The relation between social network site usage and loneliness and mental health in community-dwelling older adults
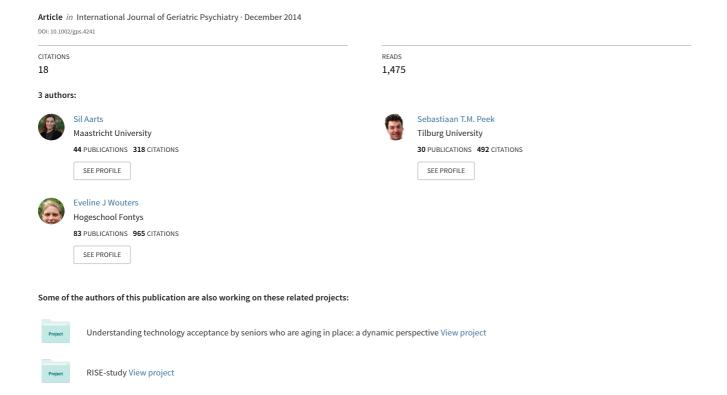
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RESEARCH ARTICLE

The relation between social network site usage and loneliness and mental health in community-dwelling older adults

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Background: Loneliness is expected to become an even bigger social problem in the upcoming decades, because of the growing number of older adults. It has been argued that the use of social network sites can aid in decreasing loneliness and improving mental health. The purpose of this study was to examine whether and how social network sites usage is related to loneliness and mental health in community-dwelling older adults.

Method: The study population included community-dwelling older adults aged 60 and over residing in the Netherlands ($n = 626$) collected through the LISS panel (www.lissdata.nl). Univariate and multivariate linear regression analyses, adjusted for potentially important confounders, were conducted in order to investigate the relation between social network sites usage and (emotional and social) loneliness and mental health.

Results: More than half of the individuals (56.2%) reported to use social network sites at least several times per week. Social network sites usage appeared unrelated to loneliness in general, and to emotional and social loneliness in particular. Social network sites usage also appeared unrelated to mental health. Several significant associations between related factors and the outcomes at hand were detected.

Conclusion: In this sample, which was representative for the Dutch population, social network sites usage was unrelated to loneliness and/or mental health. The results indicate that a simple association between social network site usage and loneliness and mental health as such, cannot automatically be assumed in community-dwelling older adults. Copyright © 2014 John Wiley & Sons, Ltd.

Introduction

In a recently conducted study among 2.6 million individuals aged 65 and over living in the Netherlands, almost 800 000 consider themselves lonely (Ouderenfonds, 2014). It has been projected that by the year 2040, as much as 26% of the Dutch population will be aged 65 or older. Similar findings have been reported in almost all countries worldwide (UN, 2002). Loneliness is expected to become an even bigger social problem in the upcoming decades (Duin and van Stoeldraijer, 2012).

Loneliness has been defined as an unpleasant subjective state of sensing a discrepancy between the desired amount of companionship or emotional support and that which is available in the person's environment (Perlman and Peplau, 1981). Researchers have found moderate to high correlations between loneliness and adverse health effects including depression (Coyle and Dugan, 2012; Jaremka *et al.*, 2014), cognitive problems (O'Luanaigh *et al.*, 2012), and suicide (Pettigrew, 2007). More specifically, age-related losses such as loss of working sphere, physical mobility and the loss of loved ones can affect a person's ability

to maintain relationships and independence, which, in turn, may result in, for example, depressive feelings (Alpass and Neville, 2003). Research also pinpoints that it is not the absence of relationships per se that is related to loneliness, but rather the lack of quality of these relationships. In other words, the subjective interpretation of the quality of the relationships a person has is of utmost importance when considering loneliness (Fokkema and Knipscheer, 2007).

