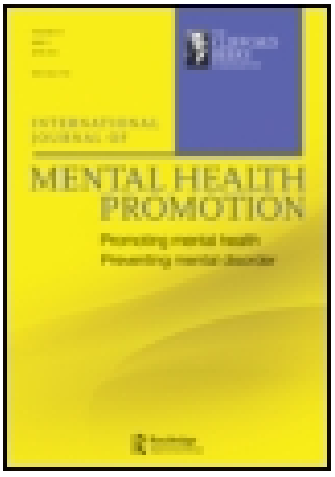

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Alleviating Loneliness among Frail Older People - Findings from a Randomised Controlled Trial

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Alleviating Loneliness among Frail Older People – Findings from a Randomised Controlled Trial

Keywords: loneliness; older people; rehabilitation; randomised controlled trial

Introduction

In order to improve older people's well-being and quality of life, tackling the issues of social isolation and loneliness is recognised in an international policy (WHO, 2002). Absence of social isolation and loneliness may be seen as a desirable state that older people wish to maintain. Social integration and participation of older adults in society are seen as indicators of productive ageing, and alleviation of loneliness forms a part of policies aimed at achieving the goal of 'successful' ageing (de Jong Gierveld, 1998).

Loneliness is defined as a state resulting from deficiencies in a person's social relationships. It is a subjective experience, and not synonymous with objective social isolation. The experience of loneliness is unpleasant and distressing (Peplau & Perlman, 1982). In addition, loneliness signifies a discrepancy between one's desired and achieved levels of social contact (Perlman, 1987). The experience of loneliness is distinct from social isolation. Although some studies have tried to distinguish these concepts, the results have been contradictory. On the one hand, loneliness has been associated with scarce contacts with close persons (Bondevik & Skogstad, 1998; Prince *et al*, 1998; Savikko *et al*, 2005), and on the other hand, it has not been associated with visits by children or friends (Dugan & Kivett, 1994; Fees *et al*, 1999). However, living alone is connected with loneliness (de Jong Gierveld & van Tilburg, 1999; Samuelsson *et al*, 1998; Yeh & Lo, 2004).

A B S T R A C T

Loneliness among frail older people predicts increased use of health services, early institutionalisation and increased mortality. The objective of this study was to determine the effects of a new rehabilitation model on loneliness among frail older people. This randomised controlled multi-centre trial with a 12-month follow-up was implemented in Finland. A total of 708 community-dwelling people aged 65+ years with progressively decreasing functional capacity participated. Participants were randomly allocated to the intervention group (n = 343) or to the control group (n = 365). The intervention consisted of a network-based group rehabilitation programme designed for frail older people. A 0.9-fold decrease in the proportion of participants feeling lonely was observed in the intervention group and a 1.1-fold increase in the control group. The results suggest that a physically orientated rehabilitation programme may reduce emotional loneliness.

Most estimates suggest that a majority (two thirds) of older people are not lonely (Andersson, 1998; Wenger & Burholt, 2004; Victor *et al*, 2005), but a high proportion of older people suffer from loneliness in Finland. More than a third of older people (65+) have been found to suffer from loneliness, of whom five per cent report feeling this way often or always (Savikko *et al*, 2005). Feelings of loneliness increase with age (Andersson, 1998; Victor *et al*, 2000), especially among people aged 75 or older (Samuelsson *et al*, 1998; Tijhuis *et al*, 1999). The increase in loneliness is not explained by age itself, but rather there is a complex web of underlying factors involving changes and losses in health (Wenger & Burholt, 2004; Victor *et al*, 2005), functional capacity (Andersson, 1998; Savikko *et al*, 2005; Wenger & Burholt, 2004) and social networks (Jylhä, 2004; Tiikkainen & Heikinnen, 2005; Wenger & Burholt, 2004). In addition, loneliness is associated with depression (Adams *et al*, 2004; Alpass & Neville, 2003; Prince *et al*, 1997), either as a cause or as a consequence. Loneliness contributes to increased use of health services (Ellaway *et al*, 1999), early institutionalisation (Russell *et al*, 1997; Tijhuis *et al*, 1999; Tilvis *et al*, 2000) and impaired survival (Penninx *et al*, 1997).

