Posture & Pressure Management: Social Psychological Explanations for Compliance with Use of Clinically Prescribed Seating Functions

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Abstract/Summary

This report summarises a project conducted with users of powered wheelchairs to explore their experiences of their prescribed chair features. A series of semi-structured interviews were conducted with UK users of powered wheelchairs, with a small number of international users being included for comparison. The interviews were subject to thematic analysis to identify common themes as well as being systematically reviewed and classified for perceived benefits/barriers to use as identified by the participants themselves. These results revealed confusion about the clinical benefits of prescribed features with participants focussing on the potential functional benefits/issues with their chair features. This meant that participants based their use of prescribed features on beliefs about their utility, "worked around" features that were not perceived as functionally useful or intuitive to engage with and described different experiences of having their features demonstrated or explained to them. Recommendations are made to highlight functional as well as clinical benefits, to explore therapists' experiences of their practice, to consider different ways that information could be presented and to explore uses of social support and innovative technologies in future work.

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PMG Small Research Project Fund - Final Report (23/02/18)

Background to the Research

Over the last three decades, the use of wheelchairs within the UK has significantly increased. In 1989, the Office of Population Census and Surveys (OPCS) identified the figure of wheelchairs users at 360,000 people. Almost thirty years later, The Papworth Trust's (2016) Disability Facts and Figures report puts that number at 1.2 million. Whilst there are no national statistics indicating powered wheelchair users specifically, it stands to reason that since the Government's initial funding specifically for electrically powered indoor/outdoor chairs (EPIOCs) in 1996 (NHS Initiative 1996), this figure will almost certainly have increased too.

Within Wales, the Posture and Mobility Service criteria for provision is set by the Welsh Health Specialist Services Committee (WHSSC). WHSSC (2017) details the specific criteria for the provision of powered wheelchairs and for the prescription of tilt-in-space facility on all mobility equipment. This feature is only considered essential when the wheelchair user will be sat in the equipment for more than four hours a day and will be seen to gain significant improvements in posture, stability, pressure relief and / or reduced level of carer intervention.

Along with this increase in overall wheelchair use, there has also been an evident increase in provision of powered mobility with seating functions within the South Wales Posture and Mobility Service (SWPMS). In 2007, the SWPMS issued 179 powered wheelchairs with one, two or three seating functions. By 2017, this figure had increased 256% to 638 powered wheelchairs issued. These seating functions (tilt-in-space, recline, elevating legrests), are specifically prescribed to align postures, prevent contractures and to reduce the risk of pressure ulcers, the approximate cost of which ranges between £200 - £1000 per wheelchair. However, clinical assessment evidence has indicated that many powered wheelchair users do not comply with their prescriptions for using these features to manage posture or pressure. This is supported by literature showing a large proportion of wheelchair users utilise powered functions less than the recommended guidelines (Lacoste et al 2003, Ding et al 2008). This can lead to significant negative health consequences (e.g. increased pain, exacerbation of existing postural or mobility difficulties, pressure ulcers) as well as increasing the financial burden on the NHS.

It is of key importance to understand the reasons for non-compliance with clinical recommendations, both to enhance service user health and well-being and to ensure that resources are being directed in an efficient and appropriate manner. To date, there has been little evidence obtained to understand non-compliance, with key studies calling for further research on this (Sonenblum et al 2009, Schofield et al 2013). Therefore, the current programme of research was designed to explore this using both traditional and contemporary social psychological models of health and behavioural adherence.

Traditionally social psychological research on health behaviour has drawn heavily on two models. The Theory of Planned Behaviour (e.g; Ajzen, 1991) and the Health Belief Model (e.g. Rosenstock, 1974).

The Theory of Planned Behaviour was devised to explain the relationship between a person's attitudes and their subsequent behaviour and has been applied extensively to healthcare domains (e.g. Conner, 2008; van Lettow, de Vries, Burdorf, Conner & van Empelen, 2015). According to this model, behaviour is predicted by behavioural intentions which in turn are predicted by three components; a person's attitude about the behaviour, the subjective norms of relevant others and their perception of how much in control they are of enacting the behaviour.

Attitudes are based on an "expectancy-value" model which includes two judgements; what the outcomes are likely to be of engaging/not engaging in the behaviour and how positive or negative these outcomes are likely to be. For example, a powered wheelchair user might believe that routinely activating tilt-in-space to relieve pressure will prevent pressure ulcers in the long-term (positive outcome) but will cause discomfort while performing the behaviour itself (negative outcome). The user will also weight each outcome according to the likelihood they are to experience it and this will also contribute to their attitude. In this example, the user may reason that they will experience discomfort but might "get lucky" and not incur a pressure ulcer anyway (so called "comparative" or "unrealistic" optimism, e.g. Shepperd, Pogge & Howell, 2017). Hence, this user would form a negative attitude towards tilting the wheelchair to alleviate pressure.

