Changes in and factors related to loneliness in older men. The Zutphen Elderly Study

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Abstract

Aim: to investigate (i) whether loneliness increases in old age, and if so, whether it relates to ageing itself, to time trends or to cohort effects and (ii) the relationship between changes in institutionalization, partner status and health and loneliness.


Results: for the oldest group (born between 1900 and 1910) loneliness scores increased, but not for the younger groups. The increase in loneliness was attributable to ageing. No birth cohort or time effects were found. Loneliness was related to changes in institutionalization, partner status and subjective health but not to limitations in activities of daily living or cognitive function.

Conclusions: the increased loneliness experienced by very old men is influenced by loss of a partner, moving into a care home or not feeling healthy.

Keywords: activities of daily living, age, cognitive function, institutionalization, loneliness, longitudinal study, marital status, subjective health

Introduction

Very old people appear to be most prone to loneliness [1–3], perhaps because of loss of close ties and increasing dependency. Results from large-scale surveys give contradictory results on the relationship between loneliness and age [4–13]. Most studies are cross-sectional and not designed to study change. Reported changes in loneliness between different age groups were possibly due to cohort effects. In the longitudinal studies, age effects cannot be distinguished from time trends.

In the process of loneliness [14, 15], it is not the status of health and social relationships that is important, but a change in these characteristics. Losing a partner, deterioration of health and institutionalization influence loneliness among elderly people [9].

We have analysed to what extent feelings of loneliness are related to age, cohort effects or time trends, and investigated the relationship between loneliness and changes in situational factors like institutionalization, health and partner status [16].

Methods

We used data collected in the Zutphen Elderly Study [17]. Zutphen is a small industrial town in the Netherlands with 32000 inhabitants. In 1985 a randomly selected sample of all men living in Zutphen and born between 1900 and 1920 was asked to participate. The response was 74% (n = 939, Table 1). In 1990, a follow-up survey was conducted. Of the respondents in 1985, 221 had died and 560 participated (78%). In the next follow-up, in 1995, 463 men were invited to participate and 343 (74%) did so.

A questionnaire on psychosocial items, including measures of loneliness, partner and health status, was sent to the participants in each study year. Feelings of loneliness were measured by the De Jong-Gierveld Loneliness Scale, developed for use in survey research [18]. The scale meets the criteria of the Rasch measurement model [19] and consists of 11 items describing a discrepancy between the social relations a person has and wants. Both positive (e.g. 'There are enough people that I feel close to') and negative
Table 1. Results of longitudinal analyses: changes between survey years in loneliness in respondents from the 1985 cohort, and in respondents participating up until 1995

<table>
<thead>
<tr>
<th>Measure/survey year</th>
<th>Respondent group</th>
<th>n</th>
<th>Mean (SD)</th>
<th>n</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1985 cohort</td>
<td></td>
<td></td>
<td>Up until 1995</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td>939</td>
<td>72.6 (5.4)</td>
<td>343</td>
<td>70.6 (4.5)</td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>560</td>
<td>76.2 (4.7)</td>
<td>345</td>
<td>75.6 (4.5)</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td>343</td>
<td>80.6 (4.5)</td>
<td>343</td>
<td>80.6 (4.5)</td>
<td></td>
</tr>
<tr>
<td>Loneliness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td>738</td>
<td>2.6 (2.6)</td>
<td>295</td>
<td>2.2 (2.3)</td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>433</td>
<td>2.8 (2.7)</td>
<td>274</td>
<td>2.5 (2.5)</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td>331</td>
<td>2.7 (2.8)</td>
<td>331</td>
<td>2.7 (2.8)</td>
<td></td>
</tr>
<tr>
<td>F(P)</td>
<td>0.23 (0.79)</td>
<td>2.32 (0.10)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

None of the trends appeared significant when tested with ANOVA F-test.

(e.g. 'I miss having a really close friend') items were included. Scale scores were computed by adding the numbers of times a respondent reported loneliness [20], ranging from 0 (absence of loneliness) to 11 (severe loneliness). Reliability was in line with previous studies (Cronbach’s α = 0.81 in 1985; 0.77 in 1990 and 0.78 in 1995) [20].

Year of birth was categorized in three groups: 1900–10, 1911–15 and 1916–20. Men living in a nursing or residential home were considered to be dependent. Men living in their own house or flat were considered to be independent. Partner status was defined as having a partner (whether or not through marriage) or not. The first measure of health status is subjective health [21]. Respondents who felt healthy were scored as 0 ('healthy'), respondents who felt rather, moderately or not healthy were scored as 1 ('less healthy'). From 1990, 14 items on activities of daily living were included [22]. A sum score was computed and dichotomized into having no limitations and having one or more limitations. Mental health (in terms of cognitive functioning) was measured by the 30-point Mini-Mental State Examination [23] in a controlled setting by trained staff, in the surveys of 1990 and 1995. We used a score of 25 as cut-off point, considering scores below this point to indicate cognitive impairment [24–26].

