Impairments, mastery, and loneliness. A prospective study of loneliness among older adults

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ABSTRACT

Old age is commonly associated with loneliness as loss of partner and friends, retirement, deteriorating health and functional impairments may make way for loneliness. An ageing population may give rise to concern for growing numbers of lonely people. The study explores loneliness among older people 67-79 years old (N=699), living in their own homes, examining whether and how socio-demographic factors, subjective health, and mastery influence loneliness among people with no impairments and people with impairments. The study uses cross-sectional and longitudinal (five-year panel) data from the Norwegian Life Course, Ageing and Generation study (NorLAG), calculating the risk of loneliness at T1, and prospectively at T2. Mastery is the only factor significantly influencing the risk of loneliness both at T1 and T2, both for older people with impairments and for those without impairments. A high level of mastery is related to a lower risk of loneliness. Being married or cohabitant are related to a lower risk of loneliness, among those *without* impairments both at T1 and at T2, among those *with* impairments only at T1. Age, gender and subjective health were not independently related to loneliness at any time. The results suggest that the subjective feeling of mastery is important to avoid loneliness, both at T1 and prospectively at T2 in both groups.

INTRODUCTION

Loneliness is a universal experience as most people experience loneliness now and then. It is generally defined as a subjective experience of unsatisfactory social relations. Loneliness is a subjective experience; it is not synonymous with objective social isolation. People can be alone without being lonely, or lonely in a crowd (1-3). Old age is commonly associated with loneliness as people outlive partners and friends and exit working life. Older age is also associated with a higher risk of having impairments, which can make socializing more demanding and thus make way for loneliness. Several studies show a clear relation between impairments/ functional disability and loneliness. The association is found whether impairment is measured by general measures of daily life function (like ADL and IADL), specific physiological limitations, or limited capability of seeing or hearing, or specific diagnoses and illnesses, or the person's own subjective opinion of health or of being disabled (2-8). Also poor general health (3,7, 9-13), and specific diagnoses or illnesses are associated with loneliness (e.g. 3,14,15).

As the population ages (16), there are indications that people will live longer with their chronic diseases (17). These developments may cause concern for a growing number of people susceptible to loneliness. Hence, strategies of preventing and alleviating loneliness are of great interest and significance, and it is necessary to know more about factors releasing, aggravating, and alleviating loneliness. Loneliness has been linked to many aspects of life that in combination explain why some older people feel lonely. Both precipi-

tating events and predisposing factors like personal characteristics, social skills, attribution styles and habitual patterns of interaction are seen as factors having a potential impact on loneliness, and are explored empirically.

Most studies on loneliness are *cross sectional studies* assessing associations with age, gender and health. Results from these studies are mixed for age, with some studies finding higher rates of loneliness in older age groups (18,19) whereas other studies indicate loneliness being more intense in younger age groups (20,21). A recent study of Victor & Yang (22) showed that the association between loneliness and age is U-shaped. Higher prevalence of loneliness among older people may be attributable to age-related increases in risk factors, such as impairments, income, widowhood and living alone, rather than to ageing itself (3). Women tend to report higher rates of loneliness than men (3,20,23-25). Loneliness is more common in people *living alone* (3,7,13,20,25,26), and not being *married* (7,11,19,27-29). Loneliness is also associated with having *lower socio-economic status* (3,7,9,11). Finally, higher levels of social self-efficacy (feelings of being in control in social situations) (30), and coping self-efficacy (31) are associated with less loneliness.

Longitudinal studies of loneliness mainly show similar associations as cross-sectional studies. Poor health and poor functional capacity, marital status as single, limited social network, and living alone are associated with loneliness over time (26,28,32,33). Some longitudinal studies show that loneliness increases in old age (26,32,33), other studies do not (28,34). There are few longitudinal studies exploring the asso-

ciation between disability and loneliness. Jylhä (26) found that persons aged 60+ with functional disability were more likely to report loneliness than others, and they were also more likely to become lonely in the future. Similarly, Aartsen & Jylhä (35) reported that increased physical disabilities (rather than baseline level) was related to enhanced feelings of loneliness at follow-up among older adults aged 60–86 years at baseline. Tijhuis et al. (33), however, found that changes in limitations in activities of daily living were not related to loneliness among men aged 65–85 years at baseline. Guiaux (36) in a longitudinal study among older adults, found that a low sense of *mastery* predicted loneliness. Sense of mastery refers to the extent to which people feel in control of their life and environment in contrast to being fatalistic (37). Mastery is considered an important factor in "successful ageing" and crucial for maintaining functional ability in later life and cope with disabilities (38-41).

