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## Health information seeking, beliefs about abilities, and health behaviour among Finnish seniors

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### Abstract

The paper presents a study that examines older Finnish adults' self-perceived capability to access, evaluate, understand, and use health-related information, and their perceived ability to influence their health themselves, and the relationship between these factors and their current health, health behaviour and information seeking. Questionnaires were mailed by post to 1,000 Finns aged 65–79 years, and a total of 281 completed questionnaires (28%) were returned. Of these, 273 were included in the study. Cross-tabulation and chi-square tests were used for the analysis. Results showed that both a stronger belief in one's capability to master health information and to act in a healthy manner were positively linked to better health and health behaviour as well as more active information behaviour. These beliefs can be important factors for influencing certain health behaviours and even behaviour change.

### Keywords

Beliefs about abilities, elderly, Finland, health control belief, health information literacy, older adults

## Introduction

Non-communicable diseases mainly related to health behaviour (such as heart disease, respiratory diseases, cancer, and diabetes) are the leading cause of mortality worldwide (World Health Organization, 2017). At the same time, the population in many Western countries, including Finland, is ageing (Hallows 2013; Official Statistics of Finland, 2015). It is, hence, important to examine factors that could possibly influence health behaviour also among the elderly. We live in a society where an extensive amount of health information surrounds us in our everyday lives (Hirvonen et al., 2016). But how is the proliferation of health information connected to health behaviour? Health-promotion has usually focused on behaviours such as physical activity, healthy eating and abstinence from substances (e.g., Hirvonen et al., 2016), but also active health information seeking has been considered to be a health-promoting behaviour (Shieh et al., 2010; Roncancio et al., 2012). The motivation to seek health information has been associated with factors including self-efficacy and health locus of control (e.g. Case et al. 2005; Shieh et al., 2010). Locus of control (LoC) reflects beliefs about whether the outcomes of one's life are determined by the behaviour of the individual, whereas self-efficacy captures the extent to which an individual believes that he or she is capable of conducting a certain behaviour (Cobb-Clark et al., 2014). Already Wilson's 1996 model of information behaviour included self-efficacy as one of the activating mechanisms behind information seeking behaviour (Wilson, 1999; Case et al., 2005).

In library and information science, research has to some extent focused on either health-related self-efficacy (Anyaku and Nwosu, 2016; Pálsdóttir, 2008) or LoC (Ek and Heinström, 2011) and health-related information behaviour. Numerous studies have examined seniors' relationships to health information (Hallows, 2013). However, to our knowledge, only a few studies have combined the concepts of self-efficacy and locus of control with health information seeking among elderly people. One example of this is the small-scale exploratory study by Campbell (2009) who studied both health locus of control and health information seeking self-efficacy among seniors.

## Aim

The aim of this study is to present results relating to health information seeking, beliefs about abilities and health behaviour from a larger study conducted in 2011. Previous results of this larger study are found in, for example, Eriksson-Backa et al. (2012) and Eriksson-Backa (2013). The current study examines the relationship between 65–79 year old Finns' self-perceived capability to access, evaluate, understand, and use health-related information (their health information literacy, HIL), their perceived ability to influence their health themselves (here called health control belief, a concept related to LoC), and their current health, health behaviour and information seeking. Several studies (e.g., Enwald et al., 2016; Ek and Heinström, 2011; Gazibara et al., 2016; Pálsdóttir, 2008, 2014; Yates et al., 2012) have shown that not only factors like self-efficacy or locus of control,

but also demographic variables such as gender are related to seeking activity and interest in health information. Relationships have been found between age and education levels and seeking activity, as well (e.g., Gazibara et al, 2016; Pálsdóttir, 2008, 2014). Hence, also these demographic variables were taken into consideration.

## Beliefs about abilities

Within psychology, perceived behavioural control is believed to comprise of two related concepts: locus of control and self-efficacy. *Internal locus of control* refers to believing that what happens in life depends mainly on one's own actions, whereas having an *external locus of control* stands for belief that it is primarily influenced by external factors such as other people or luck (Cobb-Clark et al., 2014).

Bandura (1986, cited in Case et al., 2005) claimed that individuals' sense of locus of control affects their feelings of *self-efficacy*. Self-efficacy refers to individuals' judgement of their capability to act and self-efficacy beliefs influence whether people think optimistically or pessimistically, whether they are motivated and set goals and the life choices they make (Bandura, 1997, 1998, 2006). Self-efficacy has been suggested to be related to motivation to seek information, as well. If a person feels that outcomes in life depend on external factors, there is no use in seeking information, and instead the choice could be to avoid information (Case et al., 2005).

The relationship between the two concepts has been described in the following way: Internal locus of control means that a person "believes [that] positive outcomes are directly due to the behavior" and self-efficacy that a person "perceives oneself as capable of performing the behavior" (Keedy, 2009: 4). The concepts are thought to be intertwined.

Earlier studies have shown that beliefs in one's abilities and health and health behaviour are related. For example, a higher internal health locus of control has been associated with healthier behaviour and better self-perceived health (Rongen et al., 2014). Cobb-Clark et al. (2014) found strong evidence that those with an internal locus of control ate healthier food, exercised more, and smoked less. Ek and Heinström (2011) found that persons with internal locus of control but without health problems were willing and able to act on health issues. They were more interested in health information and active at seeking it, as well. Gender was also related to both LoC, perceived health and information seeking: women were inclined to have a stronger internal locus of control and were, furthermore, more interested and active seekers, as well as feeling better than the male respondents.

Originally developed as a part of the social learning theory (Bandura, 1997), the concept of self-efficacy has been widely used and included into several theoretical models of health behaviour change such as the Transtheoretical Model (Prochaska and DiClemente, 1983). Usually, the concept has been understood as task- or domain-specific (e.g., health, dietary behaviours). Different types of self-efficacies and physical activity in older adults have been investigated by, for instance, McAuley et al. (2003) who studied exercise self-

efficacy, Ayotte, Margrett and Hicks-Patrick (2010) who used both barrier and task-related self-efficacy scales, and French et al. (2014) who reviewed studies on physical activity self-efficacy. Health behaviours and self-efficacy related to health behaviours among older adults have also been studied, for example, by Grembowski et al. (1993), McAuley et al. (2011) and Yeom (2014). In relation to information behaviour, Pálsdóttir (2008) found that those respondents who belonged to the highest health self-efficacy cluster were either moderately passive or active seekers of health and lifestyle information. The majority of the most active information seekers also belonged to the group having the highest health self-efficacy. Higher health self-efficacy was also related to healthier behaviour, that is, more exercise and healthier eating. Anyaoku and Nwosu (2016) found another type of relationship: those who had more access to information about lifestyle modification also had higher self-efficacy concerning lifestyle modification. Other studies have concentrated on self-efficacy related to information seeking. Shieh et al. (2010) measured information-seeking specific self-efficacy using the Health Information Competence Scale by Gustafson et al. (2005) and Campbell (2009) assessed self-efficacy among seniors through questions measuring confidence in online information seeking capabilities.

