

Effects of Garden Visits on Long-term Care Residents as Related to Depression

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SUMMARY. Depression is a major health problem among the elderly. Its prevalence is high among those in long-term care. Exposure to the garden environment may alleviate depressive symptoms, but there is little research evidence to confirm this hypothesis. In this study we investigated the perceived effects and meanings related to garden visits among older individuals living in long-term care and assessed whether there are associations between experiences from garden visits and self-rated depression. Data were gathered by surveying 30 elderly people living in Kustaankartano, a nursing home and service center for elderly people in Helsinki, Finland. Prevalence of self-rated depression was high; 46% of the participants were depressed. Both being in the garden and seeing it from the balcony and observing nature were of great significance for most of the participants. For more than half of the participants, visiting the garden improved mood, quality of sleep, and ability to concentrate; it generated feelings of recovery and promoted peace of mind. Affective effects of visiting the garden tended to be more pronounced among the depressed than among those not depressed. The depressed did not consider social interaction and participation in social activities very important for their

well-being. Depression tended to be related to perception of the residents that they experienced hindrances and distresses associated with visiting the garden. Although there were indicative differences between the depressed and nondepressed participants in garden experiences, the results suggest that visiting the garden may affect the subjective well-being of both groups positively.

Depression is a major health problem among the elderly. It impacts negatively on the quality of life and major depression increases somatic morbidity and mortality (Blazer, 2003; Cohen, 2002; Pulska et al., 1997; Teresi et al., 2001). The prevalence of clinical depression among the elderly in long-term care is high. Estimates of major depressive disorder are 12.0% to 14.4% and for minor depression, 16.8% to 30.0% (Alexopoulos, 2000; Teresi et al., 2001). If nursing home residents with less severe, but yet significant depressive symptomatology, are included, about a half (44%) suffer from depression (Teresi et al., 2001). Medical illnesses, psychologically acute and long-term stresses, and impaired social support are predictors of late-life depression (Blazer, 2003; Kivelä et al., 1996).

There are reasons to suppose that experiences from garden environments and depression are associated among the elderly living in long-term care. Based on studies in environmental psychology, physical education, and geriatrics, it can be hypothesized that experiences from garden environments may affect depression positively by reducing stress, fostering exercise, enhancing emotional and psychological well-being, and providing access to social support.

The hypothesis that garden experiences may alleviate depressive symptoms or even prevent depression by reducing stress is based on the fact that stress is closely related to the etiology of depression (Kivelä et al., 1996). The stress-reducing effects of green environment and nature are well-established. In health care facilities, gardens offer a possibility for temporary escape and contribute to a sense of control, thus decreasing stress level (Cooper Marcus and Barnes, 1995). Viewing natural settings for only a few minutes causes a rapid recovery from

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stress symptoms (Hartig et al., 2003; Laumann et al., 2003; Ulrich et al., 1991). A strong inverse relationship has been found between the frequency of visiting urban open green spaces and the frequency of experiences of stress (Grahn and Stigsdotter, 2003).

Physical exercise may be another link between gardens and depression. Physical exercise is effective in reducing depressive symptoms (Pennix et al., 2002; Singh et al., 2001). Landscaped, accessible grounds may foster exercise by encouraging people to go out for a walk.

Favorable effects of nature on emotional and psychological well-being may enhance the mood and cognitive performance of the depressed. Negative feelings like guilt (Alexopoulos, 2000), apathy, anxiety, and cognitive deficits (Lenze et al., 2001) are symptoms of late-life depression. Visual exposure to nature may cause a positive mood change (Ulrich et al., 1991). In addition, people use natural environments for emotional self-regulation, especially in stressful situations (Korpela et al., 2001). There is evidence that the elderly living in long-term care feel themselves to be balanced and cheerful after visiting a park and their ability to concentrate is better than if they had spent time indoors (Otto and Grahn, 1998).

Lastly, gardens can be connected with depression as impacted by social support. Insufficient social support is associated with a high risk of depression (Kivelä et al., 1996). Gardens in health care facilities may increase social activity since they are places to be visited in the company of other people (Cooper Marcus and Barnes, 1995) and they provide safe places for social interaction (Ulrich, 1999).