The aim of *this study* is to examine the extent to which socio-demographic factors, health status and mastery influence loneliness in older adults without impairments and older adults with impairments. Associations will be analyzed using cross-sectional as well as longitudinal (five-year panel) data.

METHODS

Data

The study is based on panel data from the Norwegian Life Course, Aging, and Generation Study (NorLAG), i.e. on the same persons answering questions at two times. The first wave of NorLAG (T1) was conducted in 2002/3, with respondents aged 40-79 years at baseline. The second wave (T2) was conducted in 2007/8. The sample is drawn from 30 municipalities and townships from all over Norway. A combination of telephone interviews and postal questionnaires was used in both waves. At T1, a total of 5,559 persons (67%) responded to the telephone interview and 4,149 (75%) of these returned the postal questionnaire. The net sample of the NorLAG panel (persons interviewed at T1 and T2) consists of 3,774 persons, which implies that 71.6% of the respondents from wave 1 were retained at wave 2. This corresponds to 50% of the eligible gross sample (42). This paper uses data from 699 persons aged 67-79 years who answered a global question about loneliness in telephone interview at both T1 (2002/3) and T2 (2007/8). The sample includes people living outside institutions.

The loss of respondents from T1 to T2 was disproportionally distributed concerning age, health and education. Considering respondents who had died, or refused to or were not able to participate, respondents for whom we have longitudinal data at T2 are more likely to be younger, in better health and more educated than the sample at T1 (42). This kind of sample selection corresponds with panel samples in other longitudinal studies (32,43).

Measures

Dependent variable

Loneliness is assessed by a single, global question: "Do you feel lonely?" Response categories are 1="often", 2="sometimes", 3="seldom" or 4="never". Although this measure has limitations (44,45), it has been used in numerous studies (3,25-29,34,46-48) and has been reported to have good face and predictive validity (46). A global single item question about loneliness necessarily measures loneliness as understood by the respondent, not as predefined by the researcher (26).

For purposes of statistical analysis the loneliness variable was dichotomized, with response categories "often" or "sometimes" lonely combined into 1="Lonely". Response categories "seldom" or "never" lonely are combined into 0="Not lonely". This way of dichotomizing is often used in studies of loneliness (i.e. 25,34,47,48). We have classified "sometimes lonely" as "lonely" because it may be easier for people who are lonely to admit that they feel lonely sometimes than to say they feel lonely often, since being lonely carries a stigma (47).

Ancillary analyses with the loneliness variable dichotomized another way, with 1="often" lonely, and 0="sometimes", "seldom" or "never" lonely, have very few statistical significant results, which is probably caused by the low number of respondents feeling lonely "often" (5.7 percent of the sample feel lonely "often", while 24.0 percent "sometimes", 33.8 percent "seldom", and 36.5 percent "never" feel lonely).

Using the loneliness variable in an ordinal logistic regression analysis turned out to yield much the same result as in the binary logistic regression: in both analyses, personal mastery and partner status are predictors of loneliness, both among the group with no impairments and among those with impairments. Since the results of the ordinal regression and the binary regression analyses are very similar, and the results from the binary regressions are easier to understand, we here report the results with the dichotomized loneliness variable.

Independent variables

Mastery was measured by the Personal Mastery Scale (37). The Personal Mastery Scale has seven items, each of which is evaluated on a five-point Likert scale ranging from (1) 'strongly agree' to (5) 'strongly disagree'. The scale measures a general attitude towards the possibilities of influencing one's own life situation and focuses on control of those aspects of life that people consider personally important (49). The items are: (1) I have little control over things that happen to me; (2) What happens to me in the future mostly depends on me; (3) There is really no way I can solve some of my problems; (4) There is little I can do to change many of the important things in my life; (5) I often feel helpless in dealing with the problems of my life; (6) Sometimes I feel I'm being pushed around in life; and (7) I can do just about anything I really set my mind to

do. An index was estimated as the mean of the seven scores, with high scores indicating high mastery (Cronbach's alpha=0.72).

Impairments are measured by an index, formed by three items. The respondents were asked if their present health condition restricted them in a) activities like moving a table, vacuum cleaning, go for a walk, or gardening, and b) walk up stairs, several floors. (Alternatives: no/yes). The third item was c) outdoor walking ability, which distinguished between 'those who could walk less than 1 km' (that is, limited walking ability) from 'those who could walk further'. The index range from 0 to 3, where 0=experienced no problems, and 3=experienced three problems. Most persons in our sample report having no problem (77 percent, n=540), 11% (n=80) have one problem, four percent (n=31) have two problems, and seven percent (n=48) have three problems. The analyses were conducted with a dichotomized variable; 0=experienced no problems, 1=experienced 1-3 problems.