## Health information literacy

“By information behaviour is meant those activities a person may engage in when identifying their own needs for information, searching for such information in any way, and using or transferring that information” (Wilson, 1999). Julien and Williamson (2011) noted that there is an overlap between the concepts information seeking and information literacy. In fact, it has been common to study health related everyday information behaviour using the concept *health information literacy* (e.g., Enwald et al, 2016; Eriksson-Backa, 2010; Eriksson-Backa et al., 2012; Hirvonen, 2015; Hirvonen et al., 2015, 2016, Niemelä et al., 2012; Yates et al., 2012). This concept was coined in 2003 by the Medical Library Association in the USA to refer to abilities to recognize a need for health information, to know how and where to find information about health, and how to evaluate and use this information in everyday life to make good health decisions (Shipman, Kurtz-Rossi and Funk, 2009). In their review of health information literacy-related studies on senior citizens, Suri et al. (2014), found that HIL can be understood in several ways, and identified three research strands that exist in the literature from 2004-2014: demographic factors and their influence on health information seeking and use, comprehension of health information by senior citizens, and the impact of e-health literacy interventions. Eriksson-Backa (2010) used the concept HIL in a broad sense when studying how a small group of elderly people needed health-related information, as well as their use of information sources, perceptions of information quality, understanding of information, and behaviour in health matters. Yates et al (2012), furthermore, used the concept in their qualitative study on how ageing Australians use information to learn about, and maintain, their health.

Niemelä et al. (2012) designed a 10-item screening tool in order to quantitatively measure what they called everyday health information literacy (EHIL). Respondents were asked to assess their needs for health information and perceived importance of it. Other items

covered perceptions of authority, reliability and use of health information. This tool has been used in several later studies especially for investigating relationships between HIL and health behaviour. Enwald et al. (2016) studied EHIL among healthy young men and adults with a risk for metabolic syndrome (pre-stage of diabetes type 2) and found that different aspects of EHIL stood out in different population groups and that young men were more confident in their abilities and competencies relating to EHIL. Hirvonen and colleagues (Hirvonen, 2015: 119; Hirvonen et al., 2016) showed that lower EHIL scores as measured with the screening tool of Niemelä et al. (2012) were associated with some more unhealthy behaviours (concerning physical activity, smoking, drinking, tooth-brushing and eating), although not all measured, among young men. Also avoidance of information was more prevalent among those with lower scores. Skills, abilities and competencies relating to EHIL have also been applied to topics of lifestyle group counselling meetings for patients at high risk for metabolic syndrome in the research project PrevMetSyn (see Huotari et al., 2015).

Based on the results shown in previous research the following research questions were formulated:

- 1) Is there a relationship between demographic background variables and elderly persons' health information seeking behaviour, health behaviour or health?, and
- 2) How are health information literacy and health control beliefs connected to information seeking, health and health behaviour in a group of seniors?

## Methods and material

This paper presents a subset of results from data collected within a larger survey and interview study on health information behaviour and practices among Finnish seniors that was conducted in 2011. Other parts of the data have been published in, for example, Eriksson-Backa et al. (2012) and Eriksson-Backa (2013). The material for this paper comprises of responses to self-administered questionnaires that were mailed by post to 1,000 Finns aged 65-79 years, requesting a reply within one week of reception. The population was a random sample obtained from the Finnish Population Information System (Population Register Center 2017) and the questionnaire was provided for the respondents in either Finnish or Swedish according to their mother tongue as registered in the population register. The fairly extensive questionnaire comprised of 27 questions and included sections on demographic background information, situations where health information is needed, health information sources used and trusted, perceptions of capability to access and use health information, current health and health behaviour, and experiences of communication with health professionals. The questionnaire was in part based on the questionnaire used by Eriksson-Backa (2010) with additions based on literature reviews especially concerning health risks and the health information literacy scale. An earlier version of the questionnaire was tested in a small-scale study (Eriksson-Backa, 2011) and minor revisions were made for the final one. A total of 281 completed questionnaires (28%) were returned and of them, 273 were included in this study.

## Measures

### Health information seeking

The questionnaire contained two questions about the respondents' interest in and activity to seek health-related information. A 5-point Likert-type scale ranging from 'very' to 'not at all' or 'often' to 'never' was used. The questions were:

- "Are you interested in information about health or illness?", and
- "Do you actively seek (ask, read, look at, listen to) information about health, illness or medications?"

### Health information literacy

Validated tools measuring health information literacy include the Research Readiness Self-Assessment (RRSA) instrument (Ivanitskaya et al., 2012) mainly focused on seeking skills and online information and the everyday health information literacy (EHIL) screening tool developed by Niemelä et al. (2012) that was intended for use in everyday life contexts. Other tools have been suggested, as well, and in this study health information literacy was assessed with the tool developed by Eriksson-Backa et al. (2012) that contained eight statements and a 5-point Likert-type scale ranging from 'totally disagree' to 'totally agree' (cf. Norman and Skinner 2006; Shieh et al., 2010). Kurbanoglu and colleagues (Kurbanoglu 2003; Kurbanoglu, Akkoyunlu and Umay 2006) reviewed literature when they developed their Information literacy self-efficacy scale and chose items covering the following categories: A) Defining the need for information, B) Initiating the search strategy, C) Locating and accessing the resources, D) Assessing and comprehending the information, E) Interpreting, synthesizing, and using the information, F) Communicating the information, and G) Evaluating the product and process. The statements in the current scale did, in a similar way, cover needs for health information, ability to select sources and find the needed information, ability to evaluate, understand and learn from the information, as well as to use it for the benefit of one's health:

- 1) "It is easy for me to decide in which kinds of situations I need health-related information";
- 2) "I know which sources to turn to in order to obtain health-related information";
- 3) "It is easy for me to find the health information I need from the information sources I use";
- 4) "I obtain too much health-related information";
- 5) "It is easy for me to determine whether health information is trustworthy or not";
- 6) "I learn many new things from the health-related information I obtain";
- 7) "I know how to use the health information I obtain to take care of my health"; and
- 8) "I often have difficulties to understand words or sentences used in health-related information".



