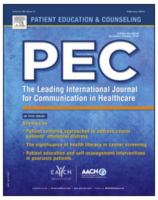
Patient Education and Counseling 98 (2015) 1418–1424

Contents lists available at ScienceDirect

Patient Education and Counseling

journal homepage: www.elsevier.com/locate/pateducou



Assessment

Measuring the effects of online health information: Scale validation for the e-Health Impact Questionnaire

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ARTICLE INFO

Article history:
Received 14 October 2014
Received in revised form 9 March 2015
Accepted 13 June 2015

Keywords:
e-Health
Patients' experiences
Information
Exploratory factor analysis
Psychometric

ABSTRACT

Objective: Health-related websites have developed to be much more than information sites: they are used to exchange experiences and find support as well as information and advice. This paper documents the development of a tool to compare the potential consequences and experiences a person may encounter when using health-related websites.

Methods: Questionnaire items were developed following a review of relevant literature and qualitative secondary analysis of interviews relating to experiences of health. Item reduction steps were performed on pilot survey data ($n = 167$). Tests of validity and reliability were subsequently performed ($n = 170$) to determine the psychometric properties of the questionnaire.

Results: Two independent item pools entered psychometric testing: (1) Items relating to general views of using the internet in relation to health and, (2) Items relating to the consequences of using a specific health-related website. Identified sub-scales were found to have high construct validity, internal consistency and test-retest reliability.

Conclusion: Analyses confirmed good psychometric properties in the eHIQ-Part 1 (11 items) and the eHIQ-Part 2 (26 items).

Practice implications: This tool will facilitate the measurement of the potential consequences of using websites containing different types of material (scientific facts and figures, blogs, experiences, images) across a range of health conditions.

1. Introduction

The internet has huge potential for promoting health and preventing disease [1]. One important way in which the internet has been used in connection with health is through the distribution of information throughout both industrialised and developing nations [2,3]. Many of the characteristics associated with the web make it a promising resource for public health. For example, the accessibility of a wide range of information can promote benefits such as public education and empowerment through informed decision-making. Wide availability of various forms of information however may also lead to negative consequences, such as misinformation or misuse of information [4]. The potential impact of using a particular website on an individual is therefore critical when informing future health information strategies.

Improved knowledge and behavioural outcomes have been demonstrated when using online information compared to traditional forms of information (for example, leaflets or pamphlets) [5]. Whilst these results are encouraging, using the web to source information compared to using printed materials is a very different user experience. In addition to differences in the volume and presentation of conventionally presented medical information, health-related websites can also offer insights into the experience of living with a health condition when printed materials typically do not. Personal experiences can be useful in maintaining the web user's interest, give more in-depth information and provide opportunities to compare and contrast experiences of health [6]. The inclusion of these forms of information, however, can sometimes be omitted by website developers [7]. To ascertain how online information can positively or negatively impact on the user, websites containing different styles of information need to be compared using appropriate methods. To date, attempts to compare the potential consequences of using a website on users and their experiences of using various styles of information have been restricted by the lack of a suitable instrument; it is this gap which we have sought to address.

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http://dx.doi.org/10.1016/j.pec.2015.06.008

This study set out to develop a valid and reliable instrument which would enable the comparison of two or more health-related websites in a standardised manner. The instrument (the eHealth Impact Questionnaire) aimed to inform health professionals, researchers and web developers about users' experiences of using different types of material (for example scientific facts and figures, blogs, experiences, images) that they might include on their websites.

To inform this instrument, a recent literature review [8] relating to the potential effects of seeing and sharing experiences online and a secondary data analysis of interviews [9] relating to experiences of health were used to generate a range of items. Five themes were identified which outlined the potential experiences and consequences a person may encounter when accessing health websites containing scientific information and/or experiential information. These themes were labelled: (1) Information, (2) Feeling supported, (3) Relationships with others (4) Experiencing Health Services and; (5) Affecting behavior.

Expert and user opinion confirmed the acceptability and relevance of 62 candidate items through expert review and a series of cognitive debrief interviews with internet users. Cognitive interviews also ensured items were interpreted as the researchers intended. Items were divided into two pools: (1) Items relating to general views of using the internet in relation to health (eHIQ-Part 1) and (2) Items directly relating to the use of a specific health-related website (eHIQ-Part 2). See Kelly et al. [9] for further detail. This paper reports the item reduction and psychometric refinement of the candidate items.

