DIFFERENCES IN MOOD BETWEEN ELDERLY PERSONS LIVING IN DIFFERENT RESIDENTIAL ENVIRONMENTS IN SLOVENIA

Estera Žalik & Bojan Zalar

University Psychiatric Clinic, Ljubljana, Slovenia

SUMMARY

Background: *Mood disorders are an important health risk factor in the elderly population. Studies on the relationship between residential environment and elder's psychological wellbeing show the worst psychological status results in institutionalized subjects. To elucidate this relationship in Slovenia, we compared cognitive functioning and the levels of anxiety and depression of Slovenian elders among different residential arrangements.*

Subjects and methods: *The subjects were recruited from elderly clubs (EC; living at home; n=32), elderly day care centers (EDC; living at home; n=22), and elderly homes (EH; institutionalized; n=49). All were female, 65-80 years of age and matched for their duration of education. We compared the cognitive status (Mini Mental State Examination) and the levels of depression and anxiety (Zung self-rating depression scale inventory, Zung self-rating anxiety scale inventory) among the three groups. For statistics ANOVA, MANOVA, and ANCOVA were used.*

Results: *The EDC group showed the highest levels of anxiety, depression and cognitive decline compared to the EC and EH groups, with no statistically significant differences between the EC and EH groups did not differ significantly in these respects. Controlling for the cognitive status revealed that general cognitive functioning and residential environment did not exert their influence directly on the depression level, but rather through their interaction. Regarding anxiety levels, after controlling for the cognitive status no significant differences were found between the study groups.*

Conclusions: *In terms of anxiety and depression among Slovenian elders without or with moderate cognitive decline, home environment may be favored versus institutionalization. Visitors of EDC should probably receive more attention to their psychological wellbeing, including possible earlier transfer to EH.*

Key words: *anxiety – depression - cognitive function – elderly - residential environment – Slovenia*

Legend of abbreviations:

EC	Elderly clubs	ANCOVA	Analysis of covariance
EDC	Elderly day care centers	MMSE	Mini Mental State Examination
EH	Elderly homes	DSI	Zung self-rating depression scale inventory
ANOVA	Univariate analysis of variance	ASI	Zung self-rating anxiety scale inventory
MANOVA	Multivariate analysis of variance		

*   *   *   *   *

INTRODUCTION

In older adults, mood disorders, i.e. anxiety and/or depression, represent an increasingly important health and sociological problem (Beekman et al. 2000, Alexopoulos 2005). The prevalence of anxiety and depression disorders in these individuals is strikingly underestimated due to the ingrained belief that mood changes in the elderly are a natural consequence of the ageing process and a normal reflection of alterations in elderly health status and losses in their social sphere (altered social roles, illness and death of peers). Because of such viewpoints and attention dominantly focused on their physical health, mood disorders in the elderly often remain unrecognized and untreated (Golden et al. 2009). Untreated anxiety and depressive disorders significantly impact the development and degree of dementia (Korczyn & Halperin 2009, Annerieke et al. 2010). Furthermore, they represent a significant risk factor for higher general morbidity and mortality at older age (Lenze 2003, Alexopoulos 2005).

Mood disorders in the elderly distinctly reduce self-evaluated quality of life and levels of self-reliance, and this is also reflected in a higher percentage of inclusion of such individuals in institutional care (Bruce et al. 2002). In view of all these considerations, early diagnosis and appropriate treatment of anxiety and depression in older adults are of significant importance. The depressive disorder is the most common psychiatric disorder in the elderly, with a prevalence of 15% in people aged over 65 (Alexopoulos 2005). Prevalence estimations of anxiety disorders among older adults range between 5.5% and 10.2% for the general elderly population. It is believed, however, that the true prevalence of mood disorders in this population is in fact much higher (Manela et al. 1996, Schoevers et al. 2005). Anxiety and/or depression symptomatology in the elderly is often atypical and shows a substantial level of somatization as well as overlap with symptoms of many common somatic dysfunctions and diseases characteristic of old age, all of which makes the recognition of mood disorders in such individuals difficult

(Trivedi 2004, Vink et al. 2008). The prevalence of depression and anxiety disorders remains relatively stable with ageing, but the pattern of risk factors for these conditions changes. While in younger persons factors such as family and personal history of mental disorders are more influential, with ageing there is an increasing impact of an individual's health status, cognitive decline and strength of their social network (Cohen 2004). Nevertheless, family and/or personal history of psychopathological symptoms as well as differences in coping strategies still represent important risk factors in older age as well (Bruce et al. 2002).