For the analysis, the response ‘Totally disagree’ was assigned 1 point, whereas 5 points were assigned for ‘totally agree’. For the two statements 4 and 8 that were negatively worded opposite points were given. The scores from these eight statements were aggregated to form a sum variable. The summative score (cf. Gustafson et al., 2005; Niemelä et al., 2012; Enwald et al., 2015; Hirvonen et al., 2016) was calculated for a total of 273 respondents who had responded to each statement and were included in this study. The respondents were categorized into four HIL groups based on the sum scores:

- low (11-20 points, n=31),
- low average (21-25 points, n=81),
- high average (26-30 points, n=92), and
- high (31-40 points, n=69).

## Health control belief

A variety of measures have been used to study health LoC. Several studies have been based on validated tests such as the Multidimensional Health Locus of Control measure (Campbell, 2009; Roncancio, 2012; Rongen et al., 2014) or scales based on this instrument (Hashimoto and Fukuhara, 2004). Wolinsky et al. (2009) used parts of another validated cognitive-specific locus of control scale. Ek and Heinström (2011), on the other hand, constructed a tool assessing three alternatives: self-control, chance control, and powerful others (cf. Wallston et al. 1976).

In this study, Health control belief (HCB) was assessed using a single item that requested the respondents to estimate on a 5-point scale (Very much - not at all) how much they could influence their own health. The question was phrased:

- “Do you think that you can influence your health yourself?”.

Higher scores were interpreted as an indication of health control belief that is closer to internal locus of control, whereas lower ones as referring to external locus of control.

Of the 268 respondents who had answered this question:

- 18 answered ‘not at all/some’ (weak),
- 53 answered ‘average’ (fairly weak),
- 114 answered ‘fairly much’ (fairly strong), and
- 83 answered ‘very much’ (strong).

## Self-rated current health and health behavior

Health behaviour and self-rated current health were assessed using a 5-point scale (Very much - not at all/Excellent - poor), as well. The four questions for health behaviour were as follows:

- “Do you eat in a healthy manner?”,
- “Do you do physical exercise? (also everyday exercise such as cleaning or walks are counted)”,
- “Do you use tobacco products?”, and
- “Do you use alcohol?”.



Self-rated current health was measured through the question “How do you perceive that your current state of health is?”. In addition, Body Mass Index (BMI) was used as an indicator of health and health behaviour (cf. Rongen et al., 2014). BMI was calculated based on respondents’ self-reported current height and weight, by dividing the individuals’ weight in kilograms by the square of their height in metres and categorized into normal ( $BMI < 25$ ), overweight ( $BMI = 25-29.9$ ), and obese ( $BMI \geq 30$ ).

## Barriers

One question asked about barriers to living in a healthy manner: “Is there anything that hinders you from living in a healthy manner, for example by doing physical exercise?”. The reply alternatives were ‘yes’ and ‘no’.

## Analysis

The data were analysed with SPSS Statistics. Cross-tabulation and chi-square tests were used to analyse relationships between demographic variables (gender, age group, education level), health information literacy and health control belief and information seeking behaviour, current health and health behavior. The significance level was set at  $p \leq 0.05$ .

Because the extremes (totally agree/totally disagree) for health behaviours and information seeking, as well as self-perceived health attracted only a limited number of responses, the alternatives ‘agree’ and ‘totally agree’, as well as ‘disagree’ and ‘totally disagree’, or ‘fairly’ and ‘very much/good’ were grouped into one category.

## Results

### Respondents

Table 1 shows the characteristics of the respondents. Of the 281 respondents who returned the questionnaire, 273 were included in this study, as they had ticked all eight items in the health information literacy scale. Of them, the majority (56%) were female, nearly half (49%) were aged 65-69 years, and the most common education level was intermediate (46%).

The mean age was 71 years for the women and 70 years for the men. When asked about possible barriers to living in a healthy manner, 73.5% ( $n=194$ ) perceived that there were no barriers whereas 26.5% ( $n=70$ ) replied that there were.

	n
Total number of respondents	281
Number of included respondents	273
Female respondents	152 (55.7%)
Male respondents	121 (44.3%)
65-69 years	134 (49.1%)
70-74 years	86 (32.5%)
75-79 years	53 (19.4%)
Basic education	91 (33.6%)
Intermediate education	121 (45.6%)
High education	59 (21.8%)
Missing education level	2 (1%)

Table 1. Characteristics of respondents

## Demographic background and information seeking, health and health behaviour

### Interest and seeking activity

Of the demographic variables, gender was significantly related to both interest in information about health or illness (chi-square=8.345,  $p \leq .05$ ) and seeking activity (chi-square=13.202,  $p \leq .001$ ); 80% of the female respondents compared to 65% of the male respondents claimed to be fairly or very interested in health information, and 71% of the women but only 50% of the men sought information fairly or very often. Level of education was significantly associated with interest in health information (chi-square=14.248,  $p \leq .05$ ): 83% of those with a high-level education were fairly or very interested, compared to 78% in the intermediate level group and 59% in the basic level group.

## Self-rated health, BMI and health behaviour

No relationships were found between demographic background variables and self-rated current health. Furthermore, only educational level was significantly related to BMI (chi-square=11.474,  $p \leq .05$ ). Fifty-four percent of those with the highest education had a normal BMI, whereas this was the case for only 28% of the ones with the basic education. In this latter group, more than half were overweight and one-fifth were obese. Gender was significantly related to alcohol use and educational level to eating habits as Table 2 shows. Women used less alcohol, whereas 87% of the women used only little or no alcohol and the remaining 13% used an average amount, almost one-third of the men used an average amount and 11% much or fairly much. Higher education was related to healthier eating habits: 83% of the highest educated responded that they eat very or fairly healthy food, whereas this was the case for 73% of the ones with the intermediate level education and 56% of those with a basic level education. A tendency ( $p = .083$ ) was seen also between age group and physical exercise (Table 2), with those in the age group 75-79 years doing exercise less frequently.