The purposes of this study were to investigate the perceived effects and meanings related to garden visits among the older individuals living in long-term nursing care and to assess whether there are associations between experiences from garden visits and self-rated depression. In addition, aspects related to the accessibility of outdoor environment were investigated. We report the frequency of garden visits, perceived effects the residents related to visits, ratings of the importance of elements of garden, social interaction, and activities and associations of all these factors with the occurrence of self-rated depression.

Subjects

The study was conducted in Kustaankartano in Helsinki, Finland. Kustaankartano is a nursing home and service center for elderly people, with accommodation for more than 600 in either short- or long-term care. Kustaankartano consists of nine residential blocks for older people, who live mainly in single rooms. The residential blocks are scattered circle shaped in a landscaped area of 8 ha (19.8 acres). In the center of the area is a wide park with walking paths and a pond. The walking paths were mainly wheelchair accessible. As a result of a landscape planning competition held by the facility, an activity garden is being developed near the entrance of each residential building. During this study the building where the majority of the participants (20 long-term care people) lived had its own activity garden. All participants had a window view of, at the least, trees from their rooms.

The data were gathered from 30 residents living in two residential blocks (B and E houses) in July 2001. Charge nurses provided lists of the residents without major cognitive, hearing, or speech impairments who were capable of answering questions independently in the interviews. Three residents refused to participate. The mean age of the participants was 84 years (range of 70 to 98 years). One participant had a visual impairment limiting her ability to see bluish colors.

Measures

The Zung self-rating depression scale [ZSDS (Zung, 1965)] was used to assess depressive symptoms. Although ZSDS was designed principally to measure depressive disorder in middle-aged populations, its validity and reliability among the elderly are high (Kivelä and Pahkala, 1986; Kivelä et al., 1987). The scale is a self-administrative quantitative measure of depressive symptoms and it includes 20 either positively or negatively formulated items. The scale was used during the interview by one of the authors (E. Rappe). People scoring ≥ 40 raw total points were classified as depressed. All 30 participants took part in answering the items on the ZSDS, but four people missed one or more items, and total points were calculated for 26 people (24 women and two men).

In addition to the ZSDS, the

questionnaire included demographic variables (gender, age, length of stay in institutions, frequency of visitors), frequency of visiting the garden and its perceived effects, and the self-rated importance of elements of the garden, social interaction, and activities. The questionnaire comprised open-ended questions and scaled statements. Visiting the garden was defined as either visiting the garden or being on the balcony overlooking the garden. Visits to the balcony were included in the study since they enabled passive nature experiences. Subjective experiences of visiting were gauged using eight statements (concentration, balance, recovery, sleep, pain, medication, mood, and strain). In each statement participants could answer in three possible ways: agree, disagree, or cannot say. In the statistical analysis the answers were dichotomized, so that agree meant agreement, and disagree and cannot say implied disagreement. The self-rated importance of garden elements, social interaction, and activities were asked using 13 items (fresh air, exercise, other people, interaction, trees, shrubs, flowers, animals, observation, scents, sounds, activities, and calming down). Participants assessed each item on a scale: important, does not make any difference, not at all important. The answers were dichotomized in the analyses, except in the factor analysis, so that important meant agreeing with the importance and the two other answers meant disagreeing with the importance. The staff assessed functional abilities and dependency level of the participants on a scale from 1 = independent to 5 = bedridden and requiring help in all activities. According to assessments of the staff, 17 participants were ambulatory and 13 used some assistive devices for walking. None of the participants was bedridden. After all, when visiting the garden 19 participants were reported to use a wheelchair or other device. Some participants used assistive devices outdoors for safety reasons although they were able to walk at least short distances without them.