Statistics

Statistical tests (two-tailed, \(P \leq 0.05\)) were carried out using SAS (version 6.11). Loneliness was considered to be a continuous variable. Both parametric and non-parametric tests were performed because loneliness score distributions were skewed. Since these tests revealed similar results, only parametric test results are shown.

Three methods were used to disentangle the effects of ageing, birth cohorts and time [27]: (i) longitudinal method (comparison of loneliness scores between the years of study), (ii) cross-sectional method (comparison of loneliness scores between different age groups within each year of study) and (iii) time-series method (comparison of loneliness scores of similar age groups between the years of study). If both longitudinal and cross-sectional findings are consistent in direction, an effect of ageing is present. Consistent findings in both longitudinal analyses and time series suggest a time trend. Differences in loneliness scores between birth cohorts are present if both cross-sectional analyses and the time series reveal consistent findings.

For each method, tests for trend (ANOVA, F-test) were performed. Longitudinal analyses were conducted for all respondents (\(n = 939\)) and for survivors up to 1995 (\(n = 543\)). Due to missing values in the loneliness measure, the numbers of respondents included in the analyses differ between the study years. Cross-sectional analyses included all respondents in a given survey year. For the time-series approach, differences between 1985, 1990 and 1995 in loneliness for those aged 75–79 or 80–84 were tested. These age groups were chosen to exclude overlap (one respondent being in the same group in two survey years).

Age-, cohort- and time-related changes in loneliness were also estimated using a mixed longitudinal model (repeated effects model with compound symmetry covariance structure [28, 29]). To investigate the effects of change in situational factors a similar model was used.

Results

Of all respondents in 1995, 20% (68) were born between 1900 and 1910, 31% between 1911 and 1915 and 49% between 1916 and 1920. The largest Pearson correlation coefficient between loneliness scores was found for 1985 and 1990 (\(R = 0.56\)). The correlations for other combinations of years ranged from 0.46 to 0.54. Average loneliness scores did not change between 1985 and 1995 (longitudinal analyses, Table 1). However, a non-significant trend in loneliness was observed for respondents participating up until 1995: loneliness scores increased from 2.2, to 2.5 and 2.7. Cross-sectional associations (Table 2) between age and loneliness were observed in 1990 for the respondents participating up until 1995 and in 1995. The oldest men reported more loneliness. Time-series analyses showed no significant trend in change in loneliness score over the survey years for either age group (Table 3).
Relationships in the cross-sectional analyses were confirmed by the (non-significant) trend found in the longitudinal analyses. Thus, increasing loneliness was due to ageing effects. These results were confirmed by additional repeated measurements analyses. Overall change in loneliness was 0.02 per year \((P = 0.06)\). With each year, loneliness scores increased by 0.04 \((P = 0.02)\). Time and cohort effects were not statistically significant \([estimates = 0.02 (P = 0.46) and 0.004 (P = 0.09)\, \text{respectively}]\).

Similar repeated measurements analyses were performed to assess effects of changes in situational factors. For most men, institutionalization, partner status and cognitive function did not change. Because of small numbers moving into care or changing partner status, we had to combine groups. Results for multivariate models are shown in Table 4. Age at baseline was not related to loneliness in 1995 after adjustment for change in situational factors. These analyses were not stratified by age because of small numbers, especially in the oldest group. Change in institutionalization, partner and subjective health status was related to loneliness, while change in cognitive function and in limitations in activities of daily living were not. In 1995 men who lived dependently or became dependent reported 1.72 times higher loneliness scores than those who lived independently or became independent. Being without a partner, partner loss, feeling less healthy or subjective health impairment were all related to higher loneliness scores \([estimates = 1.83, 1.46, 1.69, 0.94\, \text{respectively}]\).

Repeated measurements analyses on change in institutionalization, partner and health status were also performed adjusting for loneliness at earlier points in time. These analyses (not shown) gave similar results.

**Discussion**

Loneliness does increase with age, but only in the very old. We found no birth cohort or time trends. Change in partner status, in subjective health and in institutionalization were clearly related to loneliness. Men who were or became dependent, men without a partner or who lost their partner and men who felt less healthy or experienced health impairment reported more loneliness than those who had a partner, lived independently or felt healthy. Changes in cognitive function and in limitations in activities of daily living were not related to loneliness.