In a recent review of health promotion interventions designed to alleviate and prevent social isolation and loneliness (Cattan *et al*, 2005), it was found that group interventions were effective when they involved some form of educational or training input and social activities targeted to specific groups of older people. Although there are a wide range of services and activities intended to alleviate and prevent social isolation and loneliness among older people, many of them do not meet the actual needs of older people (Cattan *et al*, 2003).

Rehabilitation may be beneficial both by alleviating loneliness and by reducing some of the adverse effects of loneliness (Donaldson & Watson, 1996). First, during a rehabilitation programme, it is possible to develop a supportive network among the participants. Second, the rehabilitation professionals can strengthen the existing support systems of the participants by increasing their contacts with friends, neighbours and family, thereby affecting social loneliness. Third, the professionals may instruct the participants about how to gain access to the resources or organisations available to them.

In Finland, the municipalities are responsible for providing social and health services, including rehabilitation of the elderly. Rehabilitation is carried out partly by rehabilitation centres, which are independent of the general health care system. While rehabilitation after acute incidents is carried out in hospitals, the rehabilitation centres mainly serve individuals with chronic conditions. Since 1977, rehabilitation has been provided systematically for World War II veterans. At the same time, publicly funded rehabilitation centres were founded across the country. Since 2000, a rehabilitation programme designed to support community-dwelling frail older people's independent living has been in place. The programme is based on networking of private in-patient rehabilitation centres, the local offices of the Social Insurance Institution of Finland (SII) and the municipal social and health service providers. In order to explore the effectiveness of this new network-based model, a national randomised controlled multicentre research project, the AGE study, was initiated in 2002 (Hinkka *et al*, 2006).

To our knowledge, there are no earlier studies concerning the effect on loneliness of group rehabilitation of frail older people. The primary objective of the present report was to assess whether a network-based rehabilitation programme has an effect on emotional loneliness among community-dwelling older people at high risk of long-term institutional care.

Methods

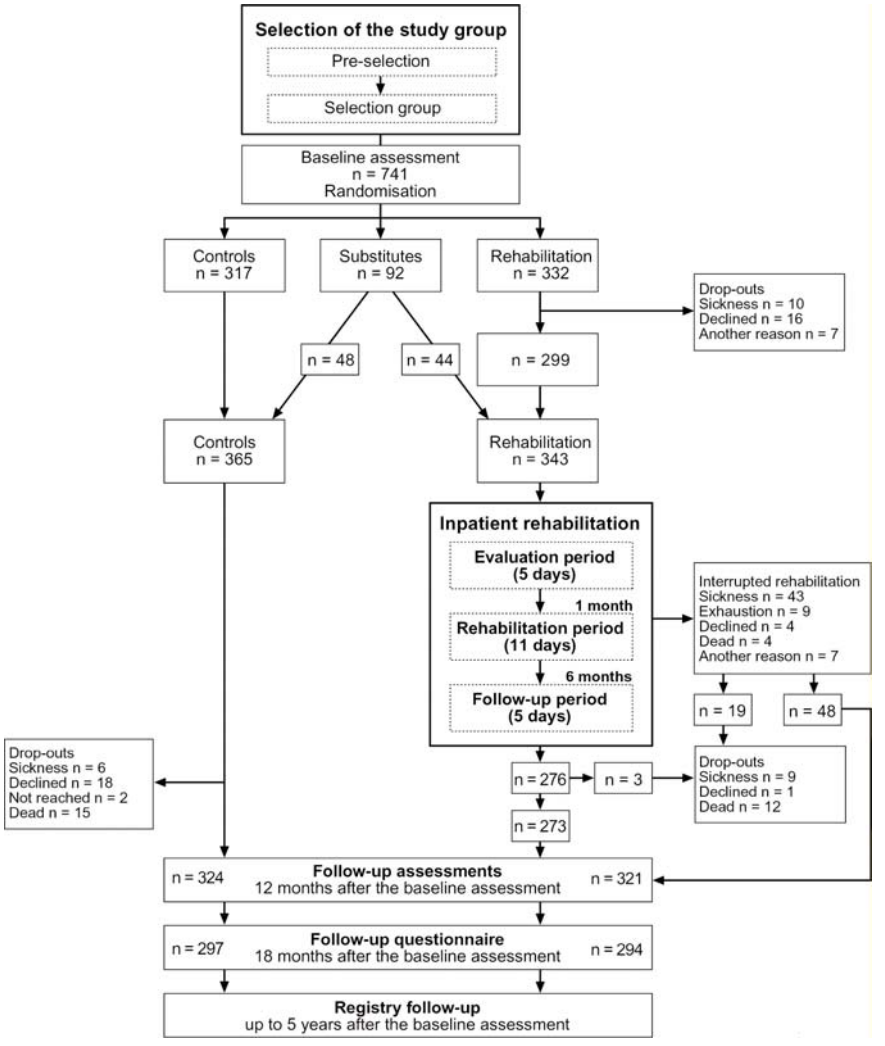
The Ethical Committees of the Social Insurance Institution of Finland and the Turku University Hospital approved the study protocols. The participants were informed in person, and they gave their written informed consent.