Analyses

The data were analyzed using descriptive statistics. Cross-tabulation, chi-square test, and *t*-test were used to test the significances of differences among the groups. In assessing the relationship between depression and

the frequency of visiting the garden, Spearman correlation coefficient was used. The small number of participants ($n = 30$) restricted the use of statistical methods. The items concerning the importance of garden elements, social interaction, and activities were subjected to principal component factor analysis. Factors with eigenvalues greater than 1.0 were selected for further analysis and rotated by varimax with Kaiser normalization. Factor loading of at least 0.500 was a criterion for item inclusion. If the item had a loading greater than 0.500 for more than one factor, it was included only in the factor for which its loading was highest. The emergent factors were analyzed for content and to judge the reliability of the factors, Cronbach's alpha coefficients were computed. All statistical analyses were conducted using PC-based SPSS (version 10; SPSS Inc., Chicago).

Results

FREQUENCY OF VISITING THE GARDEN. The participants visited the garden quite often. Sixteen participants visited the garden daily, at least in summer, and only one visited there only a few times annually. Twelve participants visited the garden throughout the year and 18 only in summer.

Those who felt that they got help to visit the garden when they wanted, visited there more often than those who did not feel that they were able to get help [$t_{(28)} = 2.145, P = 0.041$]. Participants who wanted to visit the garden more often than they did, felt that they did not get help to visit when they wanted [$\chi^2_{(1)} = 6.47, P = 0.011$]. Those who agreed that visiting the

garden enhanced sleep tended to visit outdoors more often than those who disagreed ($t_{(9,9)} = 1.547, P = 0.153$). The frequency of visits by relatives was not associated with the frequency of visiting the garden or with the feeling of getting help to visit.

HINDRANCES. Most of the participants (70%) reported experiencing one or more hindrances to visiting the garden. The most frequently mentioned problem was difficulty in getting assistance to visit. Circumstances related to weather conditions were the second most important problem. Slippery walks and snow in the winter, as well as cold and windy weather year round, were regarded as common hindrances. Aspects related to physical environment were mentioned less frequently; steep and uneven paths were a problem. Although participants were elderly, living in residential care, poor health was very rarely mentioned as a hindrance.

PERCEIVED EFFECTS OF VISITING THE GARDEN. Visiting the garden clearly affected mood (Table 1). Almost all participants felt themselves to be more cheerful and alert outdoors than indoors. Three out of four participants associated a feeling of recovery with visiting the garden. More than half of the participants felt that visiting the garden enhanced sleep, increased the feeling of balance, and promoted ability to concentrate. Fifty percent felt that visiting the garden decreased pain. About one-third felt that visiting the garden was burdensome. Visiting the garden had no effect on the use of medicines.

IMPORTANCE OF GARDEN ELEMENTS, SOCIAL INTERACTION, AND

ACTIVITIES. Various elements of garden were of great importance: for all participants except one it was important to see trees, flowers, and shrubs outdoors (Table 2). To observe and to smell nature, to get exercise and fresh air, to see other people and to calm down were the other aspects of going to the garden felt to be important by at least 80% of the participants. To see animals and birds (73.1%) was less important than to see plants, with this ranking third from the last. To listen to nature (76.9%), to interact with other people (69.2%), and to participate in activities (53.8%) were also felt to be somewhat less significant.

In the factor analysis for gauging the importance of garden elements, social interaction, and activities, four factors emerged that accounted for 73.95% of the total variance (Table 3). The items that had the highest loadings on the first factor were related to seeing plants and to calming down. This factor could be termed "recovery in the garden." The items that emerged as significant on the second factor referred to exercise and activities and to observation of animals, birds, sounds, and nature. The second factor could be termed "activities in the garden." The third factor contained two items related to the significance of fresh air and scents. It could be termed "freshness in the garden." In the fourth factor two items related to social interaction had the highest loadings. This factor could be termed "interaction in the garden."