The following variables are entered in the analyses because they are known to influence loneliness:
Respondent's age is defined as the number of complete years lived at the time of interview.
Gender is coded 0=male and 1=female.
Partner status is measured by a dichotomy coded 1= married/cohabitant, and 0=not married/not cohabitant (including those who are divorced/separated or widowed).
Educational level is categorized as 1=primary school, 2=secondary school, and 3=college/university level.
Subjective health is assessed by the question "How would you best describe your current health?" Answer categories range from 1=excellent to 5=poor. As few respondents describe their health as "excellent" or "poor", using the variable as an ordinal variable is not an option. The results produced by a variable with three categories; "very good" [1,2], "good" [3], and "poor" [4,5] were much the same as the results produced with a dichotomous variable. In the analyses, we thus apply a dichotomous health variable where the self reported health evaluations "excellent", "very good", and "good" health is classified as "good health", while self reported "fair" and "poor" health are classified as "poor health". (Subjective health is often measured by these or similar adjectives. As personal assessments they do not denote clear categories, but indicate ordinal arranged evaluations. This dichotomization arranges those assessing their health in the upper part of the Likert scale (1-3) as being in "good" health and those assessing their health in the lower part of the scale (4 or 5) as being in "poor" health.)

The measures of loneliness and subjective health are from the telephone interview. Age, partner status and education are data from public registries (Statistics Norway), added with the respondents' informed consent. Five of the questions about personal mastery are from the postal questionnaire, two are from the telephone interview.

Analyses

We use both cross-sectional and longitudinal analyses. The analyses begin with a descriptive analysis of loneliness at T1 in the two groups under study, those with functional impairment and those without functional impairments. Next, bivariate analyses are conducted. We explore the bivariate associations between loneliness and the independent variables measured at T1. Then, multivariate analyses follow, assessing the relative significance of the independent variables (measured at T1) for the risk of loneliness at T1, and the risk for loneliness at T2, prospectively.

Associations between loneliness and the independent variables (age, gender, partner status, education, subjective health, and mastery) at T1 are tested using chi square tests and analysis of variance (ANOVA). Multivariate logistic regression is applied to assess the relative significance of the independent variables for risk of loneliness. For all analyses, p-values smaller than 0.05 were considered to be statistically significant.

To determine whether differences (in age, gender, partner status, education, subjective health, and mastery) between those with and those without impairments are statistically significant, we estimated separate interaction models. Interaction effects were tested entering one pair of predictors at a time in the regression equations.

RESULTS

At T1, 28 percent reported having impairments while 72 percent had no impairments. Those with impairments were significantly more often lonely than those without impairments (chi square=15.095, df=1, p<0.001). Among those with impairments, 42 percent reported loneliness. Among those without impairments, 26 percent reported loneliness.

Table 1 displays respondent characteristics like socio-demographic and health variables at T1 and their associations with loneliness among those *with* impairments and among those *without* impairments.

At T1, 72 percent of the respondents *with impairments* were women, 44 percent were married or cohabitant. The most common level of education was primary school (45 percent), and the majority (67 percent) reported that their subjective health was poor. The mean age of the respondents with impairments was 73.2 years (SD=3.7), and the mean level of mastery was 21.9 (SD=5.0).

Old age was significantly associated with loneliness among those with impairments. Women were more often lonely than men. The prevalence of loneliness is strongly associated with partner status, not having a partner was associated with loneliness. Educational level was associated with loneliness. Those with low and those with high education were more often lonely than those with education on secondary school level. Poorer subjective health was not significantly associated with loneliness among those with impairments.

Table 1. Characteristics of the sample (percent/Mean [SD]), the association of those characteristics with loneliness (percent), and chi square-tests/analysis of variance (ANOVA) showing the association of each variable with loneliness at T1 (N=699).