An important risk factor affecting early diagnosis and appropriate treatment of mood disorders in older adults is their residential environment, as it affects psychological, sociological and physical factors that crucially contribute to an elder's wellbeing (La Gory 1992, Golden et al. 2009). The most important protect-tive environmental factors, which may prevent or postpone the onset of mood disorders in the elderly, comprise a good social network with positive social and emotional support from a person's partner, family member and peers, as well as organized social help, through which the elderly can create their own positive and valuable social role. While the marital status was traditionally considered an important factor affecting the appearance of depression in the elderly (Beekman et al. 2000), recent studies have found that especially in elderly women this factor has no significant influence on mood (Jang et al. 2009, St John & Montgomery 2009). Furthermore, older individuals were shown to benefit from residential environments in which the highest possible level of self-reliance may be achieved (Areán & Reynolds 2005, Golden et al. 2009). The environment chosen for elderly individuals depends on many factors: their marital status, financial and health status, size and structure of the family, family values, and the actual level of the person's self-sufficiency and independence, as well as access to social services and organized social assistance, all of which simultaneously affect the mood of the elderly population as well as the mood of their family members or caregivers, in line with the need for institutional care (Gallagher et al. 2009, Lee 2010).

Depending on the level of an elder's self-reliance and independence, different types of care are provided, and this is reflected in the type of his or her residential status. Independent elders are able to take care of their daily activities and health by themselves; they perform those actions that are necessary to protect their human integrity, physical and mental functioning, and development within the norms essential for promoting life, health and wellbeing (Železnik 2007). In Slovenia, many such elders are members of elderly clubs (EC). Within the scope of EC, varied entertainment, educa-tional and social activities are organized. The main focus of EC activities is to maintain an appropriate level of the residents' psychophysical fitness, independence and social ties, while special medical, social or nursing services are usually not included. Impaired elders on the other hand depend on the help of others and live either in elderly homes (EH) (institutional care facilities) or at home, where care is provided by their family members. On workday mornings, the elders residing in their home environment can visit the local elderly day care center (EDC). The majority of EDC operate within the pre-mises of EH, where visitors (together with EH residents) can engage in various social activities. However, the main purpose of EDC is to provide organized meals and transport (to the EDC and back home), as well as to offer professional medical, nursing and social security assistance (Voljč 2009).

With the transition to postmodern society, earlier emancipation of younger generations, and changes in family structure, care for the elders has been increa-singly transferred from individual to the state level (Grenade & Boldy 2008). However, studies on the rela-tionship between the residential environment and psycho-logical wellbeing of older adults have revealed that home environment is in favor against various types of institutionalization (Stanley & Beck 2000, Pawlinska-Chmara 2005, Karakaya et al. 2009).

Even so, there are significant differences between individual countries regarding the factors affecting mood in the elderly in view of both individual circum-stances (e.g., social network, financial situation, health status, structure of core families) and the state social system (e.g., different social value systems, varying economic circumstances, the organization and services of social institutions) (Grenade & Boldy 2008). The findings of foreign epidemiological studies on the relationship between mood disorders and residential environments in the elderly are therefore not easily transferable between different social systems. To elu-cidate this relationship in the Slovenian elderly population, our aim was to compare general cognitive functioning as well as anxiety and depression symptom-matology between three groups of elderly persons: members of EC living at home, visitors of EDC living at home, and residents of EH institutions.

