What Do You Need to Know to Stay Healthy? – Health Information Needs and Seeking Behaviour of Older Adults in Germany

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Abstract. Deep understanding of users' needs is crucial for developing successful digital health technology. At the beginning of system development, it is thus important to analyze and specify the context of use within the users-centered development process. Knowing what patients need to know about their health and which information sources they apply to find those, bears implications for personal health ICT conveying health information to the elderly patient. Present results from a survey on health information need and seeking behaviour of N = 551 older adults in Germany suggest that older adults are fairly satisfied with the information they get, indicating a low need to acquire health information. Higher health information need corresponds with a larger amount of health apps installed on older adults tablet PC and with the usage of smartwatches and apps in general. Finally, results support the theoretical influence of demographic variables. Here, educational attainment significantly revealed to be a main influence on information need.

Keywords: Health information need · Information seeking behavior Gerontology · eHealth · Context analysis · Older adults · Ageing

1 Introduction

In times of demographic change, the need for innovative and comprehensive care concepts for older adults has increased. This is because people are not only getting progressively older, but also because the incidence and prevalence of illnesses and the resulting limitations can greatly reduce the quality of life for the people affected [1]. The application of digital information and communication technology (ICT) and related services in existing and future health services represents an extremely promising opportunity. Digital health is thus expected to meet the challenges posed by the societal age shift. This does not only apply to Germany but to most western countries [2]. The decoupling of medical care from the local and temporal availability of medical personnel, which is associated with digital health systems, makes it possible to provide

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patient-specific and cost-efficient services and therapies. Unfortunately, the nationwide distribution of so-called eHealth systems is the exception in Germany and other European countries. Not only legal and organizational obstacles but above all a lack of knowledge of the requirements of older adults regarding the design of eHealth and eHealth services could be identified in post-hoc analysis of facilitators and enablers of digital health systems [3]. Therefore, existing systems and services often lack acceptance and adherence. A means to support the acceptance and permanent use of digital health information systems is the user-centered development process [4, 5]. It begins with an understanding of the user, his tasks and the environment. Information demand and information search behaviour describes the context of digital information systems. Accordingly, identifying the users' goals, their information needs and the different ways via the user, obtains the information needed, would help to better understand the context of ICT systems and thus support its design. In this paper, we would like to examine in more detail the potential relationships between ICT use and information requirements as well as information search behaviour using the example of the application context of health. The following section, in this regard, deals with a theoretical model illustrating the concepts of health information need and seeking behaviour and the variables that are expected to influence them.

2 Related Work

Various theoretical models exist to describe information need and information seeking behaviour. One incorporating health variables is Wilsons model of information seeking behaviour. The goal of Wilsons model of information seeking behavior [6–8] as depicted in Fig. 1, is to provide a general overview of information behaviour and the relationship between the user and the main concepts of information need and information seeking behavior. Information seeking behaviour describes human behaviour as part of the search for information, which usually represents the consequence of a previously existing need for information. To give an example, imagine the case of a patient receiving a medical diagnosis. Consequently, this patient may now develop a need to seek additional information to his or her diagnosis. Accordingly, to satisfy this need, the patient will want to employ information sources or information retrieval systems (IR-systems) such as the internet, using a computer, a smartphone or other compatible devices. This can lead to a success or a failure of this source. In the case of success, the patient will use the gathered information and will either have satisfied the initial need for more information or not. Success or failure of one information source also influences the use of other sources. Additionally, the model shows that the process of seeking information can involve the exchange of information with other people. In addition, the use and subsequent processing or transfer of information can be part of information behaviour that again can be accomplished by incorporating the use of technical devices. The concept of information seeking—as mentioned previously—is based on the concept of information need. Need is a subjective experience which can have underlying physiological, cognitive and affective motives that on part of the information user can influence the seeking process. Next to those three kinds of need, also personal circumstances such as the social role and environmental factors can exert influence on the seeking

behaviour. Other intervening factors that were later included in the revised model can be personal characteristics of psychological, cognitive or emotional kind. In addition, demographic variables, educational variables, social/interpersonal variables, economic variables and source characteristics should be considered as being possibly intervening. Moreover, the revised model now also takes into account in what way information-seeking behavior can occur, ranging from passive attention to more active and ongoing search. Furthermore, it incorporates different stress- coping mechanisms that can arise when e.g. getting an unpleasant medical diagnosis. Some people may show an avoidant behaviour while others orientate towards the possible threat. Additionally, the construct of self-efficacy that can affect how successful information sources are used, is also considered.

