

## Internet use and self-reported psychosocial health: Applying a more nuanced approach when studying a Finnish population sample

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*J. Nordmyr, A.K. Forsman. Internet use and self-reported psychosocial health: Applying a more nuanced approach when studying a Finnish population sample. Gerontechnology 2016;15(1):17-23; doi:10.4017/gt.2016.15.1.004.00* **Objective** In the present study, the role of Internet use in relation to self-reported psychosocial health among Finnish older adults is explored, looking at associations between Internet use for different purposes and three health dimensions. **Methods** This study is based on population survey data of 1097 respondents aged 65 to 80 years old, who were Internet users and non-users, respectively. Binary logistic regression analysis was performed, comparing emotional, social and physical health status (based on items from the Short Form Health Survey, SF-12) between Internet users and respondents not using the Internet. Also, a post hoc multinomial logistic regression analysis was performed. **Results** Internet use was associated with emotional health status (OR 0.58 (0.39-0.86), 95%CI), but not physical or social health status when controlling for socio-demographic variables. More specifically, respondents using the Internet for hobby or entertainment (OR 1.68 (1.02-2.76), 95%CI) and work or study purposes (OR 2.37 (1.03-5.49), 95%CI) exhibited a better emotional health status than respondents not using the Internet. **Conclusions** Results add to the growing body of research emphasizing the need for increased focus on evolving societal determinants which may complicate, support or protect the psychosocial health of older individuals. The specific study findings should be further explored for causality, in order to discern whether they may constitute a useable mechanism when designing Internet initiatives for digital inclusion or mental health promotion aimed at older adults.

**Keywords:** Older adults, Internet use, psychosocial health, SF-12, survey, Finland

Ageing and theories on ageing have historically been associated with uniformly negative terms, characterizing this as a time for disengagement and readying oneself for decline and death<sup>1,2</sup>. Since then several theoretical concepts encompassing positive aspects of ageing have been introduced. Two of the most commonly used have been 'successful ageing'<sup>3</sup> and 'healthy ageing'<sup>4</sup>. Rowe and Kahn's<sup>3</sup> definition of 'successful ageing' contains three essential components: the avoidance of disease and disability, the maintenance of high physical and cognitive function, and sustained engagement in social and productive activities. The successful ageing concept has, however, received critique for being overly focused on physical functioning, for not encompassing subjectivity or diversity and for its discriminating potential<sup>5,6</sup>. In order to overcome the limitations of this framework, a psychosocial approach to ageing may be more useful and suitable. The theory of 'optimal ageing'<sup>7</sup>, further developed by, for instance, Brummel-Smith<sup>8</sup>, represents a psychosocial view on ageing. This framework places emphasis on cognitive, emotional, social and existential health dimensions in old age, in addition

to physical and functional aspects. In this study, older adults' subjective health is viewed in this broader perspective, underlining the importance of psychological or emotional aspects and social aspects alongside physical health markers.

The development of information and communication technology (ICT), has recently transformed, for instance, social interaction, information sharing, and consumption of goods and services, both on an individual and societal level<sup>9</sup>. In a European context, 65% of individuals aged 16 to 74 in the EU28 used the Internet daily in 2014<sup>10</sup>. The digitalization of society has given rise to new phenomena and concepts illustrating potential challenges associated with this development, for example 'digital literacy' and 'digital divide'<sup>11</sup>. Given the profound effects of ICT and Internet development on the daily lives of most individuals either directly or indirectly, there has been increased interest in research looking at the influence of Internet usage, on psychosocial health and well-being both on an individual and societal level. Because Internet use is more common among younger people<sup>12</sup>, research on

Internet use has predominantly targeted these age groups, while older adults have received less attention in this area. In Finland for example, Internet use in 2015 was 100 % among 16-44-year olds, with usage decreasing to 69 % among 65-74-year olds, and a decrease to 31 % among 75-89-year olds<sup>13</sup>. The same pattern of decreased use among older adults compared to younger age groups is evident in other Nordic countries, for instance, in Sweden<sup>14</sup> and Iceland<sup>15</sup>, as well as in the EU at large<sup>10</sup>.

A recent systematic review of the evidence on associations between Internet use and psychosocial health among older adults highlighted, among other topics, the need for more population-based (representative) research in this area<sup>16</sup>. Also, the need for distinguishing between different purposes of Internet use, as well as a more comprehensive instrumentation of psychosocial health was highlighted. These recommendations are adhered to in the current study.