TRENDS IN DIFFERENCES BETWEEN THE DEPRESSED AND THE NONDEPRESSED. Due to the small number of participants, differences between the

Table 1. The perceived effects of visiting the garden by residents of a long-term care facility. Percentage of the participants who agreed or disagreed with the statements in total study population and in study population classified as depressed or nondepressed by the Zung self-rating depression scale (cutoff point = 40).

| Statement | Total population (n = 26) | | Depressed (n = 12) | | Nondepressed (n = 14) | | P for differences between depressed and nondepressed |
|-----------------------------------|------------------------------|-----------------|-----------------------|-----------------|--------------------------|-----------------|--|
| | Agree (%) | Disagree (%) | Agree (%) | Disagree (%) | Agree (%) | Disagree (%) | |
| My concentration ability improves | 57.7 | 42.3 | 50.0 | 50.0 | 64.3 | 35.7 | 0.462 ^z |
| I feel more balanced | 61.5 | 38.5 | 75.0 | 25.0 | 50.0 | 50.0 | 0.248 ^y |
| I feel recovered | 73.1 | 26.9 | 58.3 | 41.7 | 85.7 | 14.3 | 0.190 ^y |
| I sleep better at night | 65.4 | 34.6 | 66.7 | 33.3 | 64.3 | 35.7 | 1.000 ^y |
| I feel less pain | 50.0 | 50.0 | 41.7 | 58.3 | 57.1 | 42.9 | 0.431 ^z |
| I use fewer medicines | 0 | 100 | 0 | 100.0 | 0 | 100.0 | --- |
| I feel more cheerful and alert | 84.6 | 15.4 | 91.7 | 8.3 | 78.6 | 21.4 | 0.598 ^y |
| Visiting the garden burdens me | 30.8 | 69.2 | 50.0 | 50.0 | 14.3 | 85.7 | 0.090 ^y |

^z χ^2 test was used to test the differences between depressed and nondepressed.

^yFisher's exact test was used to test the differences between depressed and nondepressed.

Table 2. The self-rated importance of garden elements, social interaction, and activities by residents of a long-term care facility. Percentage of the participants who agreed or disagreed with the statements in total study population and in study population classified as depressed or nondepressed by the Zung self-rating depression scale (cutoff point = 40).

| Statement— It is important for me: | Total population (n = 26) | | Depressed (n = 12) | | Nondepressed (n = 14) | | P for differences between depressed and nondepressed |
|--|------------------------------|-----------------|-----------------------|-----------------|--------------------------|-----------------|--|
| | Agree (%) | Disagree (%) | Agree (%) | Disagree (%) | Agree (%) | Disagree (%) | |
| To get fresh air | 84.6 | 15.4 | 91.7 | 8.3 | 78.6 | 21.4 | 0.598 ^z |
| To get exercise | 88.5 | 11.5 | 83.3 | 16.7 | 92.9 | 7.1 | 0.580 ^z |
| To see other people | 80.8 | 19.2 | 66.7 | 33.3 | 92.9 | 7.1 | 0.148 ^z |
| To interact with others | 69.2 | 30.8 | 58.3 | 41.7 | 78.6 | 21.4 | 0.401 ^z |
| To see trees | 96.1 | 3.9 | 91.7 | 8.3 | 100 | 0 | 0.462 ^z |
| To see shrubs | 96.1 | 3.9 | 91.7 | 8.3 | 100 | 0 | 0.462 ^z |
| To see flowers | 96.1 | 3.9 | 91.7 | 8.3 | 100 | 0 | 0.462 ^z |
| To see animals and birds | 73.1 | 26.9 | 75.0 | 25.0 | 71.4 | 28.6 | 1.000 ^z |
| To observe nature | 84.6 | 15.4 | 83.3 | 16.7 | 85.7 | 14.3 | 1.000 ^z |
| To smell nature | 80.2 | 19.2 | 66.7 | 33.3 | 92.9 | 7.1 | 0.148 ^z |
| To listen to nature | 76.9 | 23.1 | 75.0 | 25.0 | 78.6 | 21.4 | 1.000 ^z |
| To participate in activities | 53.8 | 46.2 | 41.7 | 58.3 | 64.3 | 35.7 | 0.249 ^y |
| To calm down and to enter into own thoughts | 80.8 | 19.2 | 83.3 | 16.7 | 78.6 | 21.4 | 1.000 ^z |

^zFisher's exact test was used to test the differences between depressed and nondepressed.

^yχ test was used to test the differences between depressed and nondepressed.