Participants

The trial was implemented in seven independent rehabilitation centres and 41 municipalities around Finland. All the municipalities and rehabilitation centres involved had previous experience of the group rehabilitation model. The participants were recruited through a two-phase standardised selection process between January and October 2002 (***Figure 1***, overleaf) (Hinkka *et al*, 2006). Representatives of the local social and health services in the municipalities made the preliminary selection according to written guidelines. Thereafter, the rehabilitation centre concerned and the local SII office jointly assessed the selected individuals' suitability for rehabilitation.

The goal was to recruit a representative sample of frail older persons aged over 65 years who, at enrolment, were living at home but faced a risk of institutionalisation within the next two years owing to their progressively decreasing functional capacity. As an indication of frailty, they had to meet the criteria of eligibility for the SII care allowance for pensioners (Kela, 2004). This benefit is granted to pensioners with a medical disability verified by a physician, and a verified need of assistance. The benefit is independent of

FIGURE 1 ***Flowchart of Participants in AGE Study***



the individual's other income. For this study, the exclusion criteria were:

- severely declined cognitive capacity (MMSE < 18 points (Folstein *et al*, 1975)
- acute or aggressively progressing diseases such as some cancers or heart diseases that would prevent participation in the group rehabilitation
- participation in some type of in-patient rehabilitation during the preceding five years.

The outcome, on which the power calculations were mainly based, was living independently at home after the five-year follow-up. The important difference estimated between the intervention and control group was 10% (50% to 40%, respectively). A type I error of 0.05 and power of 80% were used in calculations, resulting in a sample size of 305 in both groups. Based on these calculations, 44 rehabilitation groups were included. In order to ascertain the fulfilment of every intervention group, a substitute group was also created. If a person in the intervention group refused to participate in the rehabilitation, he or she was replaced by a substitute. The intention was to find 18 persons per rehabilitation group to be randomised to the intervention (n = 8), control (n = 8) or substitute (n = 2) group.

Altogether 741 older persons were recruited. After the baseline measurements, they were randomly allocated by the blinded examiners to the intervention (n = 332), control (n = 317) and substitute (n = 92) groups. The randomisation was based on numbered and sealed envelopes stratified by gender, using a computer random number generator. Each

municipality had its own envelopes containing, in random order, an allocation to one of the three groups. Of the subjects in the intervention group, 33 dropped out and were replaced by substitutes. An additional 12 substitutes filled up the rehabilitation groups, while the rest of the substitutes were integrated into the control group. The final study group consisted of 343 people in the intervention group and 365 in the control group. The drop-outs did not differ from the intervention group (Hinkka *et al*, 2006).

