Effects of Psychosocial Group Rehabilitation on Health, Use of Health Care Services, and Mortality of Older Persons Suffering From Loneliness: A Randomized, Controlled Trial

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Background. Loneliness is a distressing feeling of a lack of satisfying human relationships. It is associated with poor quality of life, impaired health, and increased mortality among older individuals. The study aim was to determine the effects of new psychosocial group rehabilitation on the subjective health, use and costs of health services, and mortality of lonely older individuals.

Methods. This randomized, controlled trial was performed in seven day care centers. A total of 235 older people (>74 years) suffering from loneliness participated. Intervention was implemented in 15 groups (each with 7–8 participants and 2 professional group leaders) meeting for 3 months altogether 12 times. Group intervention aimed to empower elderly people, and to promote their peer support and social integration. Intervention was based on the effects of closed-group dynamics. The groups had the following activities according to the participants’ interests: (a) therapeutic writing and group psychotherapy, (b) group exercise and discussions, and (c) art activities. Group leaders received thorough training and tutoring. Subjective health, use and costs of health services, and mortality were measured.

Results. At 2 years, survival was 97% in the intervention group (95% confidence interval [CI], 91–99) and 90% in the control group (95% CI, 85–95) (p = .047). The intervention group showed a significant improvement in subjective health, thus resulting in significantly lower health care costs during the follow-up: the difference between the groups was −943 €/person per y (95% CI −1955 to −127; p = .039).

Conclusions. Psychosocial group rehabilitation was associated with lower mortality and less use of health services.

Key Words: Loneliness—Aged—Psychosocial rehabilitation—Randomized controlled trial.

Loneliness is a common and distressing feeling among older people associated with impaired quality of life (1), cognitive decline (2,3), poor subjective health (4), disability (5), increased use of health and social services (2,6–8), and increased mortality (2,9,10). In a Finnish population-based study on older people (2), feelings of loneliness increased the risk of cognitive decline, being permanently institutionalized or being deceased in a 10-year follow-up. The Longitudinal Aging Study Amsterdam had similar results concerning older people’s mortality in a mean 29 months follow-up (9). Feeling of loneliness was an independent predictor of death among coronary artery bypass surgery patients both in a 30-day and in a 5-year follow-up (10). The prevalence of loneliness has varied greatly across cultures (11–13). In Nordic countries, about one third of older people suffer from loneliness (14–16).

Loneliness has been defined as an individual’s subjective experience of a lack of satisfying human relationships (13). A person may feel lonely even if surrounded by other people (13). Although the terms loneliness, social isolation, and living alone are often used interchangeably, they are distinct—interrelated—concepts (17). Social isolation refers to the number of one’s social contacts and has been studied extensively, showing a prognostic significance similar to that of loneliness (18).

Older people are prone to feeling lonely. Losses tend to occur in old age. Retiring from work, the death of a spouse, and greater disability lead to reduced social integrity (11,18). Although loneliness and social isolation have been extensively studied in cross-sectional and longitudinal prognostic studies, less is known about whether loneliness and its harmful consequences may be relieved by interventions (19,20). Several randomized studies have been performed to relieve loneliness, and some group-based interventions have shown promise in reducing loneliness and improving social activity and well-being (20). A Swedish intervention study (21) used group meetings and discussions about health themes to alleviate loneliness among older people. However, the high number of dropouts was a
limitation of this study. Other group intervention studies (22,23) have used art experiences, exercise, and discussions to socially activate lonely older people. Although these studies have improved loneliness and well-being, they have not examined the effects of intervention on the health, use of health services, or mortality, all of which are well-known consequences of loneliness. Cattan and research colleagues (20) suggested in their review that group-based, goal-oriented interventions in which the participants are allowed to influence the content of the intervention are the most effective in alleviating loneliness. We hypothesized that by including the effective elements (group-based intervention, participants can influence the contents of intervention, goal-oriented work), a psychosocial group rehabilitation could improve older people’s well-being and health.