Subjective norms are usually further divided into two categories; descriptive norms (a judgement of what most people would do) and injunctive norms (a judgement of what most people think I should do). These have been shown to have separate effects on other health behaviours (e.g. Nan, Zhao, Yang & Iles, 2015 with youth smoking; Sharps & Robinson, 2017 for eating behaviour in children). Further research has suggested that these norms are particularly influential when they are linked to a relevant group with which the person identifies (e.g. Stok, deVet, de Ridder and De Wit, 2012 – who linked referent group norms and group identification to intended and actual fruit consumption).

The Health Belief Model (e.g Rosenstock, 1974) is one of the earliest socio-cognitive models of health behaviour and remains influential today. It has prompted the development of several other theoretical approaches and hundreds of studies on health behaviour (see e.g. Sheeran, Klein & Rothman, 2017 for a recent review of health behaviour change models). Both models include a key role for attitudes but unlike the Theory of Planned Behaviour where intentions and norms drive behaviour, the Health Belief Model and those derived from it draw much more heavily on perceptions of risk, perceptions of barriers and facilitating factors and perceived severity of the illness (or outcome of failing to engage in a health promotion behaviour). These barriers or facilitating factors could fall into a range of categories. For example, these could be structural (e.g. lack of funding for a specific feature that a user perceives to be necessary), cognitive (e.g. lack of awareness about the importance of this behaviour), situational (e.g. lack of time to undertake pressure-relieving movements within a specific employment setting) or biological (e.g. experience of pain when a user completes the action). Interestingly comparative/unrealistic optimism or social norms could also be considered as barriers or facilitating factors within this model. Therefore, the Health Belief Model was proposed as the initial framework underpinning this study but with specific elements of the Theory of Planned Behaviour providing a focus for interview and survey questions.

One of the key features of research on health behaviour is that while different behaviours can be explained by several core elements (e.g. attitudes, norms and perceptions of risk), the prediction of these can be improved by the addition of other theoretically relevant constructs. For example Mason and White (2008) found that self-identity improved the prediction of the Theory of Planned Behaviour when assessing breast self-examination in young women while group identification improved this theory's predictive power when examining smoking reduction in young people (e.g. Moan & Rise, 2006). This might well be because a stable sense of self as "a healthy person" , "someone who checks for health problems" or " a non-smoker" might link to the formation of a habitual behaviour and habit strength also improves predictive power (e.g. de Bruijn, 2010). However what is clear is that identity has significant and independent predictive power beyond that of traditional TPB items (e.g. White et al., 2009) although these effects might be stronger when predicting intention than behaviour (e.g. Gardner, de Bruijn & Lally, 2012). That the effects are stronger on behavioural intention might well be because perceived behavioural control has direct effects on behaviour (Ajzen, 1991) and can undermine even the best placed intention.

These results suggest that there is a clear value in understanding how wheelchair users might see themselves when understanding barriers and facilitating factors; at least when forming intentions to comply with clinical prescriptions. However, it is possible that it is not just "self-identity" but also "social identity" which is important to understanding the process of compliance and indeed that social identity might provide an answer to the issue presented by perceived behavioural control. Traditionally research on health promoting behaviours has focussed very much on individuals as making personal decisions. However more recently research has considered that group memberships can enhance health and well-being (e.g. Wakefield et al., 2017) and that strong identification even with "stigmatised groups" can be more beneficial than marginal identities (e.g. Chapman & Dammeyer, 2017). This might be because having multiple social identities or strong group identifications can increase opportunities for social support (e.g. Steffens et al., 2016) or because they satisfy basic psychological needs, such as the need for belongingness and control (e.g. Greenaway, Cruwys, Haslam & Jetten, 2016). Thus social identity might well provide a means to enhance *realistic* perceived behavioural control, as well as providing a basis to strengthen the predictive power of subjective norms and having independent effects on behavioural intentions.

Aims & Objectives

Based on the literature cited above, the following aims and objectives were proposed:

The aim of this research was to further understand the reasons that powered wheelchair users had for complying/not complying with the features of their chairs. Specifically we were interested in the perceptions that powered wheelchair users had of these features; their understanding of how they were used and their belief about the importance or benefit of them. We were also interested in how users of powered wheelchairs obtained support and the role that social group membership played in this process.

Methodology

Ethical Approval and Context of Research

Ethical approval was obtained from the Ethics Committee of the Faculty of Life Sciences & Education at the University of South Wales. Originally, the objectives of the research were to complete 12-15 interviews with users of powered wheelchairs at the University of South Wales. However, could extend these objectives by utilising a more representative sample of wheelchair users from the general population.

Design & Analytic Strategy

A qualitative design was used for this project with semi-structured interviews being conducted with users of powered wheelchairs. Audio files were transcribed and subject to two forms of analysis – summarised here and in the results as "Section 1" and "Section 2".