In order to support psychosocial health among older adults in the Nordic context – where the population aged 65 or over is 25% of the adult population<sup>17</sup> – innovative approaches are needed. Here, the high-end technological advances could be utilized in the organization and provision of health promotion initiatives, and social and health care services targeting older people. However, in order to develop these initiatives, up-to-date knowledge is needed on Internet use patterns among older adults, as well as on the association between the use of technology (for instance, e-services) and experienced psychosocial health.

In the present study, associations between Internet use for various purposes and current self-reported psychosocial health status among Finnish older adults are explored, while considering socio-demographic factors.

## METHODS

### Data collection

The current study utilized data from the Western Finland Mental Health Survey, a population survey conducted in three-year intervals between 2005 and 2014. For details on the survey, please see the survey method report<sup>18</sup>. The study has received ethical approval from the Ethical Committee of the National Institute for Health and Welfare THL (30.1.2014/§606).

Survey recipients (n=10,000, age range 15-80 years) have each survey year been selected from the Population Information System by the Finnish Population Register Centre, applying a stratified random sampling approach. The geographical area (Western Finland) from where the sample

was selected is inhabited by 17% of the population in Finland (920,000 inhabitants), and encompasses a wide range of municipalities in small rural areas as well as urban areas, including a few larger cities. While the survey response rate has declined through the years, the higher age groups have always been the most active in responding to the survey. The overall survey response rate in 2014 was 36.4%, the response rates in age groups 61-70 years and 70-80 years being 50.9% and 54.2%, respectively<sup>18</sup>. In 2014, 1097 of the survey respondents were aged 65 to 80 years old.

### Measurements

The outcome of interest in this study was current self-reported psychosocial health. The standardized and validated 12-item version of the Short Form Health Survey (SF-12)<sup>19</sup> was used to measure perceived psychosocial health status; physical, psychological and social health dimensions.

The response to items extracted from the SF-12 instrument was dichotomized for the three different health dimensions separately. For emotional and physical health status the same grouping approach was applied: respondents answering yes to both questions within respective dimension were grouped together (higher subjective level of problems). Respondents answering yes to one question and no to the other were grouped together (moderate subjective level of problems), while respondents answering no to both questions within each health dimension were grouped together and categorized as suffering from a minimal level of subjective emotional or physical problems, respectively.

For social problems, another categorization (three groups) was used. Respondents were grouped together if they reported having experienced problems all or most of the time (high level of subjective problems), some of the time or a little of the time (moderate level of subjective problems), and finally none of the time (low level of subjective problems).

The frequency of missing values for the individual items from the five SF-12 items utilized was relatively low; the number of individuals that could not be categorized into the groups described above due to missing responses was 2.3% (n=25) for the social health dimension, 6.7% (n=69) for the physical health dimension, and 7.8 % (n=79) for the emotional health dimension.

Applying dichotomization of individual items from the Short Form Health Survey is not uncommon practice, for example the question “*In general, would you say that your health is: excellent, very good, good, fair, or poor*” is used as an in-

# Internet use and health

indicator of general health status<sup>20</sup>. Similarly, other studies have also been performed utilizing specific subscales from the longer instrument<sup>21-23</sup>.

In addition to the SF-12 instrument, descriptive questions concerning respondents' Internet use are utilized in analyses. A general question concerned whether or not respondents were Internet users: "Do you use the Internet (via computer, tablet, smartphone or comparable device)?" Response options were 'yes' and 'no'. Respondents answering 'no' were instructed to skip the next question concerning internet use for different purposes. The options for Internet use were: public or commercial services, work or studies, following news or information seeking, hobbies or entertainment, communication with family and/or friends, obtaining new companionships, participation in support groups, other. Some examples were used to exemplify for the categories as well<sup>18</sup>.

Respondents were grouped according to whether they reported having used the Internet for any of the purposes mentioned above. Of the respondents, 34 people (3.1% of the sample) had not answered the question and could not be categorized as an Internet-user or as not utilizing the Internet.

Finally, the socio-demographic variables, gender (men, women), age (65-69 years; 70-74 years; 75-80 years), marital status (married or cohabiting in a relationship; divorced or unmarried; widowed) and educational level (basic level; advanced level; high level) were also utilized in analysis in order to control for variance.