The aim of our study was to investigate the effects of a psychosocial group rehabilitation model on the subjective health, use and costs of health services, and mortality of elderly people suffering from loneliness.

METHODS

Settings: Rehabilitation Centers and Group Leaders

This multicenter study was performed in six communities and seven study sites throughout Finland. Six rehabilitation centers for World War II veterans and one day care center providing group psychotherapy implemented the psychosocial group rehabilitation in the study. Fourteen group leaders, one pair from each center, were chosen to implement the intervention. The professional backgrounds of the group leaders varied (specialized registered nurses, occupational therapists, and physiotherapists). Detailed training for group leaders included 9 days of seminars, writing diaries on each group meeting, and continuous tutoring of their work. Training included group dynamics, group leader’s skills, the significance of loneliness in old age, how to enhance participants’ empowerment, peer support, and adherence to groups as well as the aims and contents of intervention. Pitkala and associates (24) have previously described the details of this training.

Recruitment of Participants

In autumn 2002, a postal questionnaire was sent to a random sample of 6,786 older people (≥75 years) in six communities from the Finnish National Population Register, and resent 1 month later to those who had not yet responded. Of the sample, 5.1% were already deceased (statistical and postal delay), 10.5% were residing in permanent institutional care, and 26 addresses were unknown. The response rate among home-dwelling individuals (n = 5,722) was 71.2% (n = 4,113) (16). In this questionnaire we inquired, “Do you suffer from loneliness?” (1 = seldom or never, 2 = sometimes, and 3 = often or always). Those indicating that they had suffered from loneliness sometimes or often or always (n = 1,541) received a second questionnaire in which we inquired about their willingness to participate in group rehabilitation, their interests and hobbies, and their preferences for the content of the group intervention. Of them, 746 responded during the first round (Figure 1). Those excluded from the trial were older and more often women. They had more disabilities and suffered more often from dementia. About one in three refused participation when they heard about the intervention in detail. About 13% could not be contacted.

The volunteers were divided into three groups according to their preferences and interests: (a) art and inspiring activities, (b) exercise and health-related discussions, and (c) therapeutic writing and group psychotherapy. In five municipalities, only one type of intervention content was available. In these municipalities, we chose primarily those elderly individuals showing particular interest in the group content available. This was to ensure the participants’ commitment to the groups. It was more challenging to find people interested in therapeutic writing and psychotherapy groups than in the other groups. Therefore, we also recruited some participants outside the survey. These individuals (n = 11) were people who had sought the group psychotherapy center on their own and suffered from loneliness.

We telephoned potential participants and described to them the intervention and study protocol as well as the possibility of being chosen for the control group. At the first study, nurse assessment informed consent was obtained from each participant. The study was approved by Helsinki University Hospital ethics committee.

Inclusion and Exclusion Criteria

The inclusion criteria included being 75 years or older, having subjective feelings of loneliness, being home dwelling, and volunteering to participate in the group intervention. The exclusion criteria included moderate or severe dementia (Mini-Mental State Examination <19 points (25) or a Clinical Dementia Rating >1 (26)), living permanently in institutional care, blindness, deafness, or the inability to move independently without another person’s aid. We wanted to keep the groups as homogeneous as possible to ensure the equality of the participants. In the exercise and discussion groups, New York Heart Association Classification (27) classes 3 and 4 constituted additional exclusion criteria.

Design and Randomization

Participants were randomized in clusters of 16 people in each study site. This had to be done to form eight-person intervention group to the community where the participants came from. The participants with an interest in the same activity (exercise, art, or writing) were primarily invited in the same cluster. The groups started in a stepwise fashion in
different communities. After interviewing and assessing potential participants, the study nurse ended up with a list of 16 people fulfilling inclusion criteria in the order they had been assessed. A study nurse then called a person at a randomization center who did not know the identities of potential participants. The study nurse read the names from a paper list in the order that they appeared in her list. Participants were then randomly assigned to intervention or to continue in usual community care. Neither study nurse nor the person in the randomization center could influence the program because the randomization assignments appeared to the program only after the name and the participant number were input into the program (Figure 1).