While new media are still considered to strengthen processes towards loneliness in young adults (Kross *et al.*, 2013; Teppers *et al.*, 2014), it has also been argued that internet and other communication tools, such as social network sites (SNS; also known as 'social media'(Nef *et al.*, 2013)), may have the potential to become instruments in the fight against loneliness in older individuals (Fokkema and Knipscheer, 2007; Leist, 2013). SNS are defined as internet-based services that provide individuals three major capabilities (Boyd and Ellison, 2007). First, the ability to construct a public or semi-public profile. Second, the ability to identify a list of other users with whom a connection is shared, and third, the ability to view and track individual connections as well as those made by others (Boyd and Ellison, 2007; Nadkarni and Hofmann, 2012). Even though older individuals are less likely than younger age groups to use SNS, adoption rates for individuals aged 65 to 74 have nearly doubled in the Netherlands in the last two years (Eurostat, 2013) and have tripled in the U.S. in the last four years (Brenner and Smith, 2013).

Recent systematic reviews on SNS usage among older individuals pinpointed that the majority of included articles were of qualitative nature (i.e. focus groups) or regarded telephone interviews (Nef *et al.*, 2013) and were focused on populations sampled from undergraduate and graduate students (Nadkarni and Hofmann, 2012). One review concluded that, when several barriers regarding SNS usage such as privacy, technical difficulties and the fact that the majority of web designs do not yet consider the needs of older individuals, were addressed, SNS could be considered a tool to support communication of older individuals (Nef *et al.*, 2013).

To our knowledge, no study has yet examined the relationship between SNS usage and loneliness and mental health in a large sample of older adults. Since the available literature (on younger individuals) is undecided whether the relation between SNS usage and loneliness and/or mental health is a positive (i.e. SNS usage is related to lower levels of loneliness/higher levels of mental health) or a negative one (i.e. SNS usage is related to higher levels of loneliness/lower levels

of mental health), the primary purpose of the present study is to examine whether and how SNS usage is related to loneliness and mental health in community-dwelling older adults. If usage of social network sites by older adults is indeed related to lower levels of loneliness and improved mental health, older adults could be encouraged to start using social network sites in order to engage in, possible, meaningful social contacts.

Methods

Study design

Data were collected through the LISS (Longitudinal Internet Studies for the Social sciences) panel administered by CentERdata (Tilburg University, The Netherlands). The study is based on data from the Dutch speaking population permanently residing in the Netherlands. The sample frame was based on the nationwide address frame of Statistics Netherlands. Individuals who were willing to participate in the study but who did not had a personal computer and/or an Internet connection were provided equipment to access Internet (i.e. in order to fill in the online questionnaires) via a broadband connection (i.e. $n = 55$, 8.8% in the current study), hereby, insuring a representative sample of community-dwelling individuals. In total, a simple random sample of 10 150 addresses was drawn from the aforementioned address frame.

Study population

The study population included community-dwelling older adults aged 60 and over. Data regarding mental health was accumulated during November/December 2011. Data regarding social media use and loneliness were accumulated during February/March 2012. Descriptive characteristics of the study population available at February/March 2012 were compared to that of November/December 2011. In case of discrepancies regarding the descriptive characteristics of participants in 2012 compared to the characteristics of 2011 (e.g. a change in living arrangements), the most recent data regarding the descriptive characteristics were used (i.e. data available at February/March 2012).

Measures

Independent variable. In order to determine SNS usage, the following question was formulated: 'How

often did you make use of social network sites in the past two months?' (to help understanding the meaning of 'social network sites', examples were provided including 'Facebook'). The following answers were possible: (1) never, (2) less than once a month, (3) 1–3 times per months, (4) once a week, (5) several times a week, (6) every day, and (7) several times per day. Based on these answers three groups were formed: those who never used a social network site or used a social network site less than once a month (i.e. answer possibility 1 and 2; 'low usage', $n = 189$), those who used a social network site once a month or once a week (i.e. answer possibility 3 and 4: 'medium usage', $n = 85$), and those who used a social network site at least several times per week (i.e. answer possibility 5, 6, and 7 'high usage', $n = 352$). This latter group was formed in order to determine if the degree of SNS usage mattered.