Intervention

The subjects in the intervention group participated in geriatric rehabilitation. The controls continued their normal life. The rehabilitation programme, which had been in use since 2000, was based on networking between the rehabilitation centres, the SII local offices, and the municipal social and health service providers (Hinkka *et al*, 2006; Ollonqvist *et al*, 2007). Since Finland is a sparsely populated country and the rehabilitation centres are often located far from the centres of the municipalities, an in-patient rehabilitation model was selected in preference to an outpatient rehabilitation model. The eight participants in each rehabilitation group came from the same municipality, and the groups kept together throughout the programme.

The rehabilitation consisted of three separate in-patient periods (***Figure 1***) at a rehabilitation centre within eight months. The evaluation and follow-up periods were individually orientated. The key members of the rehabilitation team (physician, physiotherapist, social worker, occupational therapist) met personally with the participants. In addition, these periods included group activities, most often physical activities (Ollonqvist *et al*, 2007). The actual rehabilitation period was based on group activities. Again, the main part of the group activities focused on physical activation such as exercises in a sitting position, pool exercises or resistance training in the gym. The participants also attended group discussions and lectures given by members of the rehabilitation team. The topics covered older people's life situation and possible problems, promotion of self-care, psychological counselling, discussions on medical aspects, information on social services and recreational activities. Individual counselling was provided when indicated. Usually the individual encounters involved physical therapy (Ollonqvist *et al*, 2007). The total time used for group activity varied from 20 to 56 hours, and individual counselling from four to 19 hours during the three in-patient rehabilitation periods, depending on the rehabilitation centre.

Data collection

Baseline measurements between February and November 2002 and the subsequent 12-month follow-up measurements (***Figure 1***) were carried out in the participants' home municipalities by three blinded independent examiners, who were qualified physiotherapists, specially trained to perform the measurements, and who had no role in the intervention (Hinkka *et al*, 2006).

The examiners checked a pre-mailed questionnaire and completed it together with the participant when needed. Living arrangements and type of dwelling were asked about. Loneliness was measured with three indicators. First, loneliness was assessed with the question 'Do you feel yourself lonely?' (0 = never, 1 = seldom, 2 = sometimes, 3 = often, 4 = always). Loneliness was categorised into two groups: 1 (lonely) = those who suffered from loneliness sometimes, often or always, and 2 (not lonely) = those who suffered from loneliness seldom or never. This question type has been used in population-based studies and has good predictive validity (Pitkälä *et al*, 2004; Routasalo *et al*, 2006; Tilvis *et al*, 2000). The second and third measures were derived from a multiple-choice question 'Does one of the following cause you insecurity?'. (Answer 'yes' to alternatives: loneliness, fear of being left alone). Participants' social network was assessed by asking the number of their relatives and friends, and their satisfaction with their engagement with their children.

Depressive mood was assessed using the shorter version of the Geriatric Depression Scale, GDS-15 (Sheikh & Yesavage, 1986; Yesavage *et al*, 1983), with a scale from 0 to 15 expressing the severity of the symptoms of depression; the higher the score, the more severe the depression. A questionnaire with a five-point Likert scale was applied to enquire about the participants' subjective health. Functional ability was assessed by asking about ability to move outdoors, using a three-point scale (1 = no difficulties, 2 = difficulties to perform, 3 = need of help).

Statistical analyses

Baseline characteristics and associations were compared between the groups using the *t*-test and the χ^2 test. In longitudinal studies, the repeated measurements of the same subject are correlated, and in order to take this into account, the generalised estimating equation (GEE) technique was applied in the analysis. Liang and Zeger (1986) introduced the GEE as a comprehensive and robust method of dealing with correlations when analysing data with generalised linear models. Using the SAS Institute's GENMOD procedure

(1993), it is possible to fit models to correlated data by the GEE method, and to apply different types of working correlation structures in calculations (Liang & Zeger, 1986; Lipsitz *et al*, 1994). The changes in loneliness, satisfaction with seeing children, number of friends, subjective health, depressive mood and ability to move outdoors were expressed with rate ratios and 95% confidence intervals (CI). CIs that do not include unity are statistically significant when $P < 0.05$. Intragroup and intergroup mean changes and 95% CIs of the numerical outcome variables were analysed using the general linear mixed model with analysis of variance for repeated measures (MIXED procedure).