SUBJECTS AND METHODS

Subjects

The study included a total of 103 elderly residents of Ljubljana, Slovenia: 32 members of elderly clubs living at home (EC), 22 subjects living at home and visiting elderly day care centers (EDC), and 49 residents of elderly homes (EH). The study was conducted in the period between May and August 2009. All subjects were females and were matched in terms of age (the average age in the EC group was 71.16 years (SD 4.32), in the EDC group it was 73.86 (SD 5.34) and in the EH group 72.88 (SD 5.38) (F=1.87; p=0.16)) and years of education (the average in the EC group was 11.27 years (SD 2.61), in the EDC group it was 11.15 years (SD 2.51) and in the EH group 12.5 years (SD 3.34)

(F=0.18; p=0.835)). All participants in the EC group were married, while the participants of the other two groups were all widowed.

EC offer a variety of services intended to ensure more active participation of individuals in their social environment and maintenance of their psychophysical fitness. Their members are vital elderly persons who have many plans and are eager to participate in various activities in a desire to overcome isolation and social exclusion. The majority of EC activities are organized by the elderly persons themselves.

EDC are a more recent form of institutional care in Slovenia and are intended for relatively dependent elderly persons with increasingly declining psycho-physical condition. The centers are open on workday mornings and provide day care for the time when the elder's caregivers have other obligations. They mainly operate within the premises of EH and provide organized meals and transport, in addition to various professional medical and social security services. They also offer activities which enable the maintenance and improvement of self-care as well as intellectual, physical and social skills. In Slovenia, not much care of this type is available compared to foreign countries.

In EH, elders live in suitable single or double rooms or dorms with toilets, bathrooms and common areas. EH residents are provided with organized and appropriately adapted nutrition, as well as medical, nursing and social services. Also, many organized and individual entertain-ment and social activities are available (Voljč 2009).

Our inclusion criteria were as follows: female gender, age between 65 and 80, residing either in home environment and being a member of EC, or residing in home environment and visiting EDC, or being a resident of an EH. In the case of the latter, only those residents who had decided to live in an EH by themselves, had been living there for at least one year, and could per-form their daily routine on their own without needing any direct personal assistance, were included in the study.

The exclusion criteria were as follows: occurrence of a recent stressful event, poor social network (i.e., with-out at least one close interpersonal relationship), perso-nal or family history of psychiatric disorders and/or severe brain injuries, administration of psychoactive drug treatment, diagnosis of sleep disorders, severe sensory impairment or unstable somatic status. Elderly subjects having the clinical diagnosis of severe dementia confirmed with imaging techniques were also excluded, as were those who reached a score of 10 or lower on the Mini Mental State Examination (MMSE), since the results obtained using self-assessment questionnaires in subjects achieving MMSE scores below 10 are not valid for the application of statistical analysis (Feher et al. 1992, Trigg et al. 2007).

All participants signed an informed consent form after being provided appropriate oral information. The study was approved by the National Medical Ethics Committee of the Republic of Slovenia.

Methods

The demographic data, data on marital status, recent stressful events and the subject's current and past health status (i.e. personal and family history), as well as data on the use of psychoactive substances were collected through structured interviews. The interviews and all tests required for the study were performed by a qualified clinical psychologist in a quiet ambulatory environment. The intensity of depression and anxiety symptoms was assessed using the Zung self-rating depression scale inventory (DSI) (Zung 1965) and the Zung self-rating anxiety scale inventory (ASI) (Zung 1971), while a rough evaluation of cognitive impairment was obtained using the Mini Mental State Examination (MMSE) (Folstein et al. 1975). Zung DSI and ASI each comprise an evaluation of 20 depression and anxiety symptoms and signs in an ascending numerical manner (each item scores from 1 to 4 points), with higher scores reflecting higher intensity of the relevant sympto-matology. The MMSE is a brief, 30-point screening test for the quantitative evaluation of cognitive impairment, comprising simple questions and problem-solving tasks. A total score of ≥25 points on the MMSE indicates normal cognitive functioning. Scores below this value can indicate mild (21-24 points), moderate (10-20 points) or severe (≤9 points) cognitive impairment.