Assessments

The study nurses interviewed and assessed the participants at baseline, at 3 months, and at 6 months. Demographic characteristics, diseases, and medications were recorded and their accuracy ensured from official papers and medical records. Comorbidity was assessed by the Charlson comorbidity index, a weighed index taking into account the number and severity of comorbid conditions (28). At the baseline, the participants’ blood pressure was measured using a mercury sphygmomanometer, with the participant in the sitting position after a 10-minute rest. In addition, their heights and weights were measured, and their body mass indexes (counted [weight/height\(^2\); \(\text{kg}/\text{m}^2\)). Depression was assessed by Montgomery–Åsberg depression scale (29). Baseline assessments were done 1–2 weeks prior to the intervention.

Subjective health was assessed at baseline and at 1 year using a 4-point scale (feeling healthy, quite healthy, unhealthy, very unhealthy). The answers were categorized as “healthy” (healthy or quite healthy) and “unhealthy” (unhealthy or very unhealthy).

The participants were asked about their use of health services, and data were also retrieved from local health care registers at 3, 6, and 12 months. Mortality data (100% complete) were recorded from central registers.

Intervention

The intervention groups met at the rehabilitation centers or group psychotherapy center once a week for 3 months 12 times altogether. Each group consisted of seven to eight elderly participants and two professional group leaders. Meetings lasted for 5–6 hours having objective-oriented and a predetermined program that the participants could modify.

![Flow chart of the study](https://academic.oup.com/biomedgerontology/article-abstract/64A/7/792/548576)
The participants were transported to group meetings and back by minibus. The group meetings included coffee breaks and lunches. Everything was free of charge for the participants.

Irrespective of the group content, the principles of psychosocial group rehabilitation intervention were the same in all groups, which was ensured by the common training of the group leaders. The professional group leaders aimed to enhance security and equal communication in the groups. By taking advantage of group dynamics and the normal maturation of a group cycle (Figure 2), they aimed to empower elderly individuals and promote friendships between them. They worked more as facilitators than as active leaders. The maturation of the group cycle helped the group members to experience the ups and downs of the new developing human relationships. From the first meeting, they started to build their own group spirit with their own humor. When gaining confidence toward each other, they started to share their feelings of loneliness and other sensitive matters. As the group matured and the relationships developed stronger, the group members also dared to be critical toward each other and there were also some conflicts between the members. Further on, the solved group problems led to even stronger bonds between the group members and to mutual responsibility. The intervention promoted the participants to share their experiences with people of their own age, discuss their feelings of loneliness, receive peer support, surpass their own limits, and develop feelings of solidarity. This in turn led to empowerment of the participants, better mastery over their own lives, and support for their self-respect. The details of intervention have been described elsewhere (30).

In the “art and inspiring activities” groups, various artists (musicians, actors, artists) attended the meetings, participants visited cultural events and sights, and also actively produced their own art. In the “exercise and health discussion” groups, the participants performed various exercises like Nordic stick walking in nature, strength training, swimming, or senior dancing. All activities were adjusted according to the participants’ condition. In the therapeutic writing groups, the participants wrote about their own lives and their loneliness. They shared their writings and experiences with their group members, and reminisced about their pasts.

Figure 2. Principles of the group intervention. Group leaders facilitated the natural maturation of a group cycle that helped the group members to get experience of the ups and downs of their new human relationships and to make new friends.
The three different group topics were consciously included in the intervention to be certain to interest many types of elderly people with various interests so that they could commit themselves to the groups. The common interests in the group also ensured that the participants could find their kindred spirit and potential friendships in the groups. All the groups were planned so openly that the group members always had an opportunity to influence the program of the meetings.