In order to find variables that might explain the change in loneliness, the associations between changes in loneliness and changes in satisfaction with seeing children, number of friends, subjective health, depressive mood and ability to move outdoors were also studied. For the analysis, the subjects were divided into three groups according to the change in the variable in question: increased, no change and decreased. The associations were analysed using the χ^2 test or the Mantel-Haenszel χ^2 test. All statistical analyses were performed using the SAS for Windows package (SAS Institute). P-values below 0.05 were taken as evidence of statistical significance.

Results

Baseline characteristics

Baseline characteristics of the study groups are summarised in ***Table 1***, below. The mean age of all participants was 78 years (range 65–96 years); the majority of them were female (86%) and lived alone (72%). One third of the participants (28%) were feeling lonely. Participants had close relationships and frequent contacts with the members of their social network. The differences between the intervention and control groups were insignificant at baseline. A positive association with the three indicators of loneliness was found. In addition, loneliness was positively associated with satisfaction with seeing children, depressive mood and subjective health (***Table 2***, below).

Outcomes

At follow-up, no statistically significant change was observed in loneliness (***Table 3***, opposite). However, a 0.9-fold decrease was observed in the rate of participants feeling lonely in the intervention group, and a 1.1-fold increase in the control group. In addition, the rate of participants reporting

TABLE 1 ***Baseline Characteristics of the Participants (n(%) or mean ± SD)***

	Intervention (n = 343)	Control (n = 365)
Mean age (y) (SD)	78.1±6.6	78.6±6.6
Female (%)	290 (84.6)	318 (87.1)
Widowed (%	223 (64.7)	220 (60.3)
Living alone (%)	257 (74.9)	256 (70.1)
Feeling lonely (%)	97 (28.3)	100 (27.4)
Source of insecurity (%)		
Loneliness	105 (30.6)	94 (25.8)
Fear of being left alone	46 (13.4)	54 (14.8)
Satisfied with seeing children (%)	174 (57.2)	184 (58.4)
Number of friends (%)		
0	46 (13.4)	42 (11.5)
1–2	85 (24.8)	93 (25.6)
3–4	134 (39.1)	143 (39.3)
5+	78 (22.7)	86 (23.6)
Subjective health (%)		
Good	13 (3.8)	16 (4.4)
Average	229 (66.8)	234 (64.1)
Poor	101 (29.4)	115 (31.5)
Moving outdoors		
No difficulties	94 (27.4)	76 (21.0)
Difficulties	211 (61.5)	251 (69.3)
Not without help	38 (11.1)	35 (9.7)
Mean GDS score (SD)*	4.11±2.47	4.20±2.52

**Geriatric Depression Scale, range 0-15*

TABLE 2 ***Proportion (%) of Participants Reporting Levels of Loneliness by Age, and Variables Reflecting their Social Life and Health at Baseline***

	n	Loneliness: Not lonely	Loneliness: Lonely
Age, yrs (ns)			
65-74	214	74.3	25.7
75-84	339	69.9	30.1
85+	155	74.2	25.8
Satisfaction with seeing children***			
Yes	358	81.0	19.0
No	261	60.9	39.1
Number of friends*			
0	88	67.1	33.0
1–2	178	67.4	32.6
3–4	277	71.5	28.5
5+	164	81.7	18.3
Subjective health***			
Good	29	82.8	17.2
Average	463	77.1	22.9
Poor	216	60.2	39.8
Moving outdoors**			
No difficulties	168	82.7	17.3
Difficulties	463	69.3	30.7
Not without help	73	64.4	35.6
Depressive mood (GDS-15)***			
Yes (GDS-15>6)	584	40.3	59.7
No (GDS-15?6)	124	78.9	21.1