Table 3. Factor loadings^z for the importance of garden elements, social interaction, and activities derived from the ratings of residents of a long-term care facility. An item's highest loading is given in bold type.

| Item | Factors by name | | | |
|--|------------------------------|--------------------------------|-------------------------------|---------------------------------|
| | 1. Recovery in the garden | 2. Activities in the garden | 3. Freshness in the garden | 4. Interaction in the garden |
| Fresh air | 0.012 | -0.019 | 0.789 | 0.102 |
| Exercise | 0.049 | 0.644 | -0.159 | 0.281 |
| See other people | 0.154 | 0.052 | 0.166 | 0.917 |
| Interaction | 0.201 | 0.269 | 0.201 | 0.728 |
| Trees | 0.879 | 0.139 | 0.074 | 0.293 |
| Shrubs | 0.736 | 0.369 | 0.444 | -0.034 |
| Flowers | 0.736 | 0.369 | 0.444 | -0.034 |
| Animals and birds | 0.053 | 0.724 | 0.454 | 0.032 |
| Observe nature | 0.510 | 0.713 | -0.110 | 0.090 |
| Scents of nature | 0.147 | 0.104 | 0.733 | 0.381 |
| Sounds of nature | 0.321 | 0.799 | 0.158 | -0.034 |
| Participation in activities | -0.176 | 0.569 | 0.102 | 0.391 |
| Calming down and entering into own thoughts | 0.823 | -0.087 | -0.134 | 0.143 |
| Proportion of variance (%) | 23.22 | 21.50 | 14.80 | 14.43 |
| Cumulative proportion (%) | 23.22 | 44.72 | 59.52 | 73.95 |
| Cronbach's alpha | 0.830 | 0.753 | 0.530 | 0.752 |

^zExtraction method was principal component analysis; rotation method was varimax with Kaiser normalization, rotation converged in nine iterations.

depressed and the nondepressed could not be determined using statistical tests; only trends in differences are described, with the exception of differences between depressive symptoms.

The prevalence of depression was high; 46% scored 40 total points or more, as determined by the sum score of the ZSDS. Poor self-rated health was related to depression. Half of the depressed participants assessed their

health to be poor, whereas all the nondepressed considered their health to be good. Two-thirds of the depressed felt that they did not get help to visit the garden when they wanted, whereas only one-third of the nondepressed felt the same. Depression was not associated with age, duration of institutional care, functional abilities, or frequency of visits by relatives.

For depressed people, several items

on the ZSDS were scored higher than for nondepressed people. There were significant differences in *t*-test between the depressed and the nondepressed in terms of confusion ($P = 0.000$), retardation ($P = 0.000$), hopelessness ($P = 0.000$), indecisiveness ($P = 0.003$), personal devaluation ($P = 0.005$), emptiness ($P = 0.005$), dissatisfaction ($P = 0.004$), and fatigue ($P = 0.011$).

The negative correlation coef-

ficient (Spearman's $\rho = -0.132$) between ZSDS total points and the frequency of visiting the garden indicate that high frequency of garden visits may be associated with low depressive symptomatology. However, depression did not seem to affect the frequency of visiting the garden, although the depressed experienced hindrances to a greater degree than the nondepressed. Over 80% of the depressed experienced some hindrances related to visiting the garden, whereas the percentage of the nondepressed feeling the same was 50%. After all, the experienced hindrances had no effect on the frequency of visiting of either group. The season of visiting was not related to depression.

Some trends were noted in comparing the subjective experiences of the depressed with those of the nondepressed. There was a tendency that a greater proportion of the depressed felt more balanced and more cheerful and alert after visiting the garden (Table 1). However, visiting the garden tended to burden the depressed more heavily than the nondepressed. For the depressed there tended to be fewer positive affects on recovery, concentration ability, and pain from visiting the garden than for the nondepressed.

Some trends were noted also in comparing the self-rated importance of garden elements, social interaction, and activities between the depressed and the nondepressed. The depressed tended to consider getting fresh air more important than the nondepressed (Table 2). However, they tended to consider seeing other people, interacting with other people, participating in activities, and smelling nature less important than did the nondepressed.