The statistical analysis was performed using the SPSS 13.0 statistical software. The variables were ana-lyzed using multivariate or univariate analysis of variance (MANOVA, ANOVA), enabling us to test the null hypothesis by estimating the likelihood of the differences in mood between the three residential groups being due to chance. Post-hoc analysis was performed to determine the source of the 3-way interaction significance, by simple comparison of means using individual-sample t-tests. The Bonferonni correc-tion was applied for multiple comparisons. A 5% significance level was established as the threshold for statistical significance in the analysis. To establish whether the between-group differences in mood could have been due to different levels of general cognitive functioning in individual study groups, an analysis of covariance (ANCOVA) was performed, controlling for MMSE scores. The assumptions necessary for carrying out an ANCOVA were checked. Testing for the normal distribution of the covariate (MMSE scores) was performed using the Shapiro-Wilk test due to the low number of subjects per group (N<50). For each individual group, the analysis confirmed a normal distribution of scores (Shapiro-Wilk (EDC)=0.916; p=0.063; Shapiro-Wilk (EC)=0.952; p=0.166; Shapiro-Wilk (EH)=0.960; p=0.094). Additionally, the assumption of linearity between the covariate and independent variables (depression and anxiety scores) was confirmed (F=16.08; p<0.001 for DSI; F=7.48; p=0.008 for ASI). Moreover, the assumption of homogeneity of variance was confirmed for scores on the DSI, ASI, and MMSE tests (W=1.891; p=0.156 for

DSI; W=1.230, p=0.297 for ASI; W=1.048; p=0.355 for MMSE). However, the assumption of the independence of the covariate was violated (F=162.10; p<0.001), hence, as recommended by Miller & Chapman (2001) and Field (2009), a method of contrast on adjusted means was used to control for the differences between the groups as a result of their MMSE scores.

RESULTS

Depression symptomatology

Comparison of the intensity of Zung DSI depression symptoms between all the three study groups showed a statistically significant difference (F=7.27; p=0.001). Post-hoc tests using individual sample t-tests to elucidate the source of the difference between groups showed a significant difference in the intensity of depression symptomatology between the EH and EDC groups (t=2.37, p=0.02), as well as the EC and EDC groups (t=3.35, p=0.01). In both cases, the EDC group achieved higher scores (Mean, M (EDC)=36.8 (Standard deviation, SD 9.34); M (EC)=29.3 (SD 6.51); M (EH)=31.3 (SD 6.28)). The comparison of the EH and EC groups showed no significant difference in this respect (t=1.41, p=0.17). In all cases, the Levene test for homogeneity of variances was not significant, hence justifying the use of parametric statistics. Comparative results regarding the intensity of individual depression signs and symptoms are shown in Table 1.

Anxiety symptomatology

Comparison of the intensity of Zung ASI anxiety symptoms between all the three study groups (M (EDC)=33.0 (SD 7.0); M (EC)=27.9 (SD 5.3); M (EH)=30.0 (SD 4.85)) again showed a statistically significant difference (F=5.58; p<0.001*). Post-hoc tests using independent sample t-tests to elucidate the source of the difference showed a significant difference between anxiety scores when comparing EC and EDC (t=3.04, p=0.004), while no significant difference was found in the comparisons between the EH and EC groups (t=1.85, p=0.07) or the EH and EDC groups (t=1.81, p=0.08). In all cases, the Levene test for homogeneity of variances was not significant, thus validating the use of parametric statistics. The comparative results regarding the intensity of individual anxiety signs and symptoms are shown in Table 2.

Cognitive functioning

Comparison of individual degrees of cognitive impairment based on the MMSE total scores between all the three study groups showed a statistically significant difference (F=162.10, p<0.001). The MMSE average total score in the EC and EH groups was within the normal range (24.94 (SD 2.09)) and (23.04 (SD 2.5)), while in the EDC group it was in the range of moderate cognitive impairment (13.82 (SD 2.38)). The percentages of subjects in each study group with different degrees of cognitive impairment based on their MMSE total score are shown in Figure 1.