	Without impairments		With impairments	
	%	Feeling lonely	%	Feeling lonely
Gender		***		*
Men	54	20	28	30
Women	46	34	72	47
Partner status		***		***
Unmarried	35	49	56	54
Married/Cohabitant	65	14	44	27
Education				*
Primary school	25	27	45	52
Secondary school	51	24	41	31
College/University	24	29	14	46
Subjective health		*		
Good	83	24	33	34
Poor	17	36	67	46
Continuous independent variables	Mean (SD)	F-statistic	Mean (SD)	F-statistic
Age at T1 (n=540)	71.9 (3.4)	.423	73.2 (3.7)	3.957*
PMS sumscore (n=450)	24.1 (4.4)	23.649***	21.9 (5.0)	8.774**
Total (N)	100 (540)	26 (141)	100 (159)	42 (67)

*p<0.05, **p<0.01, ***p<0.001

Those with high levels of mastery are less lonely than those experiencing lower levels of mastery.

At T1, 46 percent of those *without impairments* were women, 65 percent were married or cohabitant. The most common level of education was secondary school (51%). The mean age was 71.9 years (SD=3.4) and the mean level of mastery was 24.1 (SD=4.4).

Among those without impairments, age was not associated with loneliness. Women were more often lonely than men. The prevalence of loneliness is strongly associated with partner status. Not having a partner was associated with loneliness. Educational level was not associated with loneliness, but poor subjective health was. Those with high levels of mastery are less lonely than those experiencing lower levels of mastery.

Multivariate logistic regression was used to assess which of the variables were independently related to loneliness at T1 and at T2, among those with impairments and among those without impairments (Table 2). Table 2 shows that among those *with* impairments, loneliness at T1 (2002/3) was independently associated with partner status (not being married). Also, loneliness was associated with low perceived mastery.

Prospectively, at T2 (2007/8), the only factor at T1 predicting loneliness at T2 among people with impairments was low perceived mastery.

Among those *without* impairments (like those with impairments), loneliness at T1 was independently associated with partner status (not being married). Education was related to loneliness: Persons with education on college/university level were most likely to be lonely, significantly more lonely than those with primary school level education. Also low perceived mastery was significantly associated with loneliness.

Prospectively, at T2, only two factors; not being married/cohabitant and low perceived mastery, predicted loneliness.

Age, gender and subjective health were not significantly associated with loneliness, neither in the cross-sectional nor in the prospective analyses, in any of the two groups studied.

In ancillary analyses including the total sample (both those with and those without impairments), interactions between the impairments variable and the variables age, gender, partner status, education, subjective health, and mastery were conducted, one pair at a time. None of the variables interacted significantly with the impairments variable.

DISCUSSION

The study shows that *mastery* is the only factor having a significant influence both at T1 and T2 for both older people with impairments and for those without. Controlling for other factors, we find that mastery and loneliness are negatively related, which is in accordance with the main tendency in previous studies. Those older people experiencing high levels of mastery are less likely to be lonely at T1 and (prospectively) at T2. Both among people with impairments and among people without impairments high levels of mastery are significant to avoid loneliness.

Among these older people, *age* is not related to loneliness in the two groups. Neither has *gender* any

Table 2. Multivariate logistic regressions of loneliness at T1 and T2 according to impairment status; persons 67-79 years.

	Without impairments (n=445)				With impairments (n=118)			
	Loneliness at T1		Prospectively, loneliness at T2		Loneliness at T1		Prospectively, loneliness at T2	
	OR (CI)	p-value	OR (CI)	p-value	OR (CI)	p-value	OR (CI)	p-value
Age	.96 (.90-1.03)	.961	.99 (.92-1.06)	.670	1.06 (.94-1.19)	.340	.96 (.86-1.08)	.510
Gender								
Men	1.00		1.00		1.00		1.00	
Women	1.33 (.81-2.19)	.258	1.05 (.65-1.70)	.852	2.22 (.80-6.16)	.127	1.20 (.43-3.36)	.729
Partner status								
Married/cohabitant	1.00		1.00		1.00		1.00	
Not married/cohabitant	5.76 (3.47-9.56)	<.001	2.84 (1.74-4.62)	<.001	3.28 (1.34-8.02)	.009	1.96 (.78-4.91)	.151
Education								
Primary school	1.00		1.00		1.00		1.00	
Secondary school	1.27 (.68-2.35)	.456	.77 (.44-1.35)	.363	.38 (.14-1.01)	.053	.51 (.20-1.34)	.174
College/University	2.11 (1.03-4.31)	.040	.61 (.31-1.21)	.157	.83 (.25-2.75)	.756	.84 (.25-2.80)	.778
Subjective health								
Good health	1.00		1.00		1.00		1.00	
Poor health	1.33 (.73-2.43)	.360	1.28 (.72-2.28)	.398	1.29 (.50-3.30)	.598	.70 (.27-1.80)	.454
Mastery	.88 (.83-.94)	<.001	.90 (.85-.96)	<.001	.90 (.82-.99)	.034	.84 (.75-.93)	.001
Nagelkerke R^2	.255		.142		.303		.232	
Hosmer & Lemeshow	X^2=4.94, df=8, p=.764		X^2=3.75, df=8, p=.879		X^2=1.464, df=8, p=.993		X^2=4.962, df=8, p=.762	