Health behaviour	Gender	Age group	Education level
Eats in a healthy manner	Chi-square=3.112, $p=.211$	Chi-square=3.842, $p=.428$	<b>Chi-square=15.864, <math>p=.003</math></b>
Does physical exercise	Chi-square=1.140, $p=.566$	Chi-square=8.253, $p=.083$	Chi-square=3.329, $p=.504$
Uses tobacco products	Chi-square=4.442, $p=.109$	Chi-square=4.573, $p=.334$	Chi-square=2.169, $p=.705$
Uses alcohol	<b>Chi-square=33.815, <math>p \leq .001</math></b>	Chi-square=7.111, $p=.130$	Chi-square=6.836, $p=.145$

Table 2. Relationships between demographic variables and health behavior (significant relationships are in bold text).

## Health information literacy and health control belief

Health information literacy and health control belief were compared with the demographic variables, as well, and the analysis showed significant relationships between higher levels of HIL and higher education level (chi-square=30.965,  $p \leq 001$ ), whereas no significance was found for HCB and any of the demographic variables.

## Beliefs about abilities and health information literacy, current health and health behaviour

### Interest and seeking activity

Health information literacy was significantly related to both interest in health information (chi-square=20.272,  $p \leq .05$ ) and seeking activity (chi-square=29.412,  $p \leq .001$ ). Less than half of those in the low HIL group, compared to 84% in the high HIL group were fairly or very interested. Regarding seeking activity, the difference was even more evident: 26% in the low group vs. 77% in the high group responded that they seek health information fairly or very often. For health control belief, there was a significant relationship with interest (chi-square=12.785,  $p \leq .05$ ). The cross-tabulation also here showed that those with stronger health control belief were more often fairly or very interested (82% vs. 50% of those with the weakest belief) and, furthermore, more often fairly or very active seekers, although that relationship was not significant: 74% vs. 50%.

### Self-rated current health and health behaviour

Table 3 shows the frequencies of respondents in each level of health information literacy and their BMI as well as perceptions of self-rated current health and health behaviour. According to the chi-square analysis, HIL was significantly associated with current self-rated health (chi-square=28.465,  $p \leq .001$ ) as almost 73% of those in the high HIL group, compared to 45% in the high average HIL group, 40% in the low average group and 33% in the low point group rated their health as good or excellent. Having a normal BMI ( $<25$ ) was also more common among the ones in the high point group than among the ones in the low point group (46% vs. 21%,  $\chi^2=13.412$ ,  $p \leq .05$ ). Also in the two average point groups, the share of respondents with a normal BMI exceeded 40% (Table 3).

	HIL Low (n=31) n (%)	HIL Low average (n=81) n (%)	HIL High average (n=92) n (%)	HIL High (n=69) n (%)
Current health (n=268)				
Fairly poor/poor				
Mediocre	10 (33.3)	16 (20.8)	11 (12.0)	5 (7.2)
Good/excellent	10 (33.3)	30 (39.0)	40 (43.5)	14 (20.3)
<i>Total</i>	10 (33.3) 30 (99.9)	31 (40.3) 77 (100.1)	41 (44.6) 92 (100.1)	50 (72.5) 69 (100)
BMI (n=266)				
normal	6 (20.7)	36 (45.0)	37 (42.0)	32 (46.4)
overweight	17 (58.6)	27 (33.8)	42 (47.7)	22 (31.9)
obese	6 (20.7)	17 (21.3)	9 (10.2)	15 (21.7)
<i>Total</i>	29 (100)	80 (100.1)	88 (99.9)	69 (100)
Eats in a healthy manner (n=267)				
not at all/some	7 (24.1)	3 (3.8)	2 (2.2)	2 (2.9)
average	13 (44.8)	27 (34.6)	18 (19.8)	10 (14.5)
fairly/very much	9 (31.0)	48 (61.5)	71 (78.0)	57 (82.6)
<i>Total</i>	29 (99.9)	78 (99.9)	91 (100)	69 (100)
Does physical exercise (n=266)				
not at all/some	10 (34.5)	12 (15.6)	8 (8.8)	3 (4.3)
average	7 (24.1)	25 (32.5)	22 (24.2)	9 (13.0)
fairly/very much	12 (41.4)	40 (51.9)	61 (67.0)	57 (82.6)
<i>Total</i>	29 (100)	77 (100)	91 (100)	69 (99.9)
Uses tobacco products (n=269)				

not at all/some average fairly/very much <i>Total</i>	26 (86.7) 0 (0.0) 4 (13.3) <i>30 (100)</i>	69 (88.5) 3 (3.8) 6 (7.7) <i>78 (100)</i>	89 (96.7) 1 (1.1) 2 (2.2) <i>93 (100)</i>	66 (95.7) 1 (1.4) 2 (2.9) <i>69 (100)</i>
Uses alcohol (n=267) not at all/some average fairly/very much <i>Total</i>	23 (79.3) 4 (13.8) 2 (6.9) <i>29 (100)</i>	54 (70.1) 18 (23.4) 5 (6.5) <i>77 (100)</i>	67 (72.8) 22 (23.9) 3 (3.3) <i>92 (100)</i>	53 (76.8) 13 (18.8) 3 (4.3) <i>69 (99.9)</i>

Table 3. Frequencies for BMI, self-rated health and health behaviour according to level of health information literacy.

Table 4 shows the frequencies regarding BMI, self-rated current health and health behavior of the respondents divided into four groups according to their health control belief level. Health control belief was related to both self-rated current health (chi-square=103.559,  $p \leq .001$ ) and BMI (chi-square=16.566,  $p \leq .05$ ). Whereas no one with the weakest health control belief rated their health as good or excellent, 69% of those with the strongest health control belief did so. Instead, among those with the weakest health control belief as many as 83% rated their health as fairly poor or poor. Fifty-seven percent of those with the strongest health control belief had a normal BMI, compared to 35% in the weakest group. Another 35% of those with the weakest health control belief were found in the obese group (Table 4).