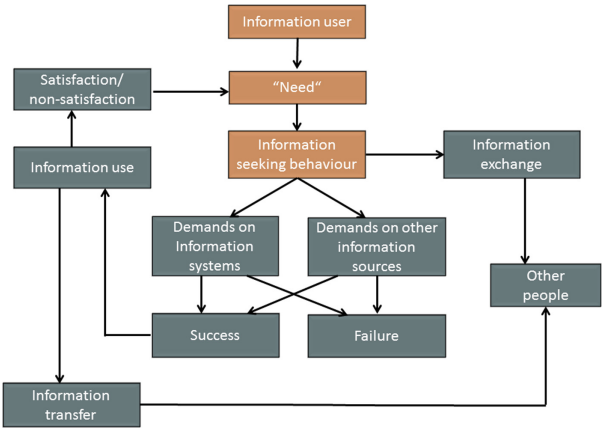

Fig. 1. The general model of information behaviour [6]

Information need and seeking behaviour was investigated for numerous application contexts. Greysen et al. [13] have investigated how functional impairment affects internet use among older adults and found that this had negative implications for meaningful use of patient portals. Yagil et al. [14] also found that using everyday technologies generated stress for older adults, which also suggested a potential barrier to patient portal adoption and use. Ancker et al. have investigated how disadvantaged populations use patient portals, based on system access logs of more than 74,000 patients at a Federally Qualified Health Center in New York City [15]. They found good adoption of the system by low-income participants, but small persistent racial disparities in both the likelihood to be offered an access code and the likelihood to actually use the system. Thus, income itself did not appear to be a limiting factor in adoption of patient portals, but may have a modifying influence in combination with other demographic factors. However, these results may not generalize to rural populations. In a qualitative study dealing with eHealth users in rural Nebraska, Fruehling reports that usability and clarity were important in the development of such systems, and also noted that security and privacy issues were a major concern with this population [16]. It can be concluded,

that most studies show that information need and technology usage correspond in some way. Additionally, while the investigations of health-related information need primarily focus on specific diseases and contexts [17–21], the information need and information seeking behaviour of older adults has so far not been described in general. This holds especially for a German population of older adults. Therefore, in order to close this knowledge gap, we want to find out (RQ1) Where do older adults seek information on their personal health and on health topics in general? (RQ2) How do older adults use information on their personal health and on health topics in general? (RQ3) What demographic factors influence health information need and seeking behaviour? (RQ4) Finally, we are interested in statistically quantifying the relationship between technology usage and information need by asking if there is a relationship between health information need/seeking behaviour and technology usage.

3 Method

Aim was, among others, to describe the health information need of older adults as starting point and motivation for investigating ergonomic aspects of personal health data access [9–11]. A detailed description of the study method and descriptive results can be found in [12].

3.1 Sample

The mean age of the participants (N = 551) was 69.17 (SD = 5.787) and ranged from 60 to 90 years. The gender ratio of the sample was balanced including 51.3% males and 48.7% females. 441 participants (80%) were already retired, while 109 (19.8%) were still working.

3.2 Procedure

A 15-page paper-based questionnaire was sent to N = 5000 randomly selected German adults aged 60 years and older in June 2016. 586 participants responded to our questionnaire. Thirty-five participants had to be excluded because they were younger than 60 years, resulting in a final sample size of N = 551 and a response rate of 11%.

Investigating elderly's health information need and seeking behaviour started with an adapted version of the EU-HLS-47, consisting of 15 instead of 47 items to assess participants' health competence selected in an expert workshop. Following this, general health information need and trust in information sources (TV, magazines, internet, doctor and pharmacist, family and friends or other) were queried. Subsequently, questions were asked on topic-related information need (diagnosis, therapy, interdependency of medicine). This section closed with a question on information sources participants use to access (personal) health information and with a question on characteristics of health information search behaviour considered as relevant in Wilsons model on information seeking behaviour.

Returned surveys were digitalized through Remark Office software. SPSS 24 served to conduct the statistical analysis of the data resulting from survey digitization with the help of Remark software.

4 Results

4.1 Health Information Need

Older adults in Germany are satisfied with the information they get about (personal) health. Sixty-four percent claim to be 'very satisfied' and 'satisfied' while 27.6% consider their satisfaction with the health information they get as 'neutral'. Only 33 participants are not satisfied. The most important health topics are information on health billing from doctors and health insurances (n = 516, M = 3.05, SD = 0.93). Besides billing transparency, older adults are interested the most in medical diagnosis (n = 540, M = 2.27, SD = 0.75), the meaning of examination results (n = 535, M = 2.37, SD = 0.72) as well as therapy and treatment options (n = 530, M = 2.66, SD = 0.83).