Section 1

For this section, a systematic extraction of key features was undertaken from the transcripts themselves. This included a coding of each participant for features of wheelchair prescribed, whether each feature was used or not, brief reasons for why the user was complying/not complying with the prescribed features and other relevant comments. Because of the requirement for this analysis to be undertaken by someone with appropriate clinical expertise, the initial extraction was completed by the third author. This was then provided to the rest of the research team and reviewed for reliability and validity by the first and second authors.

Section 2

For this section, the semi-structured interviews were then analysed using thematic analysis and followed the procedure recommended by Braun & Clarke (2006). This involved six stages; transcribing and reading the transcripts, noting points of interest, generating themes from these points of interest, clustering themes into superordinate categories, generating a thematic map and then producing a narrative description of each theme which was linked to prior literature. Independent researcher triangulation was achieved by having separate review of the transcripts by individual authors and consensus on the final themes being arrived at by discussion.

Participants

A total of 18 UK powered wheelchair users from the general population took part in this study. There were 7 males and 11 females with a mean age of 57.72 (SD 18.64). Participants were recruited in a similar way to those who participated in the quantitative survey and were interviewed face to face, by telephone or Skype depending on the participant's preference and their geographical proximity to the research team. In addition, a small number (N = 4) of non-UK participants were recruited (from Germany and the United States; mean age 24.75; SD 5.06) and interviewed via Skype to provide an international comparison group. All interviews were conducted by the fourth author.

Materials & Procedure

Interview questions were generated based on the aims and objectives of the research as well as on prior research on social psychological features associated with health and well-being. This yielded five overarching topics; general demographic and background information, knowledge of features and how to use them, perceived barriers and facilitating factors, motivation to use features and perceptions of social support. These questions were used as broad themes to help generate a conversation with participants and while presented in a loose order, participants had the flexibility to answer questions about these themes in any order, to decline to discuss an aspect or to add other information they felt was relevant or useful.

On being recruited to the study, participants were provided with an information sheet, a copy of the questions to be discussed and were given time to consider whether they wished to continue before being asked to provide informed consent if they were happy to do so. All identifying information was removed from the final transcripts and participants were informed that they could stop or withdraw at any time from the study. Once the interviews were complete, participants were offered the opportunity to review their transcripts prior to these being analysed and the anonymised transcripts were subject to thematic analysis in the manner previously described.

Results & Discussion

The results are split into two sections. Section one contains a systematic review of the data, specifically noting each participants' wheelchair features, their perceptions of the reasons for each feature's prescription, whether the features are used, perceived benefits of the features as well as other key comments made during the interviews. These findings are also summarised using some simple frequency charts. The purpose of section 1 is to provide an outline of the barriers and key issues facing this participant population. Section 2 builds upon section 1 and contains a thematic analysis (see Braun & Clarke, 2006) providing greater richness to reflect participants' day to day experiences of powered wheelchair use.

Section 1 – Systematic Review

A systematic review of the interview data was conducted in which a number of key points were noted. These were the total number of clinical and functional features prescribed, users' understanding of why they were issues, the number of features which were used and the number of prescribed features which are used for the correct clinical reasoning. Clinical features were defined by the research team as features which were primarily necessary to improve a particular condition or to prevent further complications (e.g. preventing leg ulcers or pressure sores) while functional features may have had a clinical purpose but also served to improve the users experience of the chair itself (e.g. a headrest) or to allow for other activities to be performed (e.g. a kerb climber). Table 1 displays this data for each of the 18 participants whose interviews specifically covered these topics, the four remaining participants did not explicitly discuss these areas and so are omitted from this analysis. The individual participant data from table 1 is further summarised in figures 1 and 2 below.

Ppt	Features of powered w/ch or accessories	Perceived reason for prescription	Used?	Perceived benefits or why not used	Other comments
A	Pressure Cushion	Previous pressure ulcers	Yes	Solved problem with pressure ulcers	Feels confident with the use of the w/ch, and that he understands how it all works, due to a working technical background “likes fiddling”
	Tilt in space	Unsure, although believes it’s due to diagnosis (MND)	Yes	Uses when on holiday for sunbathing as means he does not have to transfer onto a lounger. Also, used at the dentist.	
	Elevating leg rests	For circulation in legs	Yes	Uses for ankle swelling	
	Recline	No comment	Yes	Assists with examinations at hospital, to watch TV, “put feet up and relax”	
B	Tilt	No comment	No	Not used because takes too long to tilt, and physically difficult for her to operate.	Feels she knows more about the w/ch due to her inquisitive nature, personality asks more questions. Considers herself an experienced powered w/ch user.
	Riser	Doesn’t see there being a clinical need for this, only function for seeing people “eye to eye”	No	Previous experience of injury when using the riser has meant she’s lost her confidence	
	Elevating leg rests	No comment	Yes	Means of stretching her legs and improving her comfort	
	Recline	No comment	Yes	Uses to remove her clothes when toileting.	
C	Tilt in space	Due to “bad back”, also has “fitted back…so you don’t jerk about so much”	No	No comment	None
	Recline	No comment	Yes	Uses for watching TV	
	Headrest	For use when driving from the wheelchair	No	Doesn’t use because they don’t drive from wheelchair	
	Kerb climber	No comment	No	Removed because it interferes with docking stations in vehicle	
D	Recline	Prescribed because tilt-in-space was not available due to model of w/ch	Yes	For going to concerts and for aiding transfers in and out of the w/ch	Description of w/ch indicates that she does have tilt as well, but does not seem to recognise the two as different features on the w/ch
E	Recline	He could not sit up straight when first issued with the w/ch	Yes	No comment	Does not recall there being a discussion regarding positioning and posture, only about how the w/ch works.
F	Elevating leg rests	For passive movement of his legs	Yes	Uses for comfort in his legs and to reduce pressure	Believes that there are medical reasons for why he has powered features but he doesn’t know what they are. Reports a good understanding of his w/ch due to having a friend who repairs them. Reports that some w/ch users feel more disabled when using a powered w/ch over a manual w/ch, but he does not feel that way.
	Tilt in space	No comment	Yes	For watching TV, to increase balance for going down inclines	
	Recline	No comment	Yes	To stretch out and to relax	
	Riser	No comment	Yes	To reach objects and see people eye-to-eye	
G	Tilt in space	Reports that she was not informed why she needed it	No	Does not like it, had a standard w/ch before and wishes she still had it.	None