Dependent variables. The 6-item Loneliness Scale is a reliable and valid measurement instrument for overall, emotional, and social loneliness that is suitable for large surveys (de Jong-Gierveld and van Tilburg, 2006; de Jong-Gierveld and van Tilburg, 2008). This shorter version of the original Loneliness Scale is attractive for reasons of cost-effectiveness and in terms of validity and reliability in large-scale surveys. The scale consists of the following questions: (1) I have a sense of emptiness around me, (2) There are enough people I can count on in case of a misfortune, (3) I know a lot of people that I can fully rely on, (4) there are enough people to whom I feel closely connected, (5) I miss having people around me, and (6) I often feel deserted. Response categories were (1) 'no', (2) 'more or less', and (3) 'yes'. Responses to the positive items were reversed. The responses were added to form a loneliness index which ranged from 6 to 18. Higher scores indicated more feelings of loneliness.

In order to provide information regarding emotional loneliness, items 1, 5, and 6 were summed; the emotional loneliness index ranged from 3 to 9. To provide information regarding social loneliness, items 2, 3, and 4 were summed; the social loneliness index also ranged from 3 to 9. Again, higher scores indicated more feelings of emotional and social loneliness.

The five-question Mental Health Inventory (MHI-5) is a brief questionnaire that can be used to screen for depressive symptoms (Rumpf *et al.*, 2001). The MHI-5 consist of the following questions: 'How much of the time during the last month have you: (1) been a very nervous person?, (2) felt downhearted and blue?, (3) felt calm and peaceful?, (4) felt so down in the dumps that nothing could cheer you up?, and (5) been a happy person?'. For each question the respondent was asked to choose one of the following answers: all of the time (1 point), most of the time (2 points), a good bit of the time (3 points), some of the time (4 points), a little of the time (5 points), or none of the time (6 points). Since item 3 and 5 ask about positive feelings, the scoring of these questions was reversed. The score for the MHI-5 was computed by summing the scores of each item. The raw scores were transformed to a 0–100 point scale. Higher scores indicated better mental health.

Possible confounders. Several potential confounders were taken into account; sex, age in three categories: individuals aged 60 to 64, individuals aged 65 to 74, and individuals aged 75 and over, educational level in 3 categories: low (primary school, intermediate secondary education), intermediate (higher secondary education, intermediate vocational education), and high (higher vocational education, university) (de Bie, 1987), living arrangement (living together vs. living alone). Eighteen (chronic) medical conditions (see Appendix A) were included as one numeric variable in order to correct for the presence of medical conditions within patients (van den Akker *et al.*, 1998). Difficulties in carrying out activities of daily living (i.e. dressing, getting in and out of bed, walking across the room, bathing or showering, and eating and making use of toilet facilities (Kane and Kane, 1981)) were assessed by six questions that required a 4-point Likert response: (1) no difficulty, (2) some difficulty, (3) much difficulty, and (4) with help. Two groups were formed; individuals who had difficulties with at least one task (i.e. a response of 2 or more on at least one of the six questions) vs. individuals who had no difficulties. Since it is not so much a matter of the number of relationships that is related to loneliness, but rather the lack of quality in these relationships, 'satisfaction with social contacts' was used in all statistical analyses as a possible confounding factor (Fokkema and Knipscheer, 2007). The question was: 'How satisfied are you with your social contacts?'. This question required an answer on a 0 to 10 scale, ranging from 'entirely dissatisfied' to 'entirely satisfied', respectively.