	HCB Weak (n=18) n (%)	HCB Fairly weak (n=53) n (%)	HCB Fairly strong (n=114) n (%)	HCB Strong (n=83) n (%)
Current health (n=267) Fairly poor/poor Mediocre Good/excellent <i>Total</i>	 15 (83.3) 3 (16.7) 0 (0.0) 18 (100)	 15 (28.8) 27 (51.9) 10 (19.2) 52 (99.9)	 8 (7.0) 41 (36.0) 65 (57.0) 114 (100)	 4 (4.8) 22 (26.5) 57 (68.7) 83 (100)
BMI (n=261) normal overweight obese <i>Total</i>	 6 (35.3) 5 (29.4) 6 (35.3) 17 (100)	 16 (30.8) 22 (44.2) 13 (25.0) 52 (100)	 41 (36.9) 52 (46.8) 18 (16.2) 111 (99.9)	 46 (56.8) 26 (32.1) 9 (11.1) 81 (100)
Eats in a healthy manner (n=267) not at all/some average fairly/very much <i>Total</i>	 6 (33.3) 4 (22.2) 8 (44.4) 18 (99.9)	 3 (5.7) 29 (54.7) 21 (39.6) 53 (100)	 1 (0.9) 24 (21.1) 89 (78.1) 114 (100.1)	 4 (4.9) 11 (13.4) 67 (81.7) 82 (100)
Does physical exercise (n=266) not at all/some average fairly/very much <i>Total</i>	 6 (33.3) 8 (44.4) 4 (22.2) 18 (99.9)	 14 (26.4) 18 (34.0) 21 (39.6) 53 (100)	 9 (8.0) 30 (26.5) 74 (65.5) 113 (100)	 4 (4.9) 7 (8.5) 71 (86.6) 82 (100)
Uses tobacco products (n=268)				



not at all/some	16 (88.9)	51 (96.2)	105 (92.1)	77 (92.8)
average	1 (5.6)	2 (3.8)	0 (0.0)	2 (2.4)
fairly/very much	1 (5.6)	0 (0.0)	9 (7.9)	4 (4.8)
<i>Total</i>	<i>18 (100.1)</i>	<i>53 (100)</i>	<i>114 (100)</i>	<i>83 (100)</i>
Uses alcohol (n=267)				
not at all/some	17 (94.4)	41 (77.4)	74 (64.9)	65 (79.3)
average	1 (5.6)	11 (20.8)	32 (28.1)	13 (15.9)
fairly/very much	0 (0.0)	1 (1.9)	8 (7.0)	4 (4.9)
<i>Total</i>	<i>18 (100)</i>	<i>53 (100.1)</i>	<i>114 (100)</i>	<i>82 (100.1)</i>

Table 4. Frequencies for BMI, self-rated health and health behaviour according to level of health control belief.

The chi-square tests showed (Table 5) that there were significant relationships between both higher levels of health information literacy and health control belief and healthy eating behaviour and more frequent exercise, but no relationships were found with substance use. As shown in the frequency tables 3 and 4 those with higher HIL or stronger HCB ate in a more healthy manner and exercised more than those with lower points or weaker belief. One interesting finding is that alcohol use was almost non-existent only among the respondents with the weakest health control belief, as Table 4 shows.

Health behaviour	HIL	HCB
Eats in a healthy manner	<b>Chi-square=43.188, p=.000 (n=267)</b>	<b>Chi-square=66.127, p=.000, (n=267)</b>
Does physical exercise	<b>Chi-square=30.350, p=.000 (n=266)</b>	<b>Chi-square=50.684, p=.000 (n=266)</b>
Uses tobacco products	Chi-square=10.130, p=.119 (n=269)	Chi-square=0.064, p=.170 (n=268)
Uses alcohol	Chi-square=2.956, p=.814 (n=267)	Chi-square=11.293, p=.080 (n=267)

Table 5. Relationships between beliefs in abilities and health behaviour (significant relationships are in bold text)

## The relationship between health information literacy and health control belief

HIL and health control belief were also measured against each other and this analysis showed that they were significantly related ( $\chi^2=30.644$ ,  $p \leq .001$ ). This result indicates that those who have a better confidence in their capability to seek and use health information are also more confident in their ability to influence their health themselves, that is, they have a higher sense of internal locus of control.

## Discussion

### Aim of the study and the role of demographic variables

This paper studied the relationships between beliefs about abilities, health information literacy and information seeking behaviour as well as perceptions of health and health behaviour among a group of elderly Finns. The first research question was: “Is there a relationship between demographic background variables and elderly persons’ health information seeking behaviour, health behaviour or health?”. The analysis of the demographic background variables showed that female gender and higher education level were linked to health information seeking behaviour, body mass index, as well as, alcohol use and eating habits. Women were more interested in and active seekers of health information, and used smaller amounts of alcohol. Those with the highest education level were more interested in health information and more often had a normal BMI and a healthy eating behaviour. Previous research has indicated that women are usually more interested in and active at seeking health information, as well (Ek and Heinström, 2011; Enwald et al., 2016; Pálsdóttir, 2008, 2014), although Yates et al. (2012) found opposite results concerning online health information seeking among elderly Australian women. Likewise, in a study of elderly Serbians, men and those with higher education were more eager to use the Internet to seek health information (Gazibara et al., 2016). The current study, however, found higher education to be related only to higher interest in health information, not to seeking activity, which differs from previous results (Pálsdóttir, 2008; Gazibara et al., 2016). Pálsdóttir’s (2014) study showed that women, younger people and those with a higher education were more active users of social media for information on health and lifestyle. Ek and Heinström (2011), furthermore, found that female respondents perceived their health to be better than that of the men, but in the current study, no such relationship was found.

## Health control belief and health information literacy

The concept health control belief (HCB) was in this study used as a concept close to health locus of control. The same concept has previously been used in a similar way by, for example, Perrig-Chiello, Perrig and Stähelin (1999). , LoC has often been measured through validated tests. Health control belief, here defined as a perceived ability to influence one's health oneself was, contrary to locus of control (Campbell, 2009; Ek and Heinström 2011; Hashimoto and Fukuhara, 2004; Roncancio et al., 2012; Rongen et al., 2014; Wolinsky et al., 2009) measured with a single item. Self-efficacy, on the other hand, is believed to influence all kinds of behaviours, including information behaviour (cf. Wilson, 1999) and has been studied also in the context of health information seeking. For example, Shieh et al. (2010) measured information-seeking specific self-efficacy and Campbell (2009) assessed self-efficacy in the context of Internet use for health information seeking among seniors. Health information literacy was in the current study assessed with the tool developed by Eriksson-Backa et al. (2012). It has been pointed out that self-assessment of HIL may, in many cases, reflect the self-efficacy related to HIL rather than specific abilities and competencies (Enwald et al., 2016; Hirvonen et al., 2016). Perhaps as the most explicit example of this trait, the Information literacy self-efficacy scale (Kurbanoglu 2003; Kurbanoglu, Akkoyunlu and Umay, 2006), assessed respondents' self-efficacy using the phrasing "I feel confident and competent to". Similar tendencies can be seen in other information literacy scales as well (Mahmood 2017). The wording in the HIL tool used in the present study did similarly focus on confidence by using statements starting with "It is easy" and "I know", and it could, thus, be claimed that it is a measure of health information seeking self-efficacy.