Respondents were categorized in three groups according to age, in order to differentiate between more recently retired older adults and those in the age span 70-80 years.

## Statistical analysis

IBM SPSS Statistics 22 was used to analyse the data, applying a 5% confidence level. Pearson's chi-square test ( $\chi^2$ ), comparing Internet-users and non-users psychosocial health status were performed, as well as a binary logistic regression analysis predicting the dependent variable Internet

use (odds ratios, OR, and 95% confidence intervals, 95%CI, reported). In the logistic regression analysis, the independent variables consisted of socio-demographic variables (gender, age group, educational level and marital status), and variables related to different health dimensions. Additionally, because emotional health status and Internet use were significantly associated in the binary logistic regression analysis, a post-hoc multinomial regression analysis with emotional health status (high level of problems and moderate level of problems) as the dependent variable was also conducted. Internet use for different purposes and socio-demographic variables were utilized as independent variable in this analysis.

## RESULTS

Regarding socio-demographic variables, the gender frequency was 52.4% women (n=575) and 47.6% men (n=522). When splitting respondents into three age groups, 42.4% were aged 65 to 69 years old, 30.5% were aged between 70 and 74 years old and 27.1% were aged between 75 and 80 years. Regarding educational level, 43.5% of the respondents had a basic educational level (up to nine years), 38.0% had further education (up to 12 years) and 18.5% had a college or university level education. The majority of respondents (72.5%) were married, in a relationship or cohabiting with someone, 15.2% were unmarried or divorced and 12.3% were widowed.

In Table 1 the grouping of respondents according to health status in different dimensions can be viewed. Also, the difference in the distribution of respondents according to health status when comparing Internet-users and those not utilizing Internet is described. Of the respondents who had answered the question concerning Internet use ("Do you use the Internet?"), 57.5% (n=631) responding 'yes' were categorized as being Internet users.

Table 1. Pearson's chi-square test ( $\chi^2$ , degrees of freedom=2) comparing older Internet-users with non-users, looking at distribution (%) of health status (SF-12) groups, measured as problem levels

Problem level		Distribution, %			$\chi^2$	P
		In sample (n=1063)	Among users (n=631)	Among non-users (n=432)		
Physical	High	36.5	32.1	43.2	19.15	≤0.001
	Moderate	18.4	17.2	20.1		
	Low	45.1	50.7	36.8		
Emotional	High	19.3	15.1	25.5	33.10	≤0.001
	Moderate	22.6	19.4	27.3		
	Low	58.2	65.5	47.2		
Social	Always / usually	6.3	5.5	7.4	11.21	0.004
	Sometimes / Infrequent	31.7	28.3	36.6		
	None / never	61.9	66.2	56.0		

# Internet use and health

In *Table 2* the results of the binary logistic regression analysis can be viewed, evidencing significant associations between Internet use and gender, age group, marital status and educational level. Internet use remained significantly associated with emotional health status when considering these socio-demographic variables.

A post-hoc multinomial regression analysis with emotional health status; high level of problems and moderate level of problems, as the dependent variables was conducted (*Table 3*). Internet use for different purposes was included as independent variable alongside the demographic variables. The category of respondents reporting low levels of disruption in daily life due to emotional problems was used as the baseline category. The logit model then compared the other two response categories (high or moderate levels of problems) with the baseline category. The most common reported purpose for Internet use was using public or commercial services (50.0%), closely followed by following news and information seeking (48.6%). 39.5% of respondents had used the Internet to communicate with family and/or friends, 29.8% had utilized the Internet for hobby or entertainment purposes, 9.3% were online for work or studies, 5.6% used the Internet for obtaining new friendships or relationships and 1.4% had participated in online support groups. While 6.2% of the respondents (n=68) reported using the Internet for other purposes, the majority of the use reported here could be categorized under one of the previous alternatives (for instance, genealogy as a hobby, information seeking etc.). Internet use for hobby or entertainment and work or study purposes proved to be significantly associated to the older survey respondents' emotional health so that respondents not using the Internet for these purposes reported a poorer emotional health status when compared to their online peers.

