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Usability and acceptability of a website that provides tailored advice on falls prevention activities for older people

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This article presents the usability and acceptability of a website that provides older people with tailored advice to help motivate them to undertake physical activities that prevent falls. Views on the website from interviews with 16 older people and 26 sheltered housing wardens were analysed thematically. The website was well received with only one usability difficulty with the action plan calendar. The older people selected balance training activities out of interest or enjoyment, and appeared to carefully add them into their current routine. The wardens were motivated to promote the website to their residents, particularly those who owned a computer, had balance problems, or were physically active. However, the participants noted that currently a minority of older people use the Internet. Also, some older people underestimated how much activity was enough to improve balance, and others perceived themselves as too old for the activities.

Keywords

falls, health promotion, Internet, older people, usability

Introduction

Falls among older people are prevalent and costly. In 1999, UK accident and emergency departments dealt with almost 650,000 instances of people over 60 who fell, costing the National Health Service almost £1 billion [1]. There is evidence that the incidence of falls can be reduced by strength and balance training (SBT) [2], an example of which is Tai Chi, a relaxing activity that consists of slow, gentle, flowing movements. However, most older people are not sufficiently aware of the benefits of SBT for preventing falls [3]. This article

presents the initial evaluation of a novel technological approach to disseminating health promotion information to older people: a website that provides tailored health information. Internet use by older people is growing rapidly; in the UK it currently stands at 15 per cent of over 65s, and 52 per cent of 55–64s [4, 5].

A 'balance training' website was developed by the authors as a new resource for older people to encourage them to undertake SBT. A website was used as the advice was tailored, a technique that lends itself to interventions delivered online [6]. Tailoring is a technique that makes information more personally relevant to the individual by taking the individual's answers to questions and using them to match the advice to the individual's needs and preferences [7]. As explained by the elaboration likelihood model [8], by making advice more personally relevant, tailoring makes the advice more persuasive. Tailored interventions have received significantly better self-reports of the advice being read, remembered, agreeable, comprehensible, and personally relevant, and have had better behavioural outcomes although this has been found for only about 50 per cent of interventions to date [9].

Computer-based interventions have increased older people's knowledge and adoption of other healthy behaviours [10–14], as with younger and middle-aged adults [15, 16]. However, only two published studies were identified that evaluated the same website advising older people on falls prevention. This intervention provided online tailored advice through 20 case scenarios of people preventing falls [17]. Among 28 participants – older people, carers, and health professionals – most reported that they found a case that contained some appropriate information for their own situation, but many users felt that the information was not sufficiently tailored: the cases were not personally relevant and contained too much situation-specific detail. The website was then redesigned to provide advice according to different levels of intention to undertake falls prevention activities as measured on the precaution adoption process model [18, 19]. The authors examined web log files to analyse visitors' use of the website, but have yet to report a study that evaluated the acceptability of the website.

The aim of this study was to investigate the views of older people and care providers regarding the usability and acceptability of the balance training website. Care providers were recruited, as they can play an important role in motivating people to adopt health behaviours [e.g. 20]. Usability (the ease with which older people can use the website) was investigated, because if the website is not easy to use, then older people will not access the advice [21]. Acceptability (the extent to which older people agree with the advice and its implications) was investigated, because previous falls prevention advice has been reported by some older adults as either common sense and potentially patronizing, or frightening and oppressive [3]. The study aimed to find what aspects of the website could be improved to be more usable and acceptable.

Method

Design

The first author conducted interviews with older people and sheltered housing wardens and assistant wardens (in this article, the term 'warden' refers to both wardens and assistant wardens). Sheltered housing wardens were recruited, as wardens work with older people with a range of balance ability and independence. Sheltered housing is the provision of

rented flats for adults aged 55 years and above. Residents have emergency pull cords in their flats to contact a warden during office hours, or a city-wide care service available 24 hours every day of the year [22]. The wardens also assist in designing and arranging care packages (e.g. pre-prepared meals, home carers). The interviews with older people comprised two parts. Part one required the participants to interact with the tailored balance training website and 'think aloud' to verbalize their thoughts [23], a method used previously to assess the usability of a website [24]. Part two was a semi-structured interview [25] that commenced once the participant had reached the end of the website (see Table 1 for questions used). The interviews with sheltered housing wardens did not include the think aloud technique, to reduce the length of time wardens were required to participate in the study. Wardens commented on the website in a semi-structured interview (see Table 2 for the questions used). Interviews with older people were for approximately an hour, and interviews with wardens were for approximately 30 minutes.