**** p <0.001; ** p <0.01; * p <0.05*

TABLE 3 ***Rate Ratios (95% CI) Describing the Changes in Variables Reflecting Feelings of Loneliness, Social Life and Health at Follow-up*** [‡]

	Intervention (n = 321)	Control (n = 323)	Rate ratio (RR=R1/R2)[#]
Feeling lonely	0.87 (0.68-1.10)	1.10 (0.84-1.44)	0.79 (0.55-1.14)
Source of insecurity			
Loneliness	1.28 (0.99-1.66)	1.33 (1.00-1.76)	0.96 (0.66-1.41)
Fear of being left alone	1.05 (0.71-1.56)	1.28 (0.88-1.85)	0.83 (0.48-1.42)
Satisfied with seeing children	1.01 (0.79-1.31)	0.93 (0.73-1.19)	1.09 (0.77-1.56)
Three or more friends	0.71 (0.55-0.90)	0.65 (0.51-0.82)	1.09 (0.77-1.54)
Poor subjective health	1.14 (0.87-1.51)	1.46 (1.12-1.91)	0.78 (0.53-1.15)
No difficulties in moving outdoors	0.88 (0.68-1.14)	0.75 (0.55-1.01)	1.18 (0.79–1.75)
Depressive mood (GDS–15>6)	1.00 (0.78-1.29)	1.54 (1.16-2.06)	0.65 (0.44-0.95)

[‡] The baseline reference is 1.00. Confidence intervals that do not include unity are statistically significant at the p <.05 level.
[#] R1 refers to intervention group, R2 to control group

loneliness or fear of being left alone as a source of insecurity was elevated in both study groups, but to a higher degree in the control group. During the follow-up, the number of friends decreased in both groups, while poor subjective health and depressive mood became more prevalent in the control group.

Next, the associations of the change in loneliness were compared with changes in satisfaction with seeing children, number of friends, subjective health, depressive mood and ability to move outdoors. The change in loneliness was also analysed in the different age groups (***Table 4***, below). The change in loneliness was associated with the change in

TABLE 4 ***Associations of Changes in the Level of Loneliness with Age Groups and Changes in the Variables Reflecting Social Life and Health by Study Groups during the Follow-up Period (%)***

	Change in feeling lonely					
	Intervention			Control		
	Increased (n = 79)	No change (n = 170)	Decreased (n = 71)	Increased (n = 16)	No change (n = 174)	Decreased (n = 77)
Age (yrs)						
65–74	15.8	55.5	28.7	18.6	63.9	17.5
75–84	25.0	51.9	23.1	24.2	51.0	24.8
85+	25.4	52.4	22.2	30.4	46.4	23.2
Satisfaction with seeing children*						
Increased	18.0	43.6	38.5	14.7	52.9	32.4
No change	22.6	54.8	22.6	22.4	57.1	20.5
Decreased	26.3	63.2	10.5	35.9	46.2	18.0
Number of friends						
Increased	14.8	56.8	28.4	28.0	45.3	26.7
No change	26.7	49.2	24.2	25.4	57.5	17.2
Decreased	23.2	54.5	22.3	19.6	55.4	25.0
Depressive mood (GDS-15)						
Increased	28.9	49.6	21.5	25.0	57.1	17.9
No change	22.9	54.3	22.9	18.3	52.1	29.6
Decreased	15.5	55.8	28.7	25.2	52.3	22.4
Self-rated health**						
Increased	15.0	50.0	35.0	23.4	53.2	23.4
No change	21.7	57.6	20.7	23.5	51.5	25.0
Decreased	31.6	40.4	28.1	25.3	59.5	15.2
Moving outdoors						
Increased	10.8	54.1	35.1	36.7	43.3	20.0
No change	21.1	53.5	25.4	21.8	55.5	22.7
Decreased	31.3	50.8	17.9	24.6	53.6	21.7

** Significant association in the whole study group (p = 0.0142)*
*** Significant association in the intervention group (p = 0.0330)*

satisfaction in engagement with children in both groups. Furthermore, the change in loneliness was associated with the change in subjective health in the intervention group.