H	None	No comment	N/A	N/A	Relies on spouse for understanding how the w/ch works, refers to the user manual several times.
I	Riser	Reports that he doesn’t know the clinical reasons for the features on his w/ch	No	Unable to physically access the functions	None
	Tilt in space		No		
	Recline		No		
J	Headrest	No comment	No	Reports that they do not physically require a headrest so removed it	None
K	None	No comment	N/A	N/A	Reports that the assessment should take place in own environment not clinic space, as more relevant and better placed to understand environmental hazards.
L	None at present but due to have tilt and elevating leg rests on new w/ch on order	Recognises that they were prescribed for clinical reasons to aid posture and positioning in the w/ch	N/A	Feels that the new w/ch will be a big improvement, many benefits, looking forward to the change.	None
M	Recline	No comment	No	Doesn’t use as is able to transfer in and out of w/ch, so chooses to do that when looking to increase comfort.	None
	Tilt in space	Prescribed for comfort	No	As above	
	Headrest	Doesn’t know why it was prescribed	No	Doesn’t physically need it so has removed it	
	Pelvic belt	No comment	No	Will only put it on when using the w/ch outdoors	
N	Riser	No comment	Yes	Used when going to the bar	None
	Tilt in space	To be more comfortable in the w/ch	Yes	Increases comfort and makes them feel “happy in their w/ch”	
O	Tilt in space	Recognises that features and accessories issued for postural reasons, and that OTs provide clinical information about the equipment. However, also believes that you just ask for the features on the powered w/ch and you get them.	Yes	Used for sitting up in the w/ch and getting in/out of bed	Knows that his physios from his childhood would not approve, but he does not care as he is an adult now and being comfortable is what is important.
	Recline		Yes	Used for sitting up in the w/ch and getting in/out of bed	
	Pelvic belt		No	Doesn’t see the need for use when indoors as he is lounging	
	Harness		No		
P	Tilt in space	Prescribed for postural orthostatic tachycardia syndrome and for pain relief, however conflicting advice from physios and OTs.	Yes	To relieve pain, to change position, to alleviate symptoms of POTS. However, awkward to adjust the tilt, difficult to physically do (? if it is manual tilt).	Feels that physios want you to move more, OTs are more about real function. Believes that you do not get much advice from therapists.
	Kerb climber	No comment	No	Removed because she could not get on with it, previous accident when going up / down a kerb. Also, car access affected by kerb climber position.	
	Elevating leg rests	No comment	No	Bends her knees up when she is elevating her legs (not articulating)	
Q	Tilt in space	To reduce pressure through spine	Yes	Used for comfort and relaxing in the evenings, recreational use predominantly	Sceptical about clinical effectiveness of features on powered w/ch where he does not

	Riser	For functional use when going out and about	No	Not used much anymore, used to use more frequently when going out clubbing for social interaction	perceive a need for them (i.e. elevating leg rests)
	Pelvic Belt	Doesn’t know why it was prescribed as they have knee blocks	No	Feels it replicates what the knee blocks do.	
	Chest harness	To assist with sport	Yes	Only uses when playing a certain shot in boccia	
R	Tilt in space	To take the pressure off the bottom of the spine	Yes	Uses when in pain, approximately twice a day.	Reports that he was told to tilt and elevate his leg rests for 10 minutes every hour when originally provided with his first powered w/ch. However, he does not do this because he says he is too busy, wants the control, and does not see that it is necessary.
	Elevating leg rests	To reduce lymphedema	No	Feels this is managed with his stockings instead now. Uses the elevating leg rests only when going up and down ramps	