The tailored balance training website

The website was accessed on the World Wide Web at www.balancetraining.org.uk (see Figure 1 for a screen print of the website, and Figure 2 for the sequence of web pages). The website content was developed by the second author, based on the falls literature [2] and existing falls prevention advice. The safety and appropriateness of the advice was checked by members of the Prevention of Falls Network Europe (ProFaNE) (www.profane.eu.org).

Each user advanced through the questions and advice on the website in the same sequence, allowing for a direct comparison of views of the advice between intervention and control participants (since all users experienced the same format and content; for the comparison study see [26]).

The first two web pages provided an introduction to balance training and a consent form for an online experiment using this website, described elsewhere [26]. The next web page

Table 1 Semi-structured questions for interviews with older people

Did you agree with all the advice the website gave or not?
Was the advice the website gave suitable for you or not?
Would you follow the advice the website gave or not?
Was there too much or too little advice?
How would you describe the website to a friend?
Is there any way you think the website could be improved?
Would you go to this website normally if you were not asked to for this study?

Table 2 Semi-structured questions for interviews with sheltered housing wardens

What was your initial reaction to the website 'balancetraining.org.uk'?
Would you talk to older people about the website?
Is there anything about the website that could be improved?
Is there anything else you would like to say about the website that was not covered in the previous questions?

Figure 1 Screen print of the balance training website www.balancetraining.org.uk

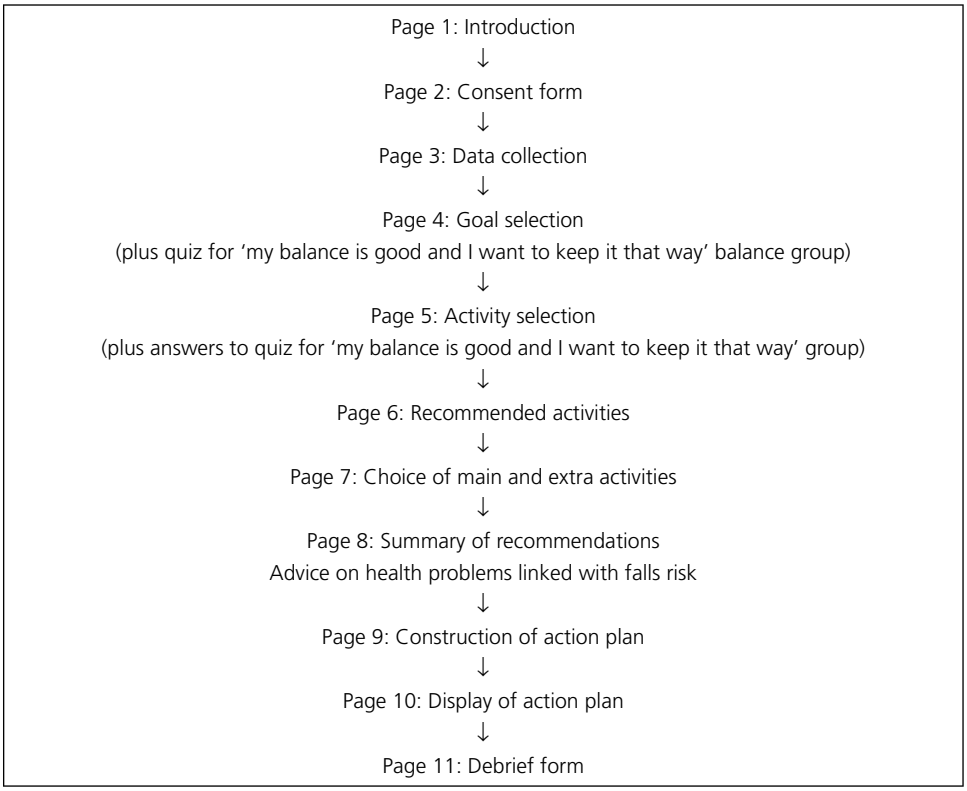

Figure 2 Sequence of web pages of the tailored balance training website

collected demographic information and data from which to tailor the advice: self-rated balance (to match the advice to users' perceived needs and capabilities), and health conditions known to increase the risk of falls (to give advice concerning unsteadiness, poor vision, osteoporosis, taking four or more daily medications, and dizziness). For self-rated balance, participants were provided with three options to rate their balance: 'my balance is good and I want to keep it that way'; 'my balance is quite good, but I would like to improve it'; and 'I have some problems with balance that I want to overcome'. All options were worded so as to imply that the participant needs to do more SBT because research has shown that, as people become older, their balance deteriorates without intervention [27].