No longitudinal study has unravelled the relationship between loneliness and age, cohort and time trends. Studies of the relationship between loneliness and age have given contradictory results \([5, 7, 8, 11, 12, 30]\). Our study and that of Wenger et al. [30] show that age is not related to loneliness after adjustment for

**Table 2. Results of cross-sectional analyses: age-related changes in loneliness in each survey year**

<table>
<thead>
<tr>
<th>Age group (year of birth)</th>
<th>1916–20</th>
<th>1911–15</th>
<th>1900–10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>281</td>
<td>256</td>
<td>221</td>
</tr>
<tr>
<td>1990</td>
<td>203</td>
<td>148</td>
<td>82</td>
</tr>
<tr>
<td>1995</td>
<td>163</td>
<td>102</td>
<td>66</td>
</tr>
</tbody>
</table>

Respondents from the 1985 cohort

| 1985 | 2.7 (2.7) | 2.4 (2.4) | 2.9 (2.7) |
| 1990 | 2.6 (2.6) | 2.7 (2.6) | 3.2 (3.2) |
| 1995 | 2.5 (2.7) | 2.4 (2.8) | 3.5 (2.9)* |

Respondents up until 1995

| 1985 | 2.4 (2.4) | 2.0 (2.4) | 2.1 (1.9) |
| 1990 | 2.4 (2.4) | 2.2 (2.2) | 3.3 (3.3)* |
| 1995 | 2.5 (2.7) | 2.4 (2.8) | 3.5 (2.9)* |

*Significant trend tested with ANOVA F-test \((P < 0.05)\).

**Table 3. Results of time-series analyses: comparisons of loneliness scores between survey years within similar age groups**

<table>
<thead>
<tr>
<th>Age group (in each survey year)</th>
<th>1985</th>
<th>1990</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>75–79 years</td>
<td>128</td>
<td>211</td>
<td>216</td>
</tr>
<tr>
<td>n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean score (and SD)</td>
<td>2.8 (2.6)</td>
<td>2.9 (2.8)</td>
<td>2.7 (2.7)</td>
</tr>
<tr>
<td>80–84 years</td>
<td>84</td>
<td>81</td>
<td>114</td>
</tr>
<tr>
<td>n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean score (and SD)</td>
<td>2.9 (2.6)</td>
<td>3.2 (3.2)</td>
<td>2.4 (2.9)</td>
</tr>
</tbody>
</table>

None of the differences between years of study appeared significant when tested with ANOVA F-test.
situational factors. The greater exposure to risk events is probably more important than age in itself [31].

Our results on relationships between loneliness and partner and health status confirm others’ reports [8, 12, 11, 12, 30]. More loneliness was found in elderly people with disabilities or mobility problems [7]. Mixed results were found with marital status and cognitive function [5, 7, 11, 12, 32]. Longitudinal studies [33–35] report that changes in loneliness are associated with change in partner status, in well-being, in mood and in satisfaction with autonomy and life in general.

Loneliness in old age often results in an increase in depression, sleeping problems and disturbed appetite [36], which may lead to institutionalization [37]. Our finding that elderly men living in institutions are more lonely than those living independently may therefore be a matter of selection: the most lonely in the community had moved into care homes. However, institutional residents with contacts with former neighbours reported lower levels of loneliness than institutional residents without such contacts [38]. Moving into a nursing home may also lead to social interaction and increased activity which result in less loneliness [39].

We only studied men. Results on gender differences in loneliness are conflicting [5, 7, 8, 11, 12, 30]. Reasons for possible gender differences are that women may have lower self-esteem (low self-esteem is associated with being lonely). Also, it is culturally more acceptable for women to express their emotional difficulties than it is for men. Further, women consider interpersonal relations more important than men do [40]. Women generally grow older and live without their partner for longer than men. Loneliness in men tends to be associated with an evaluation of the relationship with their partner, whereas in women the association tends to be with an evaluation of their overall network or relationships [41]. Therefore, effects of change in partner status on loneliness might be less for women than for men.

We have shown that institutionalization and partner and health status are related to loneliness. Age, however, was only related to loneliness in the very old. Further longitudinal research is needed to confirm our results and help understand the process and determinants of loneliness.

Key points
- Loneliness increased over time in very old men but not in the younger old.
- Men living in or moving into a nursing home were more lonely than those living independently.
- Men without a partner were more lonely than men with a partner.
- Men who felt less healthy were more lonely than men who felt healthy.

References
6. De Jong-Gierveld J. Eenzaamheid: een meersporig onderzoek
Changes in loneliness


33. De Jong-Gierveld J, Dykstra P. Changes in loneliness: assessing the impact of changes in the social network and changes in health. Working paper, prepared for the symposium on Dynamics in Personal Relationships of the Elderly: changes in the household, the family, the network and loneliness at the 7th International Conference on Personal Relationships, Groningen, 1994.


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