*Table 2. Binary logistic regression analysis of Odds Ratios (OR, 95%CI) predicting Internet use among older adults in Western Finland (n=1097)*

Parameter		OR (95 % CI)
SOCIO-DEMOGRAPHIC VARIABLES		
Gender [Women=1]	Men	1.66 (1.22-2.27)
Age group [65-69 years=1]	70-74 yrs	0.44 (0.31-0.63)
	75-80 yrs	0.25 (0.17-0.36)
Marital status [Married/cohabiting/relationship=1]	Divorced/Unmarried	0.82 (0.54-1.26)
	Widowed	0.57 (0.35-0.93)
Educational level [Basic=1]	Advanced	3.20 (2.31-4.43)
	High	9.30 (5.65-15.29)
HEALTH STATUS VARIABLES (SF-12) OR PROBLEM LEVELS		
Emotional [Low=1]	Moderate	0.75 (0.47-1.20)
	High	0.58 (0.39-0.86)
Physical [Low=1]	Moderate	0.88 (0.58-1.33)
	High	1.00 (0.63-1.56)
Social [None / never=1]	Some / infrequent	1.15 (0.58-2.30)
	Always / usually	0.94 (0.65-1.36)

## DISCUSSION

Health encompasses several components and here it has been attempted to consider three of the major health dimensions separately. In the representative sample of older Finnish adults analysed in the study at hand, Internet use was associated with the older respondents' emotional health status, but not the physical or social health status. There are naturally limitations to consider when interpreting the study findings - these are discussed further below.

Regarding Internet use and the health and well-being of older adults, earlier research has evidenced inconclusive results. In a previous Finnish study studying 542 older adults<sup>24</sup> (60-79 years), self-rated health was not significantly associated with regular Internet use or non-use, neither was functional disability associated with Internet use initiation among older adults in a Swedish sample<sup>25</sup>. Results from the same Swedish survey did, however, evidence associations between cognitive status and older adults' Internet use<sup>26</sup>. While Elliot and colleagues<sup>27</sup> did not find any direct significant association between Internet use and well-being or depression in a larger sample of community-dwelling older adults (n=6443), these factors did, however, evidence moderating effects. In a large US sample<sup>28</sup> (n=5203, aged 65+), higher levels of Internet use were significantly associated with better psychological well-being and life satisfaction, similarly to the findings of this study.

The fact that demographic variables, male gender, younger age group and a higher educational level, were significantly associated with Internet use in the logistic regression analysis is in line with earlier research findings from the Finnish study mentioned above<sup>24</sup>, as well as other recent studies from for instance, the Netherlands<sup>29</sup>. In the current study, marital status was also significantly associated with Internet use, so that widowed respondents were less likely to be Internet users compared to those in a relationship, married or co-habiting. Similar results, i.e. that living with someone increased the likelihood of an older adult being an Internet user, have been found in Swedish<sup>25</sup> and US samples<sup>30</sup>. These results highlight the large role played by socio-demographic factors when considering the digital divide not only between old-

# Internet use and health

Table 3. Post-hoc multinomial regression analysis (n=1097), looking at different purposes of Internet use, with SF-12 emotional health status as the dependent variable (low level of problems reference category, moderate and high level of problems comparison categories)

Parameters		Level of emotional stress					
		High			Moderate		
		Estimate(B) ±std. error	p	Odds Ratio (95%CI)	Estimate(B) ±std. error	p	Odds Ratio (95%CI)
SOCIO-DEMOGRAPHIC VARIABLES							
Gender	Women	-0.485±0.182	0.008	0.62 (0.43-0.88)	-0.372±0.169	0.028	0.69 (0.50-0.96)
	[Ref: Men]						
Age group	65-69 years	-0.641±0.222	0.004	0.53 (0.34-0.81)	-0.694±0.212	0.001	0.50 (0.33-0.76)
	[Ref: 75-80]						
	70-74 years	-0.270±0.228	0.236	0.76 (0.49-1.19)	-0.054±0.209	0.795	0.95 (0.63-1.43)
Marital status	Married/co-	-0.857±0.257	0.001	0.42 (0.26-0.70)	-0.374±0.260	0.149	0.69 (0.41-1.14)
	[Ref: co-						
	habiting/relationship						
	Widowed]						
	Divorced/Unmarried	-0.537±0.323	0.096	0.58 (0.31-1.10)	-0.161±0.318	0.613	0.85 (0.46-1.59)
Educational level	Basic	0.860±0.288	0.003	2.36 (1.34-4.16)	-0.018±0.247	0.943	0.98 (0.61-1.59)
	[Ref: High]						
	Advanced	0.257±0.291	0.378	1.29 (0.73-2.29)	0.151±0.232	0.515	1.16 (0.74-1.83)
INTERNET USE VARIABLES							
Public or commercial services		0.158±0.252	0.531	1.17 (0.71-1.92)	0.302±0.227	0.184	1.35 (0.87-2.11)
	[Ref: Yes], No						
Work or studies	[Ref: Yes], No	0.864±0.428	0.044	2.37 (1.03-5.49)	0.086±0.296	0.771	1.09 (0.61-1.95)
Following news and information seeking	[Ref: Yes], No	0.122±0.272	0.653	1.13 (0.66-1.93)	0.108±0.246	0.660	1.11 (0.69-1.81)
Hobby or entertainment	[Ref: Yes], No	0.518±0.253	0.041	1.68 (1.02-2.76)	0.260±0.223	0.243	1.30 (0.84-2.01)
Communicate with family and/or friends	[Ref: Yes], No	-0.175±0.270	0.517	0.84 (0.50-1.42)	0.127±0.235	0.588	1.14 (0.72-1.80)
Obtaining new friendships/relationships	[Ref: Yes], No	-0.077±0.438	0.860	0.93 (0.39-2.19)	0.231±0.424	0.586	1.26 (0.55-2.89)
Online support groups	[Ref: Yes], No	-0.655±0.722	0.364	0.52 (0.13-2.14)	-0.489±0.703	0.487	0.61 (0.16-2.43)