Based on goal theory [28], the following web page asked the participant to select a goal that they wanted to achieve from performing balance training. For the participants who self-rated their balance as 'good and want to keep it that way', they answered a quiz to assess their current level of SBT, upon which feedback was provided on the subsequent web page. The next web pages consisted of further questions used to tailor the advice. Along with self-rated balance, preference for where the activity was carried out (at home, outside, and/or in a group or class) was used to select a menu of advice about suitable activities and how these could contribute to improving balance, based on the literature showing that people are more likely adhere to physical activity that they enjoy doing [29]. The most challenging activities (e.g. rambling and jogging, cycling, swimming, sports, dancing, and going to the gym) were only recommended to those who indicated that their balance was 'good and want to keep it that way' or 'quite good but would like to improve it', while the least challenging activities (gardening, housework, and home hazard reduction) were only recommended to those who indicated that they had 'some problems with balance they wanted to overcome'. Balance training exercises carried out at home or in a class, walking, and Tai Chi, Yoga and Pilates were recommended for all levels of self-reported balance, but were presented differently to the different groups (e.g. regarding how strenuously the activity should be performed).

Participants then selected their main and any extra activities from a list of suggestions. Personalized recommendations consisted of a summary of how each activity they selected would improve their balance (e.g. either by strengthening the legs or by improving coordination), and additional advice relating to their particular health problems (e.g. osteoporosis).

Finally, participants were asked to construct an *action plan* consisting of their goal to reach by performing balance training (inserted from their previous answer), the details of their activity (location, days, times, and start date), and who would be their social support for the plan. The rationale for the content of the action plan was based on theory and research on the use of implementation intentions, contingency contracts, and social support to support behaviour change [30–32]. The website concluded with a debrief page which, as an incentive for users to reach the end, provided a free advice pack that contained contact details of various organizations that provided further information. The website takes approximately 20 minutes for users to complete.

Participants

Before recruitment commenced, ethical approval was granted from the School of Psychology, University of Southampton. A convenience sample of computer literate community-dwelling adults aged 60 and above was recruited from adult education centres with a computer

suite, and from a Christian church. After permission from the area managers of sheltered housing courts was obtained, all 24 courts of a local city council were contacted to recruit at least one member of staff for the study. The 26 participants represented 83 per cent of the city council's courts (20/24) and 56.5 per cent of the city council's wardens (26/46). The participants' experience as a warden ranged from 3 months to 19 years (mean = 8.36 years, SD = 5.72). Apart from one warden who worked with older people who required 24 hour care, all the wardens worked with older people who were relatively independent.

Procedure

The interviews were audio recorded and took place in two locations. The older people were interviewed in a small room in a quiet area of the School of Psychology, University of Southampton. A computer was used with a conventional 17 inch screen, keyboard, mouse, and Internet Explorer to access the website. The wardens were interviewed at the sheltered housing courts, in the wardens' office or the communal lounge. As the majority of courts did not have computers, the interviewer brought a conventional laptop to present the website to the participants. The laptop had a 15 inch screen and a plug-in mouse, and used Internet Explorer to access the website.

The interviewer provided the participant with a consent form informing them of the aims of the study, and an instruction sheet explaining their task of interacting with the website and providing their comments. The interviewer provided technical assistance if necessary, and to aid the think aloud analysis, spoke aloud for the audiotape to describe visual information relating to participant comments and the access of each web page. The wardens input their own details into the interactive web pages or the details of a familiar older person. Three wardens were not confident in using the laptop, and so the interviewer used the mouse and keyboard for them. Whilst the wardens were completing the website, the interviewer observed and made notes of participant comments. These notes were used to assist with the interviewer's prompts in the semi-structured interviews.

Analysis

The interviews were transcribed into Microsoft® Office Word 2003 documents and analysed thematically to obtain a summary of the recurring relevant themes across the participants [33]. All codes were analysed by the first author inductively (codes that emerged from the data), exclusively (the data can only fall under one code), and manifestly (only the explicit meaning of comments were coded) [33], and codes were discussed with the second author. Sheltered housing wardens were given the opportunity to discuss the emerging findings of the study when the first author presented them at a staff meeting.

Results

The participants were predominantly women, and apart from one Asian were all white (see Table 3). An even selection of self-rated balance options was chosen, and most of the website was accessed at least once; 90 per cent of the website was commented on by both older people and sheltered housing wardens.