4.2 Health Information Seeking Behaviour

Descriptive results suggest that older adults in Germany get information about health primarily from their doctor and pharmacist or from TV. The internet in contrast is the least used information source when it comes to searching and finding health-related information. In total 45.6% of N = 551 valid answers find health information on TV, 41.6% find health information in magazines, while 37.4% look on the internet. Doctor and pharmacist are the primary source for 47.9%, while friends and family are only consulted by 38.8%. Participants trust their doctor and pharmacist the most (M = 1.96, SD = 0.67, n = 539), while their trust in magazines and newspapers is the lowest (M = 3.30, SD = 0.80, n = 492).

Older adults primarily share their information with family and friends (89.7%) and with their doctor or their pharmacist (73.5%). Just over a quarter (25.2%) of older adults in Germany share, health-related information with acquaintances and 11.8% share it with health insurance companies. A negligible number of participants share health-related information on social networks, with self-help groups or with people, they do not know at all. From N = 551 valid answers only twenty people do not share health-related information at all.

Older adults in Germany describe their search for information about health in general or their personal health as active and incidental. On a scale where 1 = 'fully agree' and 5 = 'fully disagree' the average rating of the statement that their information search is active is M = 2.7 (SD 1.3, n = 387) while it is M = 2.7 (SD 1.22, n = 424) for the statement that their information search is causal. The least consent is received by the statement 'I search regularly for health information' with a rating of M = 3.3 (SD = 1.9, n = 361).

4.3 Relation Between Demographic Variables, Information Need and Information Seeking Behaviour

Health Information Need. There was a significant association between the information need and the educational attainment: People with lower educational attainment are less satisfied with the information they have regarding their personal health.
Older adults without education were satisfied the least with the information they receive about medical billing. Differences between all other levels of educational attainments were non-significant. Another significant association could be identified regarding the satisfaction with information about the experience that others have with their health and their education. People with a lower level of education were much more satisfied with the information available to them than people that are more educated. As there was also significant association between the satisfaction concerning information about (interaction of) medications and the number of chronic diseases our results suggest that people with a higher amount of chronic diseases are much more satisfied with this kind of information they get than people with no or less chronic diseases. The same applies to satisfaction concerning information about the course of diseases. Here, too, the group of participants without qualifications is satisfied the least. Finally, we found women are more satisfied with the information they get than men are. This is the opposite for the understanding elderly's have about their medical diagnosis. Women indicated that understanding the meaning of a diagnosis is very easy while more men than women indicated a neutral position to this ease of understanding.

Trust in Health Information Sources. Surprisingly, people in the eastern part of Germany rate the internet as slightly less trustworthy than people in the western part. Similarly, we found a significant association between the trustworthiness in doctor/chemist and their education. Older adults with university degree rate this information source as less trustworthy while people with lower educational level trust this source more.

Health Information Sharing. The older people are the less they share health related information with family and friends. In nearly all age groups the amount of people who share their information was higher than the amount of people who do not so. Furthermore, results reveal that people who live in a supervised community for older adults, share health information with acquaintances. There was also a significant association between sharing health information with health fund and age group. The amount of older adults who do not share health information is in all cases higher than the amount who do not share their health information with their health fund. The only exception here is the age group of the 85 to 90 year old adults. Here more people share information about their health with their health fund. Older adults in the east of Germany share health information less with their doctor or chemist than in the western part.

Health Information Search Characteristics. Significantly, more women than men describe their search for health information as active. Finally yet importantly, results indicate that the major part of older adults without a chronic diseases report that they do not regularly search health information while the people with two or more chronical diseases report the opposite.