Statistical analyses. Residual plots were examined in order to confirm the validation of the assumptions of normality, linearity, and equality of variances. Univariate linear regression analyses were conducted with SNS usage as the independent variable. Subsequently,

multivariate linear regression analyses were conducted to determine the association between SNS usage and loneliness and SNS usage and mental health; unstandardized regression coefficients (*B*) and *p*-values are reported. All analyses were adjusted for sex, age, educational level, living arrangement, medical conditions, difficulties in ADL, and satisfaction with social contacts. Categorical confounders were coded into dummy variables. The variables gender, age, and edu-

cational level were included in all models, irrespective of significance. *P*-values of 0.05 or less were considered statistically significant. A stepwise backward method was employed in all analyses using SPSS statistical software package version 18 for Windows (SPSS Inc., Chicago, IL, USA).

Results

Individuals who had missing data regarding SNS usage were younger, reported lower levels of mental health, and had a higher chance of living together, compared to individuals who were included in the analyses. There was no relation between missing data regarding SNS usage and gender, educational level, chronic medical conditions, difficulties in ADL, satisfaction with social contacts, and loneliness.

The final analytic sample yielded 626 individuals. Descriptive characteristics of all the included individuals are shown in Table 1. The average age of the included individuals was 66.94 years (SD: 5.99). Slightly more men than women participated in the sample (50.5%); almost half of all individuals had low education (46.2%). Most individuals were living together (73.5%). The average satisfaction with social contacts was 7.54 (SD: 1.64). The majority of individuals had one (24%) or two or more (31.3%) chronic medical conditions, while 18.5% of individuals had difficulties with at least one ADL task. More than half of the individuals (56.2%) reported to use social network sites at least several times per week. Mean loneliness score was 9.42 (SD: 1.10); mean score on the MHI was 23.52 (SD: 16.66).

In the unadjusted (see Table 1) as well as in the adjusted analyses (see Table 2), SNS usage was unrelated to loneliness and mental health. Using loneliness as an outcome measure, women reported to be less lonely compared to men (see Table 3). Compared to individuals with low education, individuals with medium and high education reported lower levels of loneliness. Using emotional loneliness as outcome measures

Table 1 Descriptive characteristics of the study population (*n* = 626)

Characteristics	
Sex (% females)	316 (50.5)
Mean age in years (SD)	66.94 (5.99)
Age (%)	
Age 60 to 64	270 (43.1)
Age 65 to 74	267 (42.7)
Age 75 and over	89 (14.2)
Education (%)[a]	
Low	289 (46.2)
Medium	165 (26.4)
High	170 (27.2)
Living arrangement (% living alone)	166 (26.5)
Medical conditions (%)[b]	
No medical condition	186 (29.7)
Single medical condition	150 (24.0)
Two or more medical conditions	196 (31.3)
Difficulties in ADL (% >1)[b]	116 (18.5)
Satisfaction with social contacts (SD)	7.54 (1.64)
Social network site usage (%)	
Never/less than once a month	189 (30.2)
Once a month/once a week	85 (13.6)
At least several times per week	352 (56.2)
Loneliness (SD)	9.42 (1.10)
Emotional loneliness (SD)	5.91 (0.55)
Social loneliness (SD)	3.50 (1.08)
Mental health (SD)[c]	23.52 (16.66)

[a]Educational level in 3 categories: low (primary school, intermediate secondary education), intermediate (higher secondary education, intermediate vocational education), and high (higher vocational education, university).
For 2 (0.3%) individuals this information was missing.
[b]For 94 (15%) individuals this information was missing.
[c]For 92 (14.7%) individuals this information was missing.

Table 2 Unstandardized egression coefficients (*B*) and *p*-values describing the unadjusted relations between SNS usage and loneliness and mental health

	Emotional loneliness		Social loneliness		Loneliness		Mental health	
	B	*p*-value	*B*	*p*-value	*B*	*p*-value	*B*	*p*-value
SNS use medium	−0.118	0.138	0.008	0.956	0.023	0.876	0.177	0.940
SNS use high	−0.050	0.363	0.111	0.271	0.011	0.915	0.035	0.983

Reference group consisted of participants with SNS 'low usage'.