er and younger generations, but also within the older adult population itself. In addition to demographic factors and other contextual variables, personal interests, inclinations and motivation are also important to consider when studying older adults and Internet use. This has recently been concluded by Van Deursen and Helsper<sup>29</sup>, and is also discussed in the work of Vroman and colleagues<sup>30</sup>.

The Finnish study by Näsi and colleagues<sup>24</sup> mentioned above evidenced a statistically significant positive association between cognitive, physical or cultural leisure activities and associations to regular Internet use. This may be a factor influencing results of the post-hoc analysis in the current study, where specifically, Internet use for hobby or entertainment and work or study purposes proved to be linked to a better emotional health status. No causal links can be discerned in this study regarding the relationship between Internet use and emotional health status. It may be that older adults leading an active life involving multiple hobbies, studies, and/or volunteer work use online resources as an extension of offline activities, and that the association to emotional health would be evident also when excluding Internet use as a factor.

## Limitations of this study

The standardized and validated SF-12 instrument was utilized in order to capture different health dimensions, however, it can be noted that dichotomization of health status naturally has its limitations. Also, using the brief version of this instrument means that only one or two items were utilized for computing the different health dimensions. Further, the SF-12 instrument is not developed exclusively for an older target group which naturally can have affected study results.

The overall survey response rate was 36.4%, however, in this particular study the effect of a relatively low response rate is balanced due to the fact that the age groups 61-70 years and 70-80 had a response rate of 50.9% and 54.2% respectively<sup>18</sup>. Still, it is important to keep in mind eventual effects of non-response bias when considering study results. Regarding the issue of missing values, the older survey respondents tend to answer most survey questions, resulting in an overall low number of missing responses for individual items in the data set.

The survey targeted community-living older adults, meaning that older adults experiencing vulnerability and various risk factors for poor



psychosocial health may have been less inclined to respond to the survey. Also, the results cannot in any way be generalized to institutionalized older adults.

Since the survey study was not solely focused on Internet use, it limited the scope of the included questions inquiring about respondents' Internet use. More information on, for example, the frequency of respondents' Internet use should be included in future work.

Finally, as mentioned earlier, studies utilizing cross-sectional data are always somewhat limited due to the fact that no causal associations can be determined. However, regardless of whether Internet use is a factor that contributes to promoting psychosocial health among older adults, or it is a characteristic associated with older adults already beforehand exhibiting various signs of op-

timial ageing, the findings support ongoing work focused on promoting and maintaining digital inclusion among older adults. It is promising that the digital agendas of Nordic countries, for instance, Norway<sup>31</sup> and Finland<sup>32</sup>, highlight older adults as a group needing special support concerning ICT uptake and digital inclusion.

## Conclusions

This study adds to the growing body of research emphasizing the need for increased focus on evolving societal determinants (Internet use being one of them) which can complicate, support or protect the psychosocial health of older individuals. The specific study findings should be further explored for causality, in order to discern whether they may constitute a useable mechanism when designing Internet initiatives for digital inclusion or mental health promotion aimed at older adults.

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