Discussion

Earlier studies showed that plants and residential landscapes are important for elderly individuals (Browne, 1992; Rappe and Evers, 2001; Stoneham and Jones, 1997). Accordingly, in this study plants and observation of nature were found to be very important for elderly people living in long-term care.

Visiting the garden was associated with enhanced emotional well-being. The positive effect of seeing green environment on mood was obvious. Four out of five participants felt that visiting the garden enhanced mood. The results of the factor analysis of the

importance ratings are in accordance with findings that nature is used for emotion regulation (Korpela et al., 2001). The main factor in the factor analysis contained items related to plants and to calming down. This suggests that the participants associated emotion regulation with plants. Although "observing nature" had a higher loading on the second factor (activities in the garden), its loading on the first factor (recovery in the garden) was quite high (>0.5). Moreover, the loading of the item "participation in activity" was negative on the first factor and positive on the second factor. It suggests that for this group observation of plants is passive and provides space for reflection, which is important for emotion regulation.

The participants considered the opportunity to get exercise as significant. They visited the garden mostly alone or in the company of a helping person. The main hindrance to visiting the garden was unavailability of assistance. The experience of getting help to visit garden when wanted was positively associated with the frequency of visiting the garden. This suggests that the frequency of visiting the garden is dependent on the availability of assistance in residential care. The positive association between the frequency of visiting the garden and the feeling of enhanced sleep may be associated with the intention of the participants to promote their well-being by visiting the garden. By means of landscape planning, it is possible to minimize obstacles to walking and need for assistance and to promote physical exercise.

Social interaction and participation in activities were less significant for the participants than individual experiences. The importance of privacy is emphasized in residential care. Possibilities for personal choices in experiences are more marked outdoors than indoors. Lennartsson and Silverstein (2001) suggested that nonsocial aspects of activities might promote health and longevity in late old age.

The results of this study confirm the observation that the prevalence of depressive disorders is high among the elderly, especially those in long-term care (Pahkala et al., 1995; Teresi et al., 2001). The tendency that the depressed felt visiting the garden to promote more strain and that they did not feel to be recovered to the same degree as the nondepressed may be

the consequence of fatigue and poor health associated with depression. A favorable affective response resulting from visiting the garden seemed to be more obvious among the depressed than among the nondepressed. Visiting the garden may represent a temporary escape from stressful, anxious feelings and alleviate depressive symptoms.

The result that the depressed considered interaction with other people and participation in activities less important than the nondepressed, deserves attention. In long-term care the elderly are often encouraged to socialize with other residents, which is self-evidently considered to promote their well-being. For example, various horticulture activity programs are recommended to prevent social isolation of the elderly living in long-term care (Barnicle and Midden, 2003; Mackenzie et al., 2000). The symptoms of the depressed reflected the feelings of loss of self-esteem and fatigue. Social interaction may result in elevated stress levels if the elderly have doubts about their coping skills. In order to support social interaction and participation in activities, adequate physical and psychological support must be provided for the depressed elderly.

Due to the small number of participants in the survey, the results are only indicative and differences established between the depressed and the nondepressed represent preliminary findings. The subjects of this study were the elderly without severe impairments in cognitive functions, but they did have various other health problems. Therefore, some caution is required concerning the reliability of information they provided. For example, the data for the frequency of visiting the garden was gathered by asking the participants and no independent observations were made to confirm the information. In this study no information about the time spent outdoors was canvassed, which may affect the experiences related to visiting the garden.

Few studies have focused on the effects of visiting the garden on the well-being of the elderly living in long-term care. Even if these visits seem to have beneficial health effects according to existing studies, further research is needed to confirm the results and gain a deeper understanding of the effects of the green environment on health. Visiting the garden involves

not only exposure to trees and flowers but also a change in environment, outdoor light, and social contact that may have health-related effects. How these factors interact with green environment merits more research. In many long-term facilities, visiting the garden is too demanding for physically impaired elderly people. The reasons why depressed people felt that visiting the garden was strenuous and did not feel recovered after it merit more research. Information about the perceived obstacles and how to overcome them would increase the possibilities for the elderly to visit outdoors.

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