The control group was treated in usual community care. In addition, they met the study nurses three times in 2-hour assessment sessions in which they received special attention.

Outcome Measures

Assessments and interventions were performed during the year 2003. Mortality data were retrieved from central registers at the end of 2005, and their accuracy was ensured from medical records.

The intervention and control groups were compared with respect to changes in their subjective health from baseline to 1 year.

The use of health services was measured in detail from the baseline of each participant until the end of year 2004. They included all visits to the doctor’s office and days spent in various hospitals. These health care costs are valued at their average unit costs in Finland in 2001 (31) and are presented as a mean cost in Euros/person per year. All services were verified against official records, and all days spent in institutions during the 1-year follow-up were retrieved from patients’ medical records in all their area hospitals. We used intention-to-treat-method to analyze the results.

Statistical Methods

Sample size was based on the feasibility of the postal questionnaire to identify volunteer participants with an interest in the particular group content available at their community.

For the continuous variables, descriptive values were expressed by means with standard deviations (SDs), interquartile range, or range. For the variables with a normal (Gaussian) distribution, statistical comparison between the groups was made by using the t test or an analysis of covariance with baseline scores used as covariates. If the variables had a nonnormal distribution or ordinal level, statistical comparison between groups was made using the Mann–Whitney test, permutation test with Monte Carlo p value; and Hodges–Lehmann estimate of median difference with 95% confidence interval (CI) was used to show changes in the outcome variables. Measures with a discrete distribution were expressed as percentages (%) and analyzed by chi-square test, Fischer exact test, or Fischer–Freeman–Halton test when appropriate. The most important descriptive values were expressed with a 95% CI. However, distributions of health services costs were skewed, and 95% CIs for the means were obtained by bias-corrected bootstrapping (5,000 replications). The normality of variables was evaluated by Shapiro–Wilk’s statistics. Generalized estimating equations models were used to test changes over time in the subjective health between the groups. The Kaplan–Meier curve was used to illustrate information on the cumulative proportions of survival, and the difference between groups was tested by using a permutation-type logrank test. The Cox proportional hazard model was used to estimate adjusted risk for mortality between groups.

RESULTS

The mean age of participants was 80 years, and three in four were women (Table 1). Of the participants, 68% were widowed and four in five lived alone. The Charlson comorbidity index and the distribution of the major risk factors at baseline were similar (Table 1). During the intervention 2.5% of the participants from the intervention group dropped out from the group rehabilitation.

By the end of year 2005, 16 of the control participants had deceased, whereas the respective figure for the intervention participants was 7. Figure 3 shows survival curves in both groups (p = .042). Survival in the intervention group at 24 months was 97% (95% CI, 91–99) and in the control group 90% (95% CI, 83–95). (See Figure 3 for Kaplan–Meyer survival curve, p = .042, logrank test.) Age-, gender-, Charlson comorbidity index–, and cognition-adjusted hazard ratio for mortality in the intervention group was 0.39 (95% CI, 0.15–0.98) compared with the control group (p = .044).

Subjective health improved more often in the intervention group than in the controls during the 1-year follow-up period (p = .007) (Figure 4). The intervention groups also used fewer health care services than did the controls (Table 2). The total costs of health care services were 1,522 €/person per year (95% CI, 1,144–2,191) in the intervention group compared with 2,465 €/person per year (95% CI, 1,826–3,372) in the control group. The significant difference (−943 €/person per year; 95% CI, −1,955 to −127, p = .039) exceeded the total costs of the intervention, which were 881 €/person covering the group rehabilitation and the program costs, transportation, meals, and the education and tutoring of the group leaders.