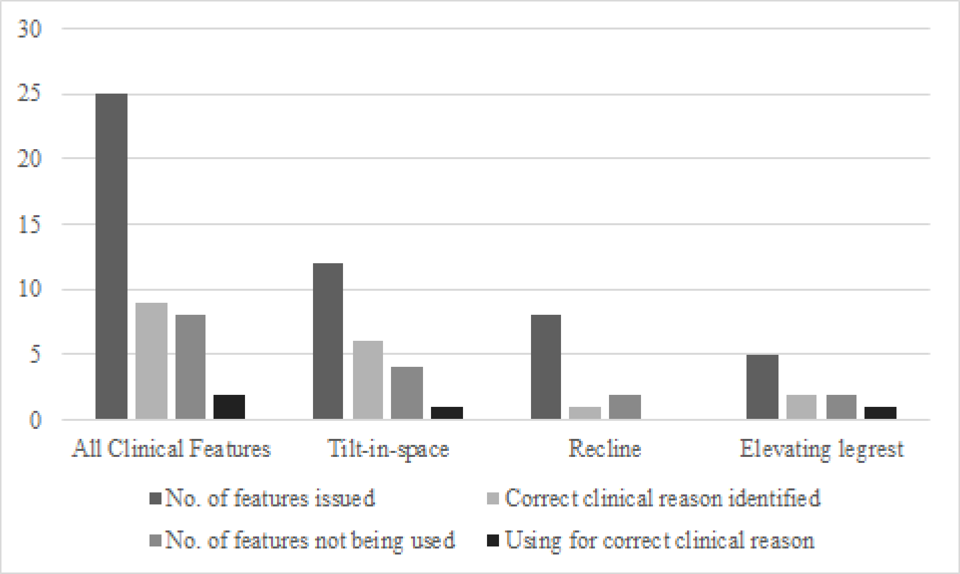

Figure 1: Clinical features: Prescription, usage, & understanding

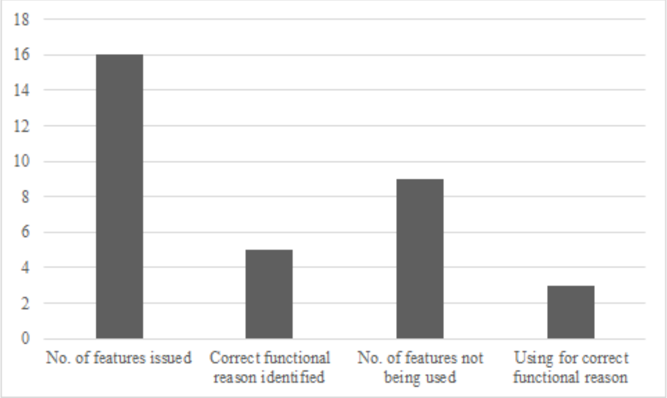

Figure 2: Functional features: Prescription, usage, & understanding

Figure 1 highlights the total number of clinical features issued, the users' understanding of why these were issued, the number of features that are then never used and finally, the number of prescribed features that are used for the correct clinical reasoning. Results demonstrated that even though the reasoning for 36% of the clinical features issued were identified and understood; only 8% of these features are used specifically for that purpose. Furthermore, 32% of the clinical features issued were not used at all. Where the participants provided an explanation for this, four evident reasons emerged as to why. These were (1) time (both for the actuator to function and the user being "too busy"), (2) user physically unable to activate the functions, (3) users' perceived need of that feature (not understood, not informed, not required) and (4) alternative intervention available to address clinical need. Also of note, is that of the clinical features prescribed, 60% of use is attributed to a non-clinical activity, or a more functional purpose. Examples of this given are watching television, attending concerts, sunbathing and assisting with dressing.

As a comparison, figure 2 also demonstrates the use of other features (recorded as 'functional features') on the wheelchairs, as identified by the participants. These included risers, belts, harnesses, cushions, headrests and kerb climbers. While some of these could have been prescribed for a clinical reason, it was decided to categorise these as functional, as there was ambiguity regarding some of the terminology used (for example, "pelvic belt" was used when it may have been a lap strap). The data indicated that that 56% of all additional features issued were no longer being used at all, highlighting similar reasons for non-use. The three main explanations given are that (1) user is physically unable to use the function or accessory, (2) users' perceived need of that feature or accessory and finally, (3) previous experience of using that feature (for example, previous injury sustained when activating the riser, or utilising the kerb climber).

These findings provide further evidence that a significant number of clinical and functional features prescribed to powered wheelchair users are either not used correctly, or in some cases, not used at all (e.g. Lacoste et al. 2003, Ding et al. 2008). Furthermore, this data provides support for aspects of the Health Belief Model (e.g. Rosenstock, 1974). It was clear that participants held a number of perceptions of barriers to engaging effectively with their equipment. These barriers ranged from the cognitive (e.g. not understanding their clinical or functional benefit), to the situational (e.g. lack of time) and to the biological (e.g. being physically unable to use the feature).