Table 3 Unstandardized regression coefficients (B) and p-values describing the relation between SNS usage and loneliness (corrected for sex, age, education, living arrangements, medical conditions, difficulties in ADL, and satisfaction with social contacts)

	Emotional loneliness		Social loneliness		Loneliness	
	B	p-value	B	p-value	B	p-value
Sex	0.005	0.918	−0.257	0.004	−0.257	0.006
Age						
Age 65 to 74[a]	−0.057	0.278	−0.017	0.855	−0.087	0.369
Age 75 and older	−0.221	0.004	−0.025	0.851	−0.204	0.142
Education[b]						
Medium	−0.110	0.073	−0.065	0.542	−0.229	0.037
High	0.058	0.344	−0.347	0.002	−0.298	0.008
Living arrangement	0.003	0.998	0.012	0.887	−0.072	0.411
Medical conditions	−0.021	0.466	0.020	0.716	−0.003	0.962
Difficulties in ADL	<0.001	0.988	<0.001	0.991	<0.001	0.329
Satisfaction with social contacts	<0.001	0.772	<0.001	0.749	<0.001	0.308
SNS use[c]						
Medium	−0.143	0.076	0.168	0.241	0.019	0.898
High	−0.061	0.279	0.081	0.420	0.036	0.728

[a]Reference group consisted of age group 60 to 64 years.
[b]Reference group consisted of participants with low education.
[c]Reference group consisted of participants with SNS 'low usage'.

(see Table 3), individuals aged 75 and older reported less emotional loneliness compared to individuals aged 60 to 64. Using social loneliness as outcome measure, women reported lower levels of social loneliness than men.

Using mental health as outcome measure (see Table 4), individuals aged 65 to 74 showed lower levels

Table 4 Unstandardized regression coefficients (B) and p-values describing the relation between SNS usage and mental health (corrected for sex, age, education, living arrangements, medical conditions, difficulties in ADL, and satisfaction with social contacts)

	Mental Health	
	B	p-value
Sex	4.263	0.003
Age		
Age 65 to 74[a]	−4.375	0.003
Age 75 and older	0.735	0.728
Education[b]		
Medium	−2.415	0.154
High	−1.760	0.296
Living arrangement	−3.256	0.012
Medical conditions	−6.735	<0.001
Difficulties in ADL	0.013	0.219
Satisfaction with social contacts	−0.004	0.398
SNS use[c]		
Medium	0.702	0.749
High	0.812	0.601

[a]Reference group consisted of age group 60 to 64 years.
[b]Reference group consisted of participants with low education.
[c]Reference group consisted of participants with SNS 'low usage'.

of mental health as compared to individuals aged 60 to 64. Moreover, women reported decreased levels of mental health compared to men. There was also a significant relation between living arrangement and mental health. The number of medical conditions present was significantly related to lower levels of mental health.

Discussion

This study focused on the relation between Social Network Sites (SNS) usage on one side and loneliness and mental health on the other in older adults. Frequent users of SNS did not show any difference regarding loneliness and/or mental health as compared to individuals who used SNS to a lesser extent (i.e. medium usage) or to those who did not use SNS at all (i.e. low usage). Several possible explanations could be brought forward. First, it cannot be ruled out that there truly is no meaningful relation between SNS usage and loneliness and/or mental health in community-dwelling older individuals. Second, it might be argued that it is not the number of times SNS are used per se, but rather the time spent on SNS that is related to loneliness and mental health. However, a post-hoc analyses using the amount of hours spent on SNS yielded similar results. The use of questions that encompass a wide-time frame (i.e. 'How often did you make use of SNS in the past two months?' or 'How many hours per week do you