Table 3 Descriptive statistics of participants and their website selections

	Older people (n = 16) no. (%)	*Wardens (n = 26) no. (%)*
Female	10 (62.5)	20 (77)
Age (years): range (mean)	60–81 (70.81)	21–62 (48.35)
Computer experience:		
< 1 year	5 (31)	8 (31)
1–5 years	6 (38)	6 (23)
5–10 years	5 (31)	12 (46)
Computing tutor	3 (19)	1 (4)
Self-rated balance selected:		
Good and want to keep it that way	5 (31)	8 (31)
Quite good, but would like to improve it	5 (31)	8 (31)
Some problems to overcome	6 (38)	10 (38)
Location for SBT selected:		
At home	7 (44)	14 (54)
Outside	3 (19)	7 (27)
Group or class	4 (25)	3 (11)
Combination	2 (12)	2 (8)
Number of tailored options selected out of 31	28 (90)	28 (90)

Older people

For the older people's think aloud data, the inductive codes are presented under three headings: usability, reasons for inputs into the interactive sections, and reaction to the advice. The general comments from the semi-structured interviews are then presented.

Usability. Only one usability difficulty was identified: most participants were unable to complete the action plan. Participants typed the date on which they were to start their SBT action plan in the incorrect format and did not notice the error message that alerted them to this. Most participants also did not notice the calendar that could be used to select the date.

Reasons for inputs into the interactive sections. Some participants commented that vigorous activity is too strenuous for older people, whereas others commented that they were already performing SBT, even though only one participant reported doing enough SBT to maintain or improve their balance. Most participants selected activities that they enjoyed or activities that they were interested in (e.g. Tai Chi), and appeared to plan to introduce these activities by careful consideration of their current routine. The action plan emerged as less useful for those who struggled with keeping a routine, and for those who lacked information on local classes that they wished to join.

Reaction to the advice. When viewing the first (introductory) web page, some participants stated that the advice did not apply to them, because they felt they were already independent and active, and did not need to increase their physical activity. Some agreed that older people need to stay active and that retaining good balance is an important issue

for older people. When viewing the advice on Tai Chi and Yoga, some participants were wary of meditation.

General comments. With regard to the general presentation of the website, some participants perceived the website as being too formal, requiring more colour and graphics to make it more attractive. The majority of participants stated that they found the balance training advice to be agreeable, suitable, and of the right length. Most said that it was of sufficient quality that they would follow the advice, would describe it to a friend as informative, and would read the advice if they came across the website in their own time.

Sheltered housing wardens

For the wardens' data, the inductive codes are presented under four headings: usability, aim, content, and promotion.

Usability. A number of participants commented that the website was easy to use, in that the layout was easy to follow, and the text was free of jargon and complex words. Some commented that the option to increase the text size was helpful, as some older people would require the font size to be larger to comfortably read the text.

Aim. A minority of participants commented that older people are learning how to use computers. However, the majority commented that most older people would not be competent or have the patience to go through a website, and are not interested in learning how to use computers.

Content. A number of participants commented that the website was interesting and informative. Some commented that as long as older people follow the advice, the website will help them improve their balance, and commented that the website increased their own awareness of SBT. A couple of participants commented that the website could promote more gentle activities such as chair-based exercises.

Promotion. Many participants commented that they or their colleagues at other courts could promote the balance training website among older people. Some commented that because they themselves do not use computers, they would not promote the website. In contrast, several participants were positive about the website, and stated it would be good for their residents to access. Some participants said that having a computer with Internet access onsite would allow for promotion of the website, particularly a communal computer, which is planned for the near future. Several participants commented that they would be willing to sit with their residents who are not computer literate to help them access the website. Lastly, there were three types of residents that some participants stated they would recommend the website to: those who own a computer with Internet access, those who have balance problems, and those who are physically active.

Discussion

This study presents the usability and acceptability of a website that provides tailored advice to help motivate older people to undertake SBT to prevent falls. Despite one usability problem to correct with the action plan calendar, the website was found to be usable. The advice was

acceptable, and older people selected SBT activities that they enjoyed or were interested in, and appeared to carefully introduce them into their current routine. The wardens said they would assist in promoting it to their residents, particularly those who owned a computer, had balance problems, or were physically active. However, some older people said they would not follow the advice because they felt it was too strenuous or that they were already active, and some were wary of activities that they believed would involve meditation. The action plan was seen as useful, but less so for those who struggled with keeping a routine and those who wanted to join a class. The sheltered housing wardens were also concerned that the majority of older people are not yet sufficiently computer literate to access it.