Section 2 – Thematic Analysis

A number of themes emerged from the data but these fell into two very distinct patterns of responding. Contrary to our expectations, neither pattern fully reflected the Theory of Planned Behaviour or the Health Belief Model. Although this was surprising, the respondents did produce themes that were supportive of the Technology Acceptance Model and it could be argued that the perceptions of barriers and facilitators were related to ***aspects of*** these other models. In terms of the themes themselves, the first was related to the reasons for complying with wheelchair use, understanding of clinical features and convergence on appropriate behaviour. This was conceptualised as a process which began with the engagement of the user in discussions around the chair's features, the clinical need for each one and the degree to which they perceived they had been involved in the decision-making.

"K: *They took. They fetched me down a child's one, they took me around the hospital.*

Int: *Right, okay.*

K: *To see if I can handle it, in and out of the thing. Then they took you out in their car-park thing and they had ramps and how to get up steps and things like that.*

Int: *Right, okay.*

K: *It was easy down there. Absolutely easy until we brought it home.*

Int: *Oh okay. What was wrong with the one you brought home?*

K: *Well. Where we live, we've got all hills."*

*"**Int:** What features are you having on your new wheelchair?*

L: *Oh, I'll have cushions on the back, cushions underneath. It'll be all the mod. It'll be everything I need. The legs will go up, the back will go down.*

Int: *Yeah*

L: *It'll be lovely.*

Int: *And, because you are having these new features, were you told the benefits of each of them?*

L: *I was told, yeah, that it will help me. My back wouldn't curve, because my back is beginning to curve because I am beginning to go to one side.*

Int: *Oh okay.*

L: *It will help me get me back and… They told me there will be big benefits. So once it comes, the OT and everybody will come, I'll see it then, properly."*

While this does not fully reflect the attitudinal and normative aspects of the Theory of Planned Behaviour as discussed in the introduction, this does support the importance of perceived behavioural control in adjustment to, and utilisation of, clinically prescribed features. Consistent with this aspect of Ajzen's (1991) model, users were more likely to be engaged in the process if they felt that they understood it and had been involved from an early stage. These perceptions would directly feed into "control beliefs" which, although usually measured in Ajzen's model with items such as "Performing pressure relieving movements is something which is easy for me", could easily be measured as "I understand the clinical/functional benefits of this prescribed feature." Similarly, participants showed more positive attitudes and intentions towards a feature if they understood the outcomes and the associated costs/benefits of these. This would be consistent with the original expectancy-value model proposed by Ajzen. However, one of the issues seemed to be that respondents ***did*** not fully understand. Feedback from users indicated that these initial discussions were often around clinical need rather than functional utility. While they considered these to be appropriate discussions with the professionals prescribing the chairs, users sometimes reported that they did not always understand the aspects/implications of the new equipment and felt that the clinical benefits could be reinforced over a period of time.

*"**A:** And um uh so that was. And she did that, I mean. I don't know, I can't honestly remember whether she asked whether I needed, um, you know, the reclining and everything like that.*

Int: *Right okay*

***A:** Because I'm not using the seatbelt, obviously it would be easier if I used a seatbelt, but it's… The trouble with a seatbelt is, if you haven't got it on, it dangles down the sides.*

***Int:** Oh*

***A:** So you have to shorten it and tuck it away in the back. It doesn't make it easy to put on and off easily."*

This would be consistent with the Health Belief Model where perceptions of barriers and facilitating factors predict engagement in a health behaviour. In this case, lack of understanding, lack of reinforcement over time and a focus on clinical rather than functional benefits could be considered as barriers to engagement. This lack of understanding of clinical features could reflect differences across participants in ***health literacy*** and is supportive of other research where low levels of health literacy have been shown to affect health outcomes (e.g. Baker et al., 1997; van der Heide et al., 2015) and tests of health literacy have been developed to assess patients' abilities to comprehend health related information because of its importance to self-reported health and participation in healthcare systems. As users of powered wheelchairs might vary in age, cognitive ability and involvement of family members and carers in their care, the individual differences associated with health literacy and healthcare engagement might well need to be considered, as might the means being used to currently assess them (e.g. Kobayashi, Wardle, Wolf and van Wagner, 2016). Features such as working memory capacity have been shown to influence the efficacy of advertisements and subsequent persuasion (e.g. Sanchez & Alley, 2016) as well as to focus attention without distractions (e.g. Lavie, 2010) and it might therefore be necessary to consider ways of providing support to users with a variety of individual differences.

Consistent with established research on motivation and engagement (e.g. Self-Determination Theory, Ryan & Deci, 2000), requesting features to be fitted to the chair seemed to link to higher perceived utility of these features. Similarly, a clear understanding of the medical or clinical benefits of features also contributed positively to perceived utility. In contrast, participants who reported initially feeling highly uncertain or experiencing high levels of ambiguity did not report the same feelings that features were useful, **unless their use was beneficial to help resolve uncertainty.** If a feature was quickly able to be "understood" or helped a participant to "ground themselves" in an uncertain situation, this contributed positive to perceived utility.