DISCUSSION

In our study, the psychosocial group rehabilitation seemed to improve the health and to reduce mortality rate of older people suffering from loneliness. It was also associated with decreased costs of health services. All our health-related end points—subjective health, the use of health care services, and mortality—consistently showed the positive effects of our psychosocial group rehabilitation. To our knowledge, this is the first intervention trial to show that the deteriorating health effects of loneliness may be reversed by intervention which socially activates lonely, elderly individuals. Although
several promising studies on group interventions focused on lonely older people have demonstrated improved well-being, none of these prior studies have attempted to show the effects of group intervention on hard end points such as health, mortality, or use of health care services.

There are a number of prior epidemiological studies suggesting that loneliness (2,9,10,32) and social isolation (33–36) have deteriorating effects on health and survival of older adults. This first randomized, controlled trial showing the reversibility of this effect supports that there may be a true causal relationship between social isolation or loneliness and deteriorating health. Our results are in line with those prior corresponding intervention studies showing the favorable effects of group intervention on surrogate outcomes of health, for example, well-being and blood pressure (21–23,37).

The mortality curves of the intervention and control groups consistently diverged during the follow-up suggesting that the favorable effects of our intervention had a long-standing impact. In our other article, we showed that the psychological well-being of intervention participants improved and they made significantly more often long-standing new friendships than the controls (38). After 1 year, 6 from 15 of the original 8-person groups continued to meet independently on their own after the official intervention was over. This may explain why the beneficial effects on health and survival were prolonged. The profile of the use of health care services suggests a true improvement in the participants’ health because the use of hospitals decreased significantly. Hospital admission in Finland is a marker of a severe disease and disability. During the first half of the follow-up year, we also interviewed the participants concerning the use of district home nursing, which was used six times more among the controls than among the intervention participants. Because the official medical records do not give the exact number of district home nursing visits, we did not include these in our analyses of the use of health services.

Self-rated health has been shown in a number of studies to be a strong predictor of survival (39,40). Self-rated health shows a graded association with several health-related biomarkers (40). It is, however, a more comprehensive measure of health condition because it covers a spectrum of health conditions better than any biomarkers or diseases (40). Self-rated health improved significantly in the intervention group compared with the control group, supporting the fact that comprehensive health truly improved as a consequence of our intervention.

Table 1. Demographic Characteristics of the Participants (%)

| Characteristics                        | Intervention, N = 117 | Control, N = 118 | p Value |
|----------------------------------------|-----------------------|------------------|---------|
| Females, %                             | 74.4                  | 72.9             | .80     |
| Age in y, mean (SD) [range]            | 80 (3) [75–92]        | 80 (4) [75–90]   | .38     |
| Marital status, %                      |                       |                  | .64     |
| Married                                | 16.4                  | 19.5             |         |
| Unmarried, divorced                    | 15.5                  | 11.9             |         |
| Widowed                                | 68.1                  | 68.6             |         |
| Education, %                           |                       |                  | .42     |
| Primary school or less                 | 54.0                  | 48.7             |         |
| Living alone, %                        | 80.2                  | 78.8             | .79     |
| Economic status, %                     |                       |                  | .74     |
| Good                                   | 17.6                  | 14.2             |         |
| Moderate                               | 79.6                  | 82.1             |         |
| Poor                                   | 2.8                   | 3.8              |         |
| Mean points in depression scale* (SD)  | 9.0 (6.9)             | 10.0 (7.0)       | .23     |
| Able to move independently without walking aids | 92.3                  | 94.9             | .64     |
| Systolic blood pressure, mean (SD)     | 165 (23)              | 161 (24)         | .26     |
| Diastolic blood pressure, mean (SD)    | 87 (12)               | 82 (12)          | .02     |
| Body mass index, mean (SD)             | 27.1 (5.6)            | 25.8 (4.1)       | .23     |
| Mean number of drugs (SD) [range]      | 4.8 (2.7) [0–12]      | 4.9 (2.8) [0–12] | .78     |
| Hypertension                           | 49.6                  | 43.6             | .39     |
| Coronary heart disease                 | 32.4                  | 34.3             | .77     |
| Diabetes                               | 10.8                  | 16.5             | .23     |
| Prior stroke                           | 18.1                  | 16.1             | .68     |
| Osteoarthritis                         | 44.2                  | 54.8             | .13     |
| Mean Charlson comorbidity index† (SD)  | 2.1 (1.6)             | 2.1 (1.6)        | .90     |
| Mean MMSE‡ (SD) [range]                | 26.9 (2.4) [19–30]    | 26.6 (3.6) [19–30] | .51  |
| CDR§, %                                |                       |                  | .94     |
| Class 0                                | 76.1                  | 77.8             |         |
| Class 0.5                              | 6.0                   | 5.1              |         |
| Class 1                                | 17.9                  | 17.1             |         |