use SNS, on average?'), might be over-simplistic in order to explain differences regarding loneliness and mental health. At least in younger adults, self-disclosure on SNS, i.e. communicating personal information, thoughts, and feelings (e.g. photo management, message posting), and the reactions of other users (e.g. friends, acquaintances) thereon, is reported to be essential in reducing loneliness and enhancing well-being by using SNS (Lee *et al.*, 2013). It might also be argued that it is neither the number of times SNS are used nor the hours spent on SNS, but rather the subjective experience of the 'SNS session', that is related to loneliness and/or mental health (i.e. how did a person feel while he/she was making use of SNS? What was his/her perception of the SNS session?). Third, in contrast to younger individuals, older individuals might not yet be aware of the fact that SNS could complement their relationships by providing a platform for communication between family, friends, and acquaintances (Fokkema and Knipscheer, 2007; Burke *et al.*, 2010). However, given the large numbers of SNS users in the present study, it seems unlikely that (the majority of) older individuals are not aware of the, possible beneficial, effects of SNS regarding communication with others. Last, it might also be argued that discussion boards and online communities are more suitable forums than SNS in the 'fight against loneliness', since they may, for example, be more suitable for providing and receiving social support (e.g. discussing a life event that has occurred) (Leist, 2013).

Studies reporting on the association between SNS usage remain inconclusive; while some studies show that the use of SNS decreases loneliness (Fokkema and Knipscheer, 2007; Leung, 2011) and improves well-being (Burke *et al.*, 2010), others report that SNS usage could result in a decline in well-being (La Grow *et al.*, 2012; Kross *et al.*, 2013). The majority of these studies were conducted in much younger populations (Burke *et al.*, 2010; Kross *et al.*, 2013). However, younger individuals are known to be less lonely and use SNS to a greater extent (RIVM, 2013; Brenner and Smith, 2013; Eurostat, 2013). Another important difference between the present study and the available literature on this topic regards the population under study. A vast amount of studies recruited their participants by means of SNS. By recruiting participants via SNS or by excluding participants with no SNS account (Leung, 2011; Kross *et al.*, 2013), a study population different than the one used in the present study is provided. Since this study is the first to investigate the relation between SNS usage and loneliness/mental health in older individuals,

comparing the present results to the available literature on SNS usage is hindered.

This study provides several additional, interesting findings. A high percentage of individuals reported to use SNS at least several times per week. This could be due to the fact that individuals, who did not have an Internet connection but who did want to participate in the LISS panel, were provided equipment to access Internet (i.e. in order to fill in the online questionnaires) via a broadband connection ($n = 55$). However, post-hoc analyses without these participants ($n = 571$) yielded similar results and conclusions. Hence, the group of individuals who were provided with a personal computer and/or an Internet connection did not influence the current results. Moreover, using the 6-item Loneliness Scale as a measure of loneliness resulted in a high mean score indicating that the majority of individuals answered at least one of the six questions affirmative. This underscores earlier claims pinpointing that loneliness should be viewed as a major social problem evident in various age groups (UN, 2002; RIVM, 2013). Additionally, several significant predictors of loneliness in general and emotional and social loneliness in particular were identified. Although these predictors were significantly related to the abovementioned outcomes, the parameter estimates were very small. Consequently, the practical relevance of these significant predictors is expected to be low (Aarts *et al.*, 2012b). Adjacent to this, several statistical significant variables were related to mental health, including sex and multimorbidity. Given the rather high parameter estimates of these variables, they may also have important practical implications. Moreover, these findings are in congruence with previous studies that conclude that women (Aarts *et al.*, 2012a) and people who suffer from (chronic) medical conditions report more mental health problems (Smith *et al.*, 2012; Brettschneider *et al.*, 2013). Finally, living alone did not result in significant higher levels of loneliness and mental health problems, as compared to living together. This finding is in congruence with the belief that it is not the absence of relationships per se that leads to loneliness, but rather the absence of meaningfulness of these relationships (Blazer, 2002).

This study has several advantages over previously conducted studies. The LISS panel data is known to be representative for the Dutch speaking adult population. Hence, the present results are generalizable to the entire Dutch ageing population. Moreover, although the data stems from Dutch respondents, the results are likely to be generalizable to other populations outside the Netherlands (Toepoel, 2013). Furthermore,

the sample frame of the current study did not consist of a so-called 'convenience sample'. That is, the study was not limited to participations who, by themselves, owned and used a computer and/or had access to internet.