## Beliefs about abilities and health information seeking behaviour

Our second research question was: "How are health information literacy and health control belief connected to information seeking, health and health behaviour in a group of seniors? ". The results show that higher health information literacy was in this study significantly related to both higher interest in health information and more active seeking, whereas stronger health control belief was only related to higher interest. Here the results differ from the study by Ek and Heinström (2011) who found that internal locus of control was related to both interest and seeking activity. As we propose that health information literacy, as measured in this study, is actually a form of self-efficacy, and both concepts have been understood as being one's belief in the capability of accessing, understanding, and using health information the current results can be compared with previous ones on information seeking self-efficacy. Shieh et al. (2010), for example, found that both information-seeking self-efficacy and internal fetal health locus of control correlated with health information seeking among pregnant women. Furthermore, higher health self-efficacy has been connected to active health information seeking (Pálsdóttir, 2008), and internal locus of control to a higher likeliness of having searched for health information online (Roncancio et al., 2012).

## Beliefs in abilities and current health and health behaviour

A connection between internal locus of control and perceptions that one's health is good has been found, as well (Ek and Heinström, 2011; Rongen et al. 2014). The results of this current study were in line with the previous ones, as both higher HIL and stronger HCB were positively associated with good self-rated current health and a normal BMI. In the study by Rongen et al. (2014) no relationship was, however, found between health locus of control and BMI.

Both higher HIL and stronger HCB were significantly related to health-promoting eating and exercise but not to tobacco and alcohol use. Hirvonen and colleagues (Hirvonen, 2015: 119, Hirvonen et al., 2016), on the other hand, found that also substance use was related to EHIL in young men. Cobb-Clark et al. (2014), furthermore, found internal locus of control to be related to both healthier eating, more exercise, and abstinence from tobacco. In the current study, however, those with the weakest health belief control avoided alcohol the most.

HIL and health control belief, furthermore, showed a significant relationship with each other. Similarly, Shieh et al. (2010) found that information seeking self-efficacy and internal fetal health locus of control were correlated, so that the pregnant women with higher information-seeking self-efficacy also believed more strongly that their behaviour could influence the health of their baby.

## Limitations

The study has some limitations. First, the results were based on self-reported behaviour gathered through self-administered questionnaires. Both when it comes to information behaviour and health behaviour, we have to rely on the respondents, whereas observed actual behaviour could have shown different results. Analysing demographic variables and measures of beliefs in abilities separately against information and health behaviour variables also did not answer the question on whether behaviour was more strongly determined by demographics or beliefs in abilities. The results were, however, more often significant with the beliefs in abilities than with demographics. The results for substance use were also probably skewed by the fact that as many as 93% of the respondents did not use tobacco at all and only a few used alcohol. The response rate was, furthermore, moderate, and the results rather showed tendencies. Different results might have occurred had the analysis been conducted on a larger material.

## Future research

Future studies could benefit from using a regression analysis to test whether demographic variables or efficacy and beliefs are stronger factors behind certain behaviour. The used measures were, furthermore, not validated, and a similar study could be conducted on elderly using other, validated, tools measuring health information literacy (e.g., Niemelä et al., 2012) and locus of control, or the current HIL tool could be used together with a validated locus of control assessment. The observation that many assessment tools used to measure HIL, including the one used in the present study, are focusing on health information seeking self-efficacy rather than competences suggest further that in future research, it would be important to be more explicit in what is being measured and to relate the findings in an appropriate body of literature (e.g. competences, practices, or self-efficacy).

## Conclusions

### Beliefs in abilities and current health and health behavior

Both the studied beliefs in abilities, that is, a better perceived capability to access, evaluate, understand, and use health-related information (HIL) and a stronger health control belief (HCB) were significantly related to healthier eating and exercise behaviour among Finns over 64 years of age. Those showing a weaker health control belief, which is closer to external locus of control, were more likely to have poor self-rated health, to be overweight or obese, and more likely to have unhealthy eating behaviour and to exercise infrequently. Furthermore, they were more likely to have poor HIL.

### Beliefs in abilities and health information seeking

Those with a higher HIL were more likely to be interested in health information and also to seek it actively, whereas health control beliefs were associated with high interest, but not with active information seeking. This finding was in line with the large body of research on self-efficacy indicating that people with high self-efficacy are likely to make efforts to master difficult tasks rather than to avoid them.

## Implications

The results can be useful for providers of health-related information, ranging from healthcare to information services. Although more research is needed on larger and different populations, there are indications that both HIL and HCB can be important factors

influencing certain health behaviours and even behaviour change, and if they are enhanced, they might positively influence the health behaviour of other groups of people, as well. Interventions to increase either self-efficacy (Ashford et al., 2010; Campbell, 2009) or LoC (Wolinsky et al., 2009), as well as health information literacy skills (Li and Brilla, 2008), have shown positive results. The results of the current study indicated that both the studied factors together need to be enhanced to maximize the probability of a desired outcome.

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## References

- Anyaku, EN and Nwosu OC (2016) Determinants of health information use for self-efficacy in lifestyle modification for chronic disease patients. *Evidence Based Library and Information Practice* 11(2). DOI: <http://dx.doi.org/10.18438/B8TC9D>
- Ashford S, Edmunds J and French DP (2010) What is the best way to change self-efficacy to promote lifestyle and recreational physical activity? A systematic review with meta-analysis. *British Journal of Health Psychology* 15: 265-288.
- Ayotte BJ, Margrett JA and Hicks-Patrick J (2010) Physical activity in middle-aged and young-old adults. *Journal of Health Psychology* 15(2): 173 - 185.
- Bandura A (1997) *Self-efficacy: The Exercise of Control*. New York: W.H.Freeman.
- Bandura A (1998) Health promotion from the perspective of social cognitive theory. *Psychology and Health* 13(4): 623-649.

