year |
| 10 | Maureen | 80 | female | yes 2+ | yes | no | yes | 8 years  |
| 11 | Eileen | 72 | female | yes 2+ | yes | no | yes | 6 months |
| 12 | Tricia | 83 | female | no | no | no | no | 8 years |
| 13 | Matt | 59 | male | yes 1 | yes | yes | no | 1 year |
| 14 | Phil  | 66 | male | no | no | no | yes | 3 years |
| 15 | Jim | 77 | male | yes 1 | yes | no | yes | 5 years |

*\* participants are identified using pseudonyms*

Table 3. Themes identified from accounts of experience of PwS

|  |  |  |
| --- | --- | --- |
|  | Framework Category | Themes |
| 1 | Impact of stroke and foot problems | 1 | Impact of stroke on mobility and balance  |
| 2 | Foot problems (related and unrelated to stroke) |
| 2 | Footwear choices and priorities | 3 | A focus on comfort, security and convenience |
| 4 | The importance of preserving identity |
| 5 | Changed priorities and choices: compromise and trade-offs |
| 3 | Challenging issues | 6 | Accommodating oedema and orthoses |
| 7 | Poor shopping experience |
| 4 | Strategies and sources of support  | 8 | Advice about footwear from Health Care Professionals  |
| 9 | Identifying brands and retailers: stick to what works |

Table 4 – Sources of Comfort , Convenience & Security in Footwear

|  |  |
| --- | --- |
| **Source of comfort** | **Example**  |
| A good fit which typically relied on generous width | *If they’re not comfortable I won’t have them, because there’s nothing worse than having your toes pinched up or aching feet is there? ...These shoes, they might not look much, but they are a lot wider so the toes spread out as they should do*. [Jim, 77. Tan leather lace up shoe]  |
| Padding or cushioning | *I think when my feet hit the ground they are cushioned… That’s the main difference; they’re much softer, and much more comfortable to wear*. [David, 65. White trainers, synthetic fabric, with laces]  |
| Lightweight construction | *And the thing is they’re lightweight, which makes a difference; you see that’s the other thing. When you asked me what I liked about them, they’re lightweight* [Eileen, 72. Navy leather slip on shoes with wedge heels & removable insoles.]  |
| **Source of convenience** | **Example**  |
| A wide enough opening for the foot to enter the shoe easily | *They’ve got to be something that I can push my foot into and wiggle it…I mean people say well you can just use a long shoehorn but actually if your balance isn’t good and you’re standing up and you’ve got one foot in a shoe and you’re trying to get the other foot in and you take away the balance trying to wield a shoe horn it’s not terribly helpful* [Tricia,83. Ankle boot with zip fastening at inner ankle] |
| Easy to fasten | *I like the ones with that Velcro fastening because you haven’t got to worry about laces*. [Joan, 76. Nubuck sports style sandal with two Velcro fastenings |
| Can accommodate swelling  | *These are quite roomy slippers, so I can get them on easily. This is what I wear mainly all day long. I can get them on and off easily, even though my foot is swollen*… [Tom, 80, fabric slipper with Velcro fastening.]  |
| **Source of Security** | **Example** |
| Non slip | *The chunky rubber sole gives good grip on an icy surface.* [ Barbara, 52. Black leather knee high boots, zip fastening, chunky rubber soles] |
| Supportive | *They don’t slip and they are supportive, I know that they are reliable and I’m not going to fall over in them*. [Edna,78. Brown leather lace-ups] |
| Secure fastening  | *They’ve got the buckles, which is wonderful. I feel safe in those, because they’re buckle. I mean we don’t all want Velcro fastenings. So many shoes have got Velcro now. I’m not keen. I just don’t trust it.* [Evelyn, 73. Black leather shoe with ankle strap and buckle fastening] |