Table 1. Comparison of individual Zung Depression Scale Inventory item scores between the three residential groups of elders
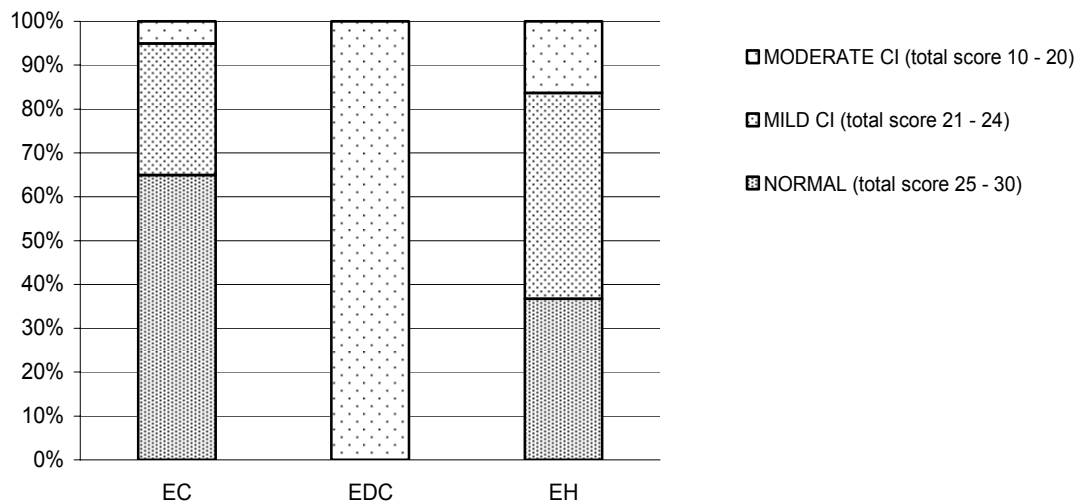
Depression symptoms and signs (Zung DSI items)	EH:EC:EDC (F value)	EH:EDC (F value)	EH:EC (F value)	EC:EDC (F value)
Depressive mood	1.65	0.59	1.55	2.55
Crying	0.96	1.17	0.12	1.65
Daily mood oscillations	4.97	9.78**	0.35	5.45*
Sleep disturbances	1.45	0.31	1.69	2.29
Reduced appetite	0.85	0.02	1.24	1.31
Weight loss	2.01*	2.31*	0.66	3.69*
Reduced libido	3.76*	4.24*	1.63	7.16**
Constipation	0.88	1.38	0.03	0.16
Chest tightness	1.67	1.73	0.53	1.91
Easy fatigability	4.45*	3.02	2.83	8.52*
Psychomotor restlessness	0.28	0.59	0.33	0.55
Psychomotor slowing	4.78*	8.89**	2.12	2.19
Attention disturbances	2.93	5.87*	0.08	3.31
Inner emptiness	3.99*	3.94*	1.04	7.16*
Hopelessness	3.13	0.91	3.27	5.42*
Indecisiveness	5.76*	13.02**	1.30	3.70*
Irritability	9.14**	17.48**	0.88	6.71**
Dissatisfaction	6.46**	4.29*	3.67	11.41**
Feelings of personal worthlessness	2.74	1.25	2.22	5.41*
Suicidal thoughts	0.71	0.67	0.17	1.37

LEGENDS: "p" EC – members of elderly clubs residing at home (n=32);   EDC – elderly persons visiting elderly day care center residing at home (n=22);   EH – residents of elderly home institutions (n=49);   DSI - Depression Scale Inventory; * – p<0.05;   ** – p<0.01

Table 2. Comparison of individual Zung Anxiety Scale Inventory item scores between the three residential groups of elders