influence. Also *subjective health* has no influence on loneliness in the two groups, controlling for other factors. The finding that subjective health has no influence in the two groups is contrary to many other studies. In the group of our study, aged 67-79 years, most people will have reduced health and probably also will expect this to occur. The deviating results from other studies concerning subjective health may be caused by our inclusion of mastery. However, even when not including mastery, those in poor subjective health are not significantly more lonely than those in good health. Impairments as measured here implicate health induced restrictions both in daily activities and mobility restrictions that may reduce possibilities for social contact, and thus be more influential on loneliness than subjective health (50).

Mastery is a subjective way of reacting to circumstances of life, and to the ageing processes. Seeing oneself as still able to handle challenges and problems, being able to decide for oneself what to do, and being in control of life even when health and strength deteriorate, are important for all – also to prevent loneliness. But, over time, mastery seems to be even more important for those with most impairments. Thus, high levels of personal mastery prevent loneliness among older people, while age, subjective health, and gender have no significant influence.

The most significant threat for becoming lonely in old age (in both groups) is losing one's wife, husband, or partner – regardless of experienced functional health. Partner status being married/cohabitant, is the most important factor (highest odds at T1) but it is not of (protective) significance for older people with impair-

ments from T1 to T2, only mastery is. A relevant question would be if the long term significance of mastery is even larger for people with impairments than for others. This should be explored in future studies.

Educational attainment is not associated with loneliness among people with impairments, but is independently associated with loneliness at T1 among people *without* impairments. Those with college/university level education are most likely to be lonely, whereas those with primary school level are least likely to be lonely at T1. These findings are not in accordance with previous studies, that are indicating more loneliness among persons with lower education (3,11). The association is not found in the bivariate analysis, but appears when the other variables in our analysis are taken into consideration. Ancillary analyses not shown here (multiple regressions with various combinations of the variables included in our statistical model) indicate that educational level reaches significance when all other variables are controlled for. People with college/university level education in this study are more likely to be lonely than those with lower (primary school) education due to differences in other aspects.

Why older people with college/university level education (and without impairments) are more likely to be lonely than those with primary school education, seems to call upon a compound explanation. Persons with low education in our sample might be a more select group than persons with higher education. Some reasons are factors like poor health and functional ability, but also factors related to motivations to participate in surveys. To participate in interviews people need to have some generalized trust in other people, and trust

is related to education (e.g. 51,52,53). Further, the level of education is associated with other variables. While some studies have shown that higher education is associated with less loneliness (3,7,9), our results indicate that the association may be different when taking into account all causal influences. Education may be related to higher levels of mastery, better health and better chances of being married or co-habitant. Our results, including people near retirement age and older, may point at transient loneliness reactions to loss of colleagues and social inclusion, especially among healthy people with high education, to whom social confirmation of competence may be important for self-esteem.

Prospectively, five years later (T2), no significant association was found between educational level and loneliness among older people without impairments. Among older people with impairments, educational attainment is not significantly associated with loneliness, when other variables are controlled for.

Different definitions of loneliness, different methods of measuring loneliness, and varying and selected loss of respondents in different age groups influence the results in loneliness studies. Usually, loneliness is higher among those "lost" respondents, they are more fragile, sicker, are more often widowed, and more often institutionalized, factors increasing the risk of experiencing loneliness (54). Also, predisposing factors like personality and special personal circumstances may influence loneliness, may be more among people with stronger loneliness than among those with weaker loneliness.

One limitation concerning our study may be the small sample of people with impairments. The selected nature of our sample both at T1 and T2 (although usual in longitudinal studies) restricts generalizations to the whole population. The experience of loneliness and the associations with various life events may differ among respondents from less socially advantaged groups; people in advanced age and very frail people with many impairments and diagnoses, or those living in institutions.

To conclude, two factors in our study are particularly significant in order to prevent loneliness among older people: high levels of perceived personal mastery and having a partner. While having a partner protects against loneliness both at T1 and prospectively at T2 among those without impairments, the protective function is found only at T1 among those with impairments. Mastery, on the other hand, protects against loneliness at both times in both groups.

ACKNOWLEDGEMENTS

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