2. Methods

This study was carried out in two stages. Stage 1 aimed to administer the pilot online questionnaire across a range of health groups with a view to reducing and refining items. Stage 2 aimed to finalise the questionnaire sub-scales using a further sample and to evaluate the validity and reliability of the scales. Recruitment methods for Stages 1 and 2(b) were approved by the University of Oxford's Medical Sciences Division Research Ethics Committee (Reference numbers: MSD/IDREC/C1/2011/77 and MSD-IDREC-C1-2013-063). Stage 2(a) was approved by the NHS Research Ethics Committee (Reference number: 12/SW/0209).

2.1. Participants

Participants were men and women who were aged 18 years or over, living in the UK and had access to the internet. To ensure items were appropriate for inclusion in a generic questionnaire, items were administered across a range of health groups (for example, carers, people with chronic conditions, people hoping to modify health behaviour). Estimates suggest that meaningful psychometric tests require at least three times as many respondents as items [10]. The largest item pool (eHIQ-Part 2) contained 39 items in Stage 1 and 34 items in Stage 2. Therefore, at least 117 participants were required for analyses in Stage 1 and at least 102 participants were required in Stage 2.

2.2. Recruitment

Stage 1: Open recruitment took place through invitations health blogs, online discussion forums, social networking sites (Facebook and Twitter), news pages on health websites, research volunteer pages, local news advertisements, and a research volunteer email list. Potential participants were asked to click on an electronic link which led them to the study materials.

Stage 2: Mixed modes of recruitment were used. Direct recruitment (Stage 2a) involved distributing postal research invitations (through the Oxfordshire Primary Care Trust ($n = 520$) and the Birmingham branch of the Multiple Sclerosis Society ($n = 235$). Open recruitment (Stage 2b) included advertisements on health-related websites and social networking sites. Care was taken to advertise the study on websites which had not been used for recruitment in Stage 1. Data were also obtained from a separate website evaluation study which used the candidate eHIQ items. This evaluation study ran in parallel with Stage 2 recruitment.

2.3. Materials

A web-based survey was formatted using Bristol Online Survey's (Stage 1) and Qualtric's (Stage 2) software for each population group. Participants were asked to access the online questionnaire and complete a series of questions about their general views of using the internet for health information (eHIQ-Part 1). Participants were then directed to spend 10–15 min browsing a relevant condition-specific health-related website (for example a website hosted by Asthma UK, the MND Association or NHS Choices) and then asked to answer a series of questions (eHIQ-Part 2) relating to the website they had been asked to browse as well as demographic questions. To assess convergent validity, participants in Stage 2 were also asked to complete two reference measures which were hypothesised to have moderate correlations with the eHIQ items.

The first reference measure was a single item from the Health Information National Trends Survey (HINTS) [11]. The single item (In general, how much would you trust information about health or medical topics on the internet?) was predicted to have a moderate correlation to eHIQ-Part 1 scores. The second reference measure comprised of one sub-scale, Access to quality information, from the Web Trust Questionnaire [12]. The sub-scale was predicted to have moderate correlations with all sub-scales within the eHIQ-Part 2. Two of the eight items in the Access to Quality Information sub-scale overlapped with two items already included in the eHIQ-Part 2 questionnaire. The relationship of the eHIQ sub-scales with an adjusted six item sub-scale was therefore undertaken to account for the overlapping items. The length of time estimated to complete the questionnaire was 10–15 min exclusive of the time allocated to browsing the specified website. Stage 2 participants were asked to complete the questionnaire on two occasions with a two week interval to examine test-retest reliability.

2.4. Statistical analysis

Analyses for the eHIQ-Part 1 and eHIQ-Part 2 were carried out independently in SPSS, Version 20 [13]. Descriptive statistics were used to present demographic data. Items were subjected to preliminary data checks to confirm their suitability for inclusion in further analysis. Decision rules for item removal included items with high floor and ceiling effects (>40% of respondents selecting one of the extreme response options) and items which had large amounts of missing data (>10% non-response). A correlation matrix identified items demonstrating poor correlations (<0.2) with a large number of items and reliability analysis was carried out to identify items with low item-to-total correlations (<0.3) or items which decreased the internal consistency (Cronbach's alpha value). Items were iteratively removed when displaying a high number of poor correlations with other items or if they reduced the Cronbach's alpha value.

Exploratory factor analysis (EFA) was carried out to identify sub-scales within the item pools and to exclude items which did not group in conceptually sound sub-scales. The suitability of using factor analysis on each dataset was assessed using Bartlett's Test of Sphericity ($p < 0.05$) [14] and the Kaiser–Meyer–Olkin (KMO)