Older people

Some older people acknowledged the importance of balance training, whereas others commented that the advice did not apply to them. These findings are consistent with the previous evaluation of a website providing tailored online falls prevention advice by means of case studies [17]. Older people have been found to deny their falls risk, including those with increased risk due to poor mobility, advanced age, or a previous fall [34]. Some older people stated that they were already doing balance training, even though only one person reported performing enough SBT to actually maintain or improve their balance. Previous studies have found that older people can overestimate the amount of physical activity that they perform [35], and those who do are less likely to intend to undertake more physical activity [36].

Other participants said that vigorous activities are too strenuous for older people. A self-perception of being 'too old' has been identified elsewhere as a barrier to exercise and balance training [37–39]. It also appears that some older people may require more information on meditation before they will feel comfortable in performing activities such as Tai Chi and Yoga. Most participants selected information on and intended to do activities that they enjoyed or were interested in (e.g. Tai Chi), which was consistent with previous research finding that enjoyment of exercise is an important factor promoting adherence to the activity [34–35, 40–48].

Some older people felt that the website would be enhanced with more colour and graphics to make it less formal. This recommendation has been made previously by older adults viewing a website providing tailored falls prevention advice [49]. Otherwise, most participants reported a positive experience of using the website, as found in a study that tailored online physical activity advice also using feedback on current level of activity and an action plan [50].

Sheltered housing wardens

The wardens also found the website easy to use. Most wardens expressed concern that currently the majority of older people will not be reached by this advice, simply because it is online. Although currently small, the number of older people using the Internet is growing [51–52], and over 50 per cent of those in the cohort next to enter retirement are currently online [5]. The wardens agreed with the advice, although some advised that more gentle activities could have been suggested. Wardens who did not use computers would not promote the website. Otherwise, the majority of wardens were motivated to promote the website, particularly among older people who own a computer, have balance

problems, or are physically active. This finding was encouraging, as health and social care providers' attitudes can have a major influence upon people's uptake and adherence to health advice [e.g. 20].

Limitations

This study had four main limitations. First, the samples of older people and sheltered housing wardens were not representative of the entire population. The older adults comprised those who were already experienced with computers, and many were already performing some SBT. This possibly reflected a self-selection bias [53], in that it is likely that those least likely to participate in balance training interventions were also less likely to participate in this study. The sheltered housing wardens were all working for a city council. Staff working in private sheltered housing are likely to serve a different clientele, who would have provided a broader range of views on the website. Second, there was a risk of social desirability influencing evaluations of the website [54], since the interviewer was younger than the participants and had helped create the website, which possibly inhibited more critical comments. Third, although the majority of participants provided detailed comments in the semi-structured interviews, it is likely that more open-ended questions would have elicited more data from the minority of participants who responded with monosyllabic answers [33]. Fourth, the website navigation was inflexible in presenting advice on web pages that advanced sequentially. Websites such as a previous one providing falls prevention advice [19] commonly allow users to navigate using keyword searches, site maps, indexes, and information trees. Further research could explore more flexible ways of presenting online SBT advice and present users with an overview of the advice sections that they will be expected to complete, and investigate whether differences in navigational activity influence the outcomes of accessing the website.

Implications

This study suggests that the balance training website could well be usable and acceptable to older people and sheltered housing wardens working with older people, and highlights the potential for health and social care providers to promote SBT to older people. However, further work is required to address misperceptions such as 'I do enough activity' and 'I'm too old for balance training'. The website could also be improved by suggesting less vigorous activities and more gentle activities for those that self-rate their balance as 'quite good but would like to improve it', and by adding an option to the action plan that allows participants to not specify when they will perform SBT (for those who struggle with keeping a routine or want to join a class). In addition, further information about Tai Chi may facilitate interest in this form of SBT.

The balance training website is an example of how new technologies can be developed to empower older people to self-manage their health. Since it is not possible to promote health to everyone in consultations with health professionals, computer tailored interventions appear to offer an acceptable method of providing individualized advice cost-effectively to a large population [5]. More research is required to identify the elements of theory-based behaviour change interventions that are most effective for tailoring advice in different contexts [55].

Conclusion

The website was generally well received among older people and sheltered housing wardens, suggesting that online tailored advice could be a promising new avenue to help motivate older people to undertake SBT.

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