*"**Int:** Do you use the elevating leg rests often?*

***R:** Only if we're going, if we're going up and down ramps.*

***Int:** Oh just to lift your…*

***R:** Yeah, cos you go down the ramp, your legs are down like that *uses hands to demonstrate*, you'll catch on the road."*

Judgements of perceived utility were consistent with the Technology Acceptance Model (e.g. Yoo, Han & Huang, 2012) and were reported by participants as being linked not only to likelihood of use, likelihood of becoming “used to” the features (convergence/habit formation) and satisfaction but also to consensus belief about other wheelchair users’ perceptions. Put simply if participants perceived utility of their own chair’s features, they believed that others would understand and use features on their chairs too.

*“**Q**: So I think um, I don’t know, I can’t speak for everybody who has a wheelchair, but I think that’s kind of, um, misunderstanding of a lot of people that there are features that would go to waste because I don’t really think they are...”*

*“**D**: No, no, that’s okay. I was just going to say it’s a personal thing really. I mean others might find it more difficult you know? It’s just my personal experience of using these particular features I’m confident with.”*

This perception of consensus is supported within other literature and is associated with risk behaviours. For example, normative misperceptions are associated with engagement in problem gambling behaviours (Larimer and Neighbors, 2003) and excessive drinking (e.g. Cunningham, Neighbors, Wild and Humphreys, 2012). However in the current context, perceived utility was constructed by participants as being “situationally dependent” and if a feature did not help in a particular situation, they would work around it; either by not engaging in a behaviour which would require the feature to be used, by adapting the feature to fit their lifestyle or by using another feature or form of support to meet a particular challenge. This may reflect a lack of deep understanding about the full range of benefits and future research should explore this in more depth.

*“**M**: I understand them. I definitely in all the technical kind of ways so how they fully work and what they are supposed to do...but maybe there’s like a medical side to it that I don’t fully understand for example the tilt in function is so I can sit in the same position all day and maybe there is some medical side to use on it that I don’t know about.”*

This study indicates that powered wheelchair users' perceptions might not be congruent with those of clinicians. However, the current study only addresses the users' perspectives. To fully understand this process, further work needs to be undertaken with professionals involved in the prescribing process. This is because the uncertainty experienced by users not only relates to perceived utility but might be due to a number of factors. For example, information might be presented in a way that only some patients would understand, it might be presented at a point where the user is not fully engaged/motivated to process the details or might be presented in too much detail without the possibility of reinforcement.

Further research is required to determine how practitioners view the process in order to fully understand how intervention could best improve this experience for both groups.

Communication between healthcare professionals and service users has been of increasing interest in both research and practice; with most medical and health training now including elements of communication skills and strategies to improve communication between patients and professionals. For example, undergraduate training in Occupational Therapy includes communication skills and reflective practice as core components while communication between doctors and patients is considered important not only in medical degrees but in terms of Continued Professional Development (e.g. the Royal College of Physicians runs CPD workshops on communication skills to enhance doctors existing skillsets). However, few of these courses fully embrace the dynamic nature of the patient-professional communication relationship and consider that individual differences in the **patient's** or **carer's** communication skills might affect the efficacy of the message conveyed. The implementation of patient communication interventions (e.g. Talen, Muller-Held, Eschelman and Stephens, 2011) might be a fruitful direction for future research.

The second pattern of responding referred to participants' self-definitions or otherwise as wheelchair users. This was a theme which some participants chose not to explore and those who did showed a full range of acceptance or rejection of the identity status. Therefore, the role of social identity as a wheelchair user in the current participant sample is unclear. For some participants, use of a wheelchair defined who they were, enabled them to establish affiliations with others and distinctiveness from able-bodied individuals. However, this was, at least for our participants, rarely chosen as a preferred identity. Participants instead seemed to prefer to define ways in which they affiliated to other groups, had other interests or hobbies or were "more" than their wheelchairs.

"Int: *Yeah, so what types of online groups do you go on?*

O: *I mean there's…erm…I'm in a couple of Facebook groups. But that's all to do with music and stuff.*

Int: *Oh okay*

O: *I mean there is a [name of health condition] one that I'm in.*

Int: *Oh okay*

O: *I suppose chairs sometimes get discussed in there. But again it's usually like… if you get a new one*

Int: *Yeah*

O: *What's new on it, or if it breaks what's wrong with it."*

This might reflect a categorisation threat for these participants and it would be interesting to explore the understanding that participants have of the category "wheelchair user" and how this impacts on their identification. Future research should explore this in more detail and look at whether such a group identity is beneficial for members. In the current study, some participants identified the role played by online sources of support and information and an examination of online forums for wheelchair users would be a fruitful direction for future research.