- Bandura A (2006) Guide for constructing self-efficacy scales. In Pajares F and Urdan TC (eds) *Self-Efficacy Beliefs of Adolescents*. Greenwich, CT: Information Age Publishing, pp. 307-337.
- Campbell RJ (2009) Internet-based health information seeking among low-income, minority seniors living in urban residential centers. *Home Health Care Management & Practice* 21(3): 195-202.
- Case DO, Andrews JE, Johnson JD and Allard SL (2005) Avoiding versus seeking: the relationship of information seeking to avoidance, blunting, coping, dissonance, and related concepts. *Journal of the Medical Library Association* 93(3): 353-362.
- Cobb-Clark DA, Kassenboehmer SC and Schurer S (2014) Health habits: the connection between diet, exercise, and locus of control. *Journal of Economic Behavior & Organization* 98: 1-28.
- Ek S and Heinström J (2011). Monitoring or avoiding health information – the relation to inner inclination and health status. *Health Information and Libraries Journal* 28: 200–209. DOI: 10.1111/j.1471-1842.2011.00947.x.
- Enwald H, Hirvonen N, Huotari ML, Korpelainen R, Pyky R, Savolainen M, Salonurmi T, Keränen AM, Jokelainen T and Niemelä R (2016) Everyday health information literacy among young men compared with adults with high risk for metabolic syndrome – a cross-sectional population-based study. *Journal of Information Science*, 42(3): 344-355. (Special Issue of I3 Conference, at Aberdeen, UK, June 2015)
- Eriksson-Backa K (2010) Elderly people, health information, and libraries: a small-scale study on seniors in a language minority. *Libri: International Journal of Libraries and Information Services* 60(2): 181-194.
- Eriksson-Backa K (2011). Health information behaviour among retired Finns with either normal weight or obesity. In: Bath PA, Mettler T, Raptis DA and Sen BA (Eds.)



*Proceedings of the 15th International Symposium for Health Information Management Research – ISHIMR 2011. Zürich, Switzerland, 8th to 9th September, 2011, pp. 259-269.*

Eriksson-Backa K (2013). The role of online health information in the lives of Finns aged 65 to 79 years. *International Journal of Networking and Virtual Organizations* 13(1): 5–23. DOI: <https://doi.org/10.1504/IJNVO.2013.058438>)

Eriksson-Backa K, Ek S, Niemelä R and Huotari M-L (2012) Health information literacy in everyday life: a study of Finns aged 65-79 years. *Health Informatics Journal* 18(2): 83-94. DOI: 10.1177/1460458212445797.

French DP, Olander EK, Chisholm A and McSharry, J (2014) Which behaviour change techniques are most effective at increasing older adults' self-efficacy and physical activity behaviour? A systematic review. *Annals of Behavioral Medicine* 48(2): 225-234.

Gazibara T, Kurtagic I, Kistic-Tepavcevic D, Nurkovic S, Kovacevic N, Gazibara T and Pekmezovic T (2016) Computer and online health information literacy among Belgrade citizens aged 66-89 years. *Health Promotion International* 31(2): 335-343. DOI: 10.1093/heapro/dau106

Grembowski D, Patrick D, Diehr P, Durham M, Beresford S, Kay E and Hecht J (1993) Self-efficacy and health behavior among older adults. *Journal of Health and Social Behavior* 34(2): 89-104.

Gustafson DH, McTavish FM, Stengle W, Ballard D, Hawkins R, Shaw BR, Jones E, Julèsberg K, McDowell H, Chen WC, Volrathongchai K and Landucci G (2005) Use and impact of eHealth system by low-income women with breast cancer. *Journal of Health Communication* 10(S1): 195-218. DOI:10.1080/10810730500263257

Hallows KM (2013) Health information literacy and the elderly: has the Internet had an impact? *The Serials Librarian* 65(1): 39-55.

Hashimoto H and Fukuhara S (2004) The influences of locus of control on preferences for information and decision making. *Patient Education and Counseling* 55(2): 236-240. DOI: <https://doi.org/10.1016/j.pec.2003.09.010>

Hirvonen N (2015). *Health Information Matters: Everyday Health Information Literacy and Behaviour in Relation to Health Behaviour and Physical Health Among Young Men*. Oulu: University of Oulu. Available at: <http://urn.fi/urn:isbn:9789526210407> (accessed 29 September 2017)

Hirvonen N, Ek S, Niemelä R, Korpelainen R and Huotari M-L (2015) Socio-demographic characteristics associated with the everyday health information literacy of young men. In: *Proceedings of ISIC, the Information Behaviour Conference*, Leeds, 2-5 September, 2014: Part 2, (paper isic25). Available at: <http://InformationR.net/ir/20-1/isic2/isic25.html> (Archived by WebCite® at <http://www.webcitation.org/6WxIb6ZOo>)

Hirvonen N, Ek S, Niemelä R, Pyky R, Ahola, R, Korpelainen R, Huotari M-L (2016) Everyday health information literacy in relation to health behaviour and physical fitness: a population-based study among young men. *Library & Information Science Research* 38: 308-318. DOI: <https://doi.org/10.1016/j.lisr.2016.11.013>

Huotari M-L, Enwald H, Hirvonen N, Keränen A-M, Jokelainen T, Salonurmi T and Niemelä R (2015) Everyday health information literacy in counselling on healthy eating. The case of PrevMetSyn. In: Kurbanoglu S, Boustany J, Špiranec S, Grassian E, Mizrachi D and Roy L (eds) *Information Literacy: Moving Toward Sustainability. Third European Conference, ECIL 2015*, Tallinn, Estonia, October 19-22, 2015, Revised Selected Papers. (Communications in Computer and Information Science Series Vol. 552) Switzerland: Springer International Publishing, pp. 223-232.

Ivanitskaya LV, Hanisko K, Garrison JA, Janson SJ and Vibbert, D (2012) Developing health information literacy: a needs analysis from the perspective of preprofessional health students. *Journal of the Medical Library Association* 100(4): 277-283.

Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3484940/> (accessed 29 September 2017)

Julien H and Williamson K (2011) Discourse and practice in information literacy and information seeking: gaps and opportunities *Information Research* 16(1): paper 458. Available at: <http://InformationR.net/ir/16-1/paper458.html> (accessed 29 September 2017)

Keedy NH (2009) *Health locus of control, self-efficacy, and multidisciplinary intervention for chronic back pain*. PhD Thesis, University of Iowa, USA. Available at: <http://ir.uiowa.edu/etd/386> (accessed 29 September 2017)

Kurbanoglu SS (2003) Self-efficacy: a concept closely linked to information literacy and lifelong learning. *Journal of Documentation* 59(6): 635-646. DOI: <https://doi.org/10.1108/00220410310506295>

Kurbanoglu SS, Akkoyunlu A and Umay A (2006) Developing the information literacy self-efficacy scale. *Journal of Documentation* 62(6): 730-743. DOI: <https://doi.org/10.1108/00220410610714949>

Kurtz-Rossi S and Duguay P (2010) Health information literacy outreach: improving health literacy and access to reliable health information in rural Oxford County Maine. *Journal of Consumer Health on the Internet* 14(4): 325-340. DOI: 10.1080/15397734.2010.524089

Li Y and Brilla, L (2008) Improving health information literacy: an environmental health application. *American Journal of Health Education* 39(4): 248-252. DOI: 10.1080/19325037.2008.10599047

Mahmood K (2017) Reliability and validity of self-efficacy scales assessing students' information literacy skills: a systematic review. *The Electronic Library* 35(5): 1035-1051. DOI: <https://doi.org/10.1108/EL-03-2016-0056>

- McAuley E, Jerome GJ, Marquez DX, Elavsky S and Blissmer B (2003) Exercise self-efficacy in older adults: social, affective, and behavioral influences. *Annals of Behavioral Medicine* 25(1): 1-7.
- McAuley E, Mullen SP, Szabo AN, White SM, Wójcicki TR, Mailey EL, Gothe NP, Olson EA, Voss M, Erickson K, Prakash R and Kramer AF (2011) Self-Regulatory processes and exercise adherence in older adults: executive function and self-efficacy effects. *American Journal of Preventive Medicine* 41(3): 284-290.
- Niemelä R, Ek S, Eriksson-Backa K and Huotari M-L (2012) A screening tool for assessing everyday health information literacy. *Libri: International Journal of Libraries and Information Services* 62(2): 125–134. DOI: <https://doi.org/10.1515/libri-2012-0009>
- Norman CD and Skinner HA (2006) eHEALS: the eHealth literacy scale. *Journal of Medical Internet Research* 8(4): e27. Available at: <http://www.jmir.org/2006/4/e27/> (accessed 29 September 2017)
- Official Statistics of Finland (OSF) (2015) Population projection. Helsinki: Statistics Finland. Available at: [http://www.stat.fi/til/vaenn/2015/vaenn\\_2015\\_2015-10-30\\_tie\\_001\\_en.html](http://www.stat.fi/til/vaenn/2015/vaenn_2015_2015-10-30_tie_001_en.html) (accessed 29 September 2017)
- Pálsdóttir Á (2008) Information behaviour, health self-efficacy beliefs and health behaviour in Icelanders' everyday life. *Information Research* 13(1): paper 334. Available at <http://InformationR.net/ir/13-1/paper334.html> (accessed 29 September 2017)
- Pálsdóttir Á (2014) Preferences in the use of social media for seeking and communicating health and lifestyle information. *Information Research* 19(4): paper 642. Available at: <http://InformationR.net/ir/19-4/paper642.html> (Archived by WebCite® at <http://www.webcitation.org/6UUsfeVem>)

- Perrig-Chiello P, Perrig, WJ and Stähelin HB (1999) Health control beliefs and old age – relationship with subjective and objective health, and health behaviour. *Psychology, Health & Medicine* 4(1): 83-94. DOI: 10.1080/135485099106423
- Population Register Center (2017) Available at: <http://vrk.fi/en/population-information-system>. (29 September 2017).
- Roncancio AM, Berenson AB and Rahman M (2012) Health locus of control, acculturation, and health-related internet use among Latinas. *Journal of Health Communication* 17(6): 631-640. DOI: 10.1080/10810730.2011.635767
- Rongen A, Robroek SJW and Burdorf A (2014) The importance of internal health beliefs for employees' participation in health promotion programs. *Preventive Medicine* 67: 330-334. DOI: <https://doi.org/10.1016/j.ypmed.2014.07.037>
- Shieh C, Broome ME and Stump TE (2010) Factors associated with health information-seeking in low-income pregnant women. *Women & Health* 50(5): 426-442. DOI: 10.1080/03630242.2010.506152.
- Shipman JP, Kurtz-Rossi S and Funk CJ (2009) The health information literacy research project. *Journal of the Medical Library Association*. 97(4): 293-301. DOI: 10.3163/1536-5050.97.4.014.
- Strecher VJ, DeVellis BM, Becker MH, Rosenstock IM (1986) Role of self-efficacy in achieving health behavior change. *Health Education Quarterly* 13(1): 73-91.
- Suri VR, Chang Y-K, Majid S and Foo S (2014). Health information literacy of seniors - a review. In: Kurbanoglu S., Špiranec S., Grassian E., Mizrahi D., Catts R. (eds) *Information Literacy. Lifelong Learning and Digital Citizenship in the 21st Century*. ECIL 2014. Communications in Computer and Information Science, vol 492. Springer, Cham: pp. 128-137. DOI: [https://doi.org/10.1007/978-3-319-14136-7\\_14](https://doi.org/10.1007/978-3-319-14136-7_14)

- Wallston BS, Wallston KA, Kaplan GD and Maides SA (1976) Development and validation of the health locus of control (HLC) scale. *Journal of Consulting and Clinical Psychology* 44: 580-585.
- Wilson TD (1999) Models in information behaviour research. *Journal of Documentation*, 55(3): 249-270. Available at <http://informationr.net/tdw/publ/papers/1999JDoc.html> (accessed 29 September 2017).
- Wolinsky FD, Weg MWV, Martin R, Unverzagt FW, Willis SL, Marsiske M, Rebok GW, Morris JN, Ball KK, Tennstedt SL (2009) Does cognitive training improve internal locus of control among older adults? *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 65B(5): 591–598. DOI: 10.1093/geronb/gbp117
- World Health Organization (2017). Noncommunicable diseases (NCD). Global Health Observatory (GHO) Data. Available at: <http://www.who.int/gho/ncd/en/> (accessed 29 September 2017).
- Yates C, Stoodley ID, Partridge HL, Bruce CS, Cooper H, Day G and Edwards SL (2012). Exploring health information use by older Australians within everyday life. *Library Trends* 60(3): 460-478. DOI: 10.1353/lib.2012.0004
- Yeom HE (2014) Association among ageing-related stereotypic beliefs, self-efficacy and health-promoting behaviors in elderly Korean adults. *Journal of Clinical Nursing* 23(9-10): 1365-1373. DOI: 10.1111/jocn.12419.