The results of the present study should also be interpreted in light of some possible limitations. First, conducting a cross-sectional, correlation study on behavior and mood items using a rather wide time frame (i.e. asking for SNS usage during the past two months) cannot result in inferences regarding cause and effect. Second, while data regarding mental health measurement was accumulated during November/December 2011, data regarding social media use and loneliness were accumulated during February/March 2012. Hence, it cannot be ruled out that, during these months, a change in mental health status has occurred. Third, the present study was based on data from a rather small number of individuals aged 80 and older. It cannot be ruled out that, by including a higher percentage of the 'oldest old', a relationship between social network site usage and loneliness and/or mental health is detected.

Future studies should try to overcome the above-mentioned drawbacks. For instance, different types of SNS users, e.g. 'passive users' vs. 'active users' or 'users of SNS' vs. 'users of discussion forms/online communities', could be examined in relation to loneliness and/or mental health. If so, implications regarding which behaviour is associated with higher or lower levels of wellbeing could be postulated. In addition, intervention studies, including longitudinally followed participants, are required in order to draw inferences regarding 'cause and effect'. These studies would have to manipulate the amount and type of use and should assess loneliness and wellbeing in the same timeframe. Conclusions regarding direction of effect, i.e. 'Does SNS usage helps to improve wellbeing or in fact reduces it?', can be drawn from these types of, experimental, studies. Alternatively, longitudinal intervention studies can be designed that incorporate SNS or other types of platforms that are especially designed to reduce loneliness and improve social contacts among community dwelling individuals.

In conclusion, a simple association between SNS on one side and loneliness and mental health on the other cannot automatically be assumed in community-dwelling older adults. However, before SNS usage should be ruled out as a possible solution to adverse health outcomes such as loneliness and mental health problems, various observational and experimental research are warranted.

Conflict of interest

None declared.

> Key points
> - Loneliness among older adults is a known, worldwide problem.
> - SNS usage appears unrelated to loneliness and/or mental health.
> - A simple association between SNS usage and loneliness/mental health cannot automatically be assumed in older adults.

Acknowledgement

Description of authors' roles

S. Aarts was responsible for the (statistical) design of the study, carried out the statistical data analysis, and wrote the manuscript. S. Peek and E. Wouters revised the manuscript for important clinical and scientific content.

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Appendix I

List of included medical conditions

1	Angina, pain in the chest
2	A heart attack including infraction or coronary thrombosis or another heart problem including heart failure
3	High blood pressure or hypertension
4	High cholesterol content in blood
5	A stroke or brain infraction or a disease affecting the blood vessels in the brain
6	Diabetes or a too high blood sugar level
7	Chronic lung disease such as chronic bronchitis or emphysema
8	Asthma
9	Arthritis, including osteoarthritis, or rheumatism, bone decalcification or osteoporosis
10	Cancer of malignant tumour, including leukaemia or lymphoma, but excluding less serious forms of skin cancer
11	A gastric ulcer or duodenal ulcer, peptic ulcer
12	Parkinson's disease
13	Cataract
14	A broken hip or thigh bone
15	Another fracture
16	Alzheimer, dementia, organic brain syndrome, senility, or another serious memory problem
17	Benign tumour (skin tumor, polyps, angioma)
18	Other afflictions not yet mentioned

Appendix II

Unstandardized regression coefficients (*B*) and *p*-values describing missing data on SNS usage

	Missing SNS	
	B	*p*-value
Sex	0.045	0.652
Age	0.061	<0.001
Education	−0.034	0.282
Living arrangement	−0.275	0.013
Medical conditions	0.059	0.332
Difficulties in ADL	−0.022	0.536
Satisfaction with social contacts	0.000	0.186
Loneliness	0.054	0.213
Mental health	−0.013	0.040