General Discussion

Across both the systematic review and the thematic analysis, a number of common ideas emerged. First, consistent with the Health Belief Model (e.g. Rosenstock 1974), users' engagement with the features of their chairs was related to their perceptions of the barriers to, and benefits of, effective use. This was not necessarily related to the information provided when the features were fitted and demonstrated to the user, with those who had a more active role in determining what was fitted and why being more confident about use and familiar with benefits. The focus on functional rather than clinical benefits seen in both the systematic review and the thematic analysis is consistent with other models of user engagement such as the Technology Acceptance Model (e.g. Yoo, Han & Huang, 2012). Further, previous negative experiences with features (e.g. physical difficulties in operation, injuries when attempting use, preferences for previously removed/replaced) acted as barriers to engagement with the features and would be consistent both with Self-Determination Theory (Ryan & Deci, 2000) and the perceived behavioural control element of the Theory of Planned Behaviour (Ajzen, 1991). These results present a number of interesting directions for future research and practice and recommendations based on these results are presented in the next section.

Summary & Recommendations

The purpose of this study was to answer a call in recent literature (see Schofield et al., 2013) to explore further the reasons underpinning wheelchair users' lack of concordance with recommendations for the usage of extra functions on their wheelchairs. This lack of engagement has a potential negative impact both on the user (e.g. deterioration of original condition, or the acquisition of new conditions) and on the service provider (e.g. initial cost of prescribing extra features, treating needlessly deteriorating/ newly acquired conditions). As such, it is important to understand the factors underpinning this behaviour as well as recommending potential interventions to improve these factors.

The main message from our findings is that a large proportion of the participants simply did not understand the *clinical* need for and benefits of these features and as such, tended not to engage with them effectively. Results suggest there are a number of practical factors underpinning this lack of understanding that appeared to stem from their interactions with their clinicians (e.g. a lack of involvement in the process of making decisions about features, the information being conveyed during the fitting of wheelchairs, lack of reinforcement of the benefits of proper usage over time).

As well as the practical issues there also appear to be significant psychological factors. For example, many of the participants in this study only ever discussed using their wheelchair's features in terms of functional use (e.g. attending concerts, watching television) as opposed to their clinical use. Each of the factors listed above presents an opportunity for improving the processes surrounding the prescription, fitting and advice provided regarding wheelchairs.

Current practice amongst healthcare professionals working within the field of posture and mobility appears to vary, but in general, the approach is to verbally explain and subsequently demonstrate the way that features may be used, as well as explaining their clinical benefit. However, the current findings suggest that this approach can lead to a lack of understanding on the user's behalf and in turn, lead to a lack of engagement with these features. This is of interest when considering the role and core skills of occupational therapists specifically. The consensus approach to intervention within posture and mobility services is one of compensative, problem-solving equipment provision, which does not ordinarily encompass the use of occupation as a means of engaging individuals in their intervention. With the results of this study highlighting that the use of powered wheelchair features is predominantly utilised with functional activities, there is clearly a gap between professional skills and subsequent professional behaviour. Therefore, further research should investigate the clinical practice of occupational therapists and/or other healthcare professionals, the rationale for this practice and the specific impact of it.

Based on the findings of the current research, it is clear that there may be a gap between the practice of conveying clinical benefits and the participants' understanding; this being due to a focus on functionality by users. One potential strategy to bridge this gap would be to give greater emphasis to what a user might consider salient; namely the functional benefits of a piece of equipment. For example a tilt in space feature might well be prescribed to address postural issues and prevent further deterioration of the user's spine (a clinical benefit)...but be perceived by the user as being helpful to make them feel more comfortable (a functional benefit). More explicit linkage between clinical and functional benefits when features are discussed, prescribed and demonstrated as well as an emphasis on **how** clinically correct usage could have functional benefits might help to sell the same message in a more user-appropriate manner.

Future research should also investigate the impact of alternative methods of conveying and reinforcing information regarding the correct ways to use these functions, as well as their clinical benefits. Showing and telling, as is the current convention may not be the most effective strategy. It may also be the case that a "one size fits all" approach is suboptimal. For example, previous research has demonstrated that when teaching younger vs. older adults to engage with new technologies, different teaching approaches yield different outcomes for each population (e.g. Hickman, Rogers and Fisk, 2007). An older adult might struggle to take in information due to deficiencies in working memory and as such would need a different approach than a younger participant (see also Jin et al., 2008 for a review). As such, it is important to consider the strategies that are appropriate and specific to the individual. One possibility for reinforcing this information is the inclusion of tailored feedback that is temporally proximate to the behaviour displayed. This would allow a user to obtain information about the utility of his/her behaviour, messages about positive benefits of continued engagement and suggestions for behavioural tweaks that might improve future clinical/functional experience. If these were delivered as close to the behaviour as possible, this would enable the user to form associations between the behaviour and the outcome that would serve as a valuable message for continued engagement. Technological advances allowing the recording and relay of data about usage and immediate response about efficacy provide a mechanism by which this could be achieved and future research should investigate these possibilities.

Acknowledgements

This report was funded by the Posture and Mobility Group's Small Research Funding Scheme.

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