Discussion

The aim of this study was to describe the effect of an in-patient group rehabilitation intervention on emotional loneliness among frail older people. Although the rehabilitation programme was physically orientated, a decrease in feelings of loneliness was observed. The decrease was still visible two to three months after the programme had been completed. Physical activity interventions have been shown to reduce feelings of loneliness in older people, but these improvements were reversed following the programme termination (McAuley *et al*, 2000). This suggests that it is not the exercise programme itself but rather the environment that provides social resources to buffer feelings of loneliness. However, in our study there was an association between improved subjective health and reduced feelings of loneliness in the intervention group, suggesting that the programme was effective. Loneliness has been reported to be a symptom of health problems (Victor *et al*, 2000; Victor *et al*, 2005).

The programme under study was implemented in groups whose members came from the same municipality. Besides the organised programme, the participants had the opportunity to spend time with other group members, for example during meals and in the evenings. The programme brought together older people in a way that enabled them to discover what they had in common. Unfortunately, it is not possible to conclude from our data whether the participants were actually able to make friends with each other. In a previous controlled study, loneliness among elderly women was reduced after participating in a programme that helped them to develop new friendships (Stevens & van Tilburg, 2000).

In our study, the number of friends decreased during the follow-up, but this was not associated with any change in loneliness. One explanation is offered by the selectivity theory (Carstensen, 1992), which suggests that older people actively narrow down their social interaction to the most meaningful contacts. If this is really the case, the question could be raised of whether or not it is even possible to establish a deeper, meaningful relationship during the few weeks of shared rehabilitation. It has also been shown that when people's social contacts decrease, the need to be engaged with others is also reduced (Perlman, 1988).

In contrast, the change in feelings of loneliness was associated with a change in satisfaction with seeing one's children. Consequently, this study confirms the findings of some previous studies suggesting that the unmet expectations of social relationships are important predictors of loneliness (Mullins & Dugan, 1990; Perlman, 2004; Routasalo *et al*, 2006). However, it does not support the previous finding that older parents' expectations of their children did not predict loneliness (Long & Martin, 2000).

The level of loneliness was defined by asking the participants directly whether they felt lonely. It has been shown earlier that, although older people with deficiencies in their relationships describe feelings and actions closely associated with loneliness, they do not always admit that they are lonely. In addition, older people are reluctant to admit to being lonely because of the stigma of social failure; to be alone and to feel lonely is to have failed in the eyes of society and oneself (Cattan *et al*, 2003). Consequently, use of explicit questions in which the term 'loneliness' is mentioned, in investigating loneliness, may result in under-reporting (de Jong Gierveld, 1998). In order to avoid this effect, loneliness in our study was measured with multiple questions.

The study sample consisted of old and frail individuals, and a few refused to participate in the study. As has been noted before (Andersson, 1985; Cattan *et al*, 2005; Stevens, 2001), we may wonder whether or not the truly lonely older people were reached at all, or whether they were the ones who refused to participate. In addition, the study sample is selected, and so the results can be generalised only to frail older people, not older people in general.

Assuming that the participants in our study were reluctant to admit that they were lonely and under-stated their feelings of loneliness, loneliness among them is actually quite extensive. Rehabilitation actions should be based on the participants' needs, which in this case would be avoiding loneliness. The programme, however, was physically orientated. Earlier studies have shown that older people are often treated as a homogeneous group, and little consideration is given to the specific or individual needs of socially isolated or lonely older people (Cattan *et al*, 2003).

The results of our study suggest that, in order to relieve loneliness and to prevent its negative predictive outcomes, it is not enough merely to seek to increase the number of social contacts of lonely older people, although this may have its benefits. Since satisfaction with social contacts was connected with feelings of loneliness, a greater understanding of the significance of having meaningful contacts seems to be important in caring for older people.

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