Notes: * Montgomery–Åsberg depression scale.
† Charlson comorbidity index (30).
‡ Mini-Mental State Examination (25).
§ Clinical Dementia Rating (26).
Why does this group intervention and social activation improve health? Several theories have suggested that social isolation contributes to impaired health including changing health behaviors, vascular hypothesis, stress theory, and weakening anabolic processes (3, 41, 42). The buffering effects of social support may explain the fairly rapid improvement on health through the neuroendocrinological system. Neuroendocrinological mechanisms may also be mediated through the immune system or by lowering blood pressure (22, 35, 42).

Which elements in the intervention worked toward health improvement? Cattan and colleagues (20) suggested in their review that lonely older people should receive group-based rather than individual-based intervention, and the participants should be able to influence the content of their intervention. We included these elements in our psychosocial group rehabilitation. We have made a careful process evaluation in this study by observing the group meetings, by reading and analyzing diaries of the group leaders, and by interviewing the participants and getting written feedback from them. This qualitative study shows that it is the intervention that worked in a very similar way empowering the older people and supporting their mastery (30). It is not the three activity types nor the group leaders’ attention but rather the peer support and groups dynamics that worked toward this aim. There is always an element of “placebo” in this kind of study how the participants receive attention. This could be observed how the control group also benefited from the study by improving their well-being and cognition, decreasing depression, and by alleviated loneliness (38).

The strength of this study is its theoretical model. We sought to empower elderly people to change their way of looking at life and at themselves: to change from a bystander to an active agent in their own lives. Penninx and associates (9) have shown that feelings of mastery predict decreased mortality. We trained the group leaders very carefully and intensively (24) including tutoring their work to ensure the uniform quality of the intervention. We paid particular attention to support the participants’ adherence to the groups because previous studies have had a high proportion of dropouts. Several studies on lonely elderly people have had a high numbers of dropouts, which have diminished the differences between the intervention and the control groups (21,43). In our study, only 2.5% of intervention participants dropped out. One participant did not start the group rehabilitation at all and two others discontinued after some.
was rather light, but it requires thorough training of the professionals and group leaders. The results of this study support the findings of previous epidemiological studies that health is interrelated with our social networks, stimulating activities, and active participation. It may be possible to reverse the deteriorating effects of social isolation and loneliness.

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**CONFLICT OF INTEREST**

The sponsors did not have any role in the design of study, neither in the collection, analysis, or interpretation of data, nor in the writing the report or in the decision to submit this article for publication. The authors were independent researchers from funders. The authors have no conflict of interest.

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**Table 2. Use of Health Services During the Follow-Up and Price per Unit**

| Services                          | Use in Units | Intervention Group (N = 117) | Control Group (N = 118) |
|-----------------------------------|--------------|-----------------------------|-------------------------|
| Days in primary hospitals         |              | 196                         | 823                     |
| Days at specialist hospitals      |              | 415                         | 444                     |
| Physician visits, units           |              | 856                         | 915                     |
| Ambulatory visits in specialist hospitals, units | | 183                         | 151                     |
| Total costs €/person/y (95% confidence interval) | | 1522 (1144–2191)             | 2465 (1826–3372)         |

*Note: * Price per unit is based on Hujanen (31).
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