4.4 Relation Between Health Information Need and Technology Usage

There was a significant negative relationship between information need and the possession of a computer or laptop $r_s = -.106$ T 95%, BCa CI [−.193, −.011], $p = 0.017$. Hence, based on the point biserial correlation we conclude that the possession of a laptop or computer accounts to 0.11% to the information need represented by the satisfaction with available health information. We additionally found a significant negative relation between information need and frequency of using a smartwatch. $r_s = -.301$ T 95%, BCa CI [−.505, −.101], $p = 0.037$. That means the lower the satisfaction with available health information the more frequent older adults use smartwatches. Furthermore, a significant negative relationship could be identified between information need and older adults frequency of app usage on tablet PCs. $r_s = -.146$ T 95%, BCa CI [−.288, .001], $p = 0.046$ as well as between information need and amount of health apps older adults have installed on their tablet PC $r_s = -.170$, T 95%, BCa CI [−.335, .003], $p = 0.041$. This indicates that lower satisfaction with health information available corresponds with a higher amount of health apps installed on older adults tablet PC. This corresponds with the relation between information need and frequency of app usage (Tables 1 and 2).

Table 1. Health information need of older adults (1 = very satisfied, 5 = very unsatisfied)

Education	Information need (N = 520)					
	1	2	3	4	5	Total
None	0	0	0	0	1	1
Certificate of secondary education	4	21	18	9	0	52
General certificate of secondary education	2	42	36	5	1	86
Professional education	12	109	34	8	1	164
A-Levels	0	17	12	1	0	30
University degree	9	109	49	8	0	175
Other	1	8	2	1	0	12

χ^2 (24) = 209,385, $p < .000$; Phi = .635; Cramer-V = .317; Contingency coefficient = .536

Table 2. Chi-square test statistics of associated variables (crosstabs).

Associated variables: information needs	χ^2	DF	p
General health information need × education	209.38	24	<.001
Billing information × education	60.48	24	<.001
Experiences of others × education	52.46	20	<.001
Medication interactions × number chronic diseases	47.93	24	<.001
Course of disease × education	36.44	24	<.05
Therapeutic options × gender	12.05	4	<.05
Meaning of examination results × gender	11.08	4	<.05

(*continued*)

Table 2. (*continued*)

Associated variables: information needs	χ^2	DF	p
Associated variables: trust in sources			
Internet trustworthiness × postal codes west/east	12.08	4	<.05
Trustworthiness doctor/chemist × education	59.25	18	<.001
Associated variables: information sharing			
With family/friends × age group	15.2	6	.05
With acquaintance × living situation	9.76	4	<.05
With health fund × age group	23.97	6	.001
With doctor/chemist × postal code (west/east)	5.519	1	<.05
Associated variables: search characteristics			
Activity of search × gender	11.56	4	<.05
Longevity of search × number chronic diseases	47.93	24	<.01

5 Summary

Results of a large-scale survey with adults older than 60 years in Germany suggest that older adults are mainly satisfied with the information they get about health in general as well as about their personal health. As a result, in addition to usability and legal hurdles, a need for health information that is sufficiently addressed by traditional information sources could also be attributed for the comparably slow spread of digital health technology into the German market. Besides doctors or pharmacists, the television is the most important source for health information. As older adults consider professional medical sources as most trustworthy, involving these actors in the introduction and application of digital health technology might increase the acceptance and adherence of digital health systems. The results further support the theoretical influence of demographic variables on health information need and seeking behavior. It is not surprising that both objectives strongly relate to educational attainment. Furthermore, the understanding of health information and level of activity in information seeking revealed to be different depending on gender. In addition, the occurrence of chronic diseases plays a major role for the information search continuity. Particularly unexpected were the results, which suggest that the trust in information sources as well as the information sharing with the doctor seem to be influenced by the political history. In the areas of the former DDR, the mistrust for the internet revealed to be higher. In addition, older adults coming from those areas share personal health information to a smaller extent with the doctor or pharmacist. However, it has to be pointed out that a relation between variables may not be equated with causality. Further investigations on this aspect are necessary. Sharing information about one's own health relates demonstrably to age. The older people get, the less they share information with family and friends. However, it seems reasonable to assume that this is not only due to the willingness and motivation, but also to mortality. Finally, our results empirically demonstrated a relationship between health information need and seeking behaviour and older adult's technology usage. Only in cases where existing sources did not

deliver the desired information, health applications and devices were applied. Here it also has to be considered that the significant relation of mentioned variables does not necessarily implicate causation. However, it indicates the theoretical relationship describing that a sources failure to deliver desired information influences the usage of other sources. Further investigation is needed in order to describe the nature of this relation in depth, as the amount of people who used health apps was low in our sample. This might be attributable to the acquisition method, meaning that an online sample might have exhibited a more frequent use of health technology due to a higher technical affinity of participants. Presented results thus not only show that information need and information seeking behaviour relate to technology usage, they also proofed a feasible mean to describe the context of digital health systems beyond disciplinary boundaries.

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