Anxiety symptoms and signs (Zung ASI items)	EH:EC:EDC (F value)	EH:EDC (F value)	EH:EC (F value)	EC:EDC (F value)
Anxiety	1.91	1.59	0.94	3.74
Fear	1.50	1.17	2.83	0.13
Panic	0.32	0.61	0.26	0.06
Fear of psychological disintegration	0.98	0.074	1.57	0.15
Anxious premonitions	5.05*	9.65**	0.89	4.16*
Trembling	2.67	4.46*	0.52	5.34*
Physical pain	2.29	3.91*	0.01	3.39*
Easy fatigability	4.11*	0.31	6.00*	9.44**
Unrest	3.16**	5.25*	0.01	3.69*
Palpitations	3.62*	0.82	4.02*	6.98**
Vertigo	7.36**	2.56	13.80**	3.97*
Dizziness	1.06	0.92	1.84	0.05
Lack of air	1.01	0.53	2.01	0.26
Paresthesiae	4.94**	6.70*	0.98	7.94**
Nausea and vomiting	2.74*	2.25	0.97	5.05*
Frequent urination	0.74	0.78	0.23	1.48
Sweating	0.37	0.48	0.56	0.01
Feeling of heat in the face	0.10	0.17	0.00	0.14
Difficulty falling asleep	3.01**	2.24	1.56	6.58**
Nightmares	2.58	0.30	3.31	5.30*

LEGENDS: "p" EC – members of elderly clubs residing at home (n=32);   EDC – elderly persons visiting elderly day care center residing at home (n=22);   EH – residents of elderly home institutions (n=49);   DSI - Depression Scale Inventory;
* – p<0.05;   ** – p<0.01

LEGENDS: "p" EC – members of elderly clubs residing at home (n = 32);   EDC – elderly persons visiting elderly day care center residing at home (n = 22);   EH – residents of elderly home institutions (n = 49);   CI – cognitive impairment

Figure 1. Percentages of subjects with different degrees of cognitive impairment on Mini Mental State Examination among the elderly from different residential environments

Differences in depression symptomatology controlled for cognitive status

Between-group differences in depression symptomatology were evaluated by controlling for cognitive status using the ANCOVA. When the variation due to the covariate (MMSE scores) was excluded, the difference in depression scores between the groups decreases and no longer reached statistical significance (F=2.54; p=0.084). The independent effect of the MMSE score did not account for the significant proportion of variation in the depression scores either (F=0.28; p=0.594). On the other hand, the effect of the Residential environment*MMSE score interaction accounted for a significant proportion of between-group variation in depression scores (F=3.33, p=0.040). Post-

hoc analysis of the effects of the covariate using the Sidak correction on adjusted means (M (EDC)=45.3 (SD 5.19); M (EC)=31.2 (SD 2.32); M (EH)=32.3 (SD 1.13)) revealed that the difference in depression scores between the EDC and EH groups was significant (p=0.046), but not when depression scores between the EDC and EC groups were compared (p=0.067).

Differences in anxiety symptomatology controlled for cognitive status

When controlling for different levels of cognitive functioning (covariate), neither the effect of residential environment or cognitive impairment, nor their interaction on the between-group differences in anxiety levels was significant (F=1.592, p=0.209 for Residential environment score; F=0.221, p=0.639 for MMSE score; F=2.603, p=0.079 for Residential Environment*MMSE score interaction). Post-hoc analysis of the effects of the covariate using the Sidak correction on adjusted means (M (EDC)=40.8 (SD 4.1); M (EC) = 29.4 (SD 1.82); M (EH)=30.3 (SD 0.9)) revealed significant differences in comparisons between EDC and EC groups (p=0.037), as well as between EDC and EH groups (p=0.041).

DISCUSSION

In contrast to expectations based on reports from some foreign studies (Stanley & Beck 2000, Pawlinska-Chmara 2005, Karakaya et al. 2009), our results did not confirm the highest intensity of depression and anxiety symptomatology or the most prominent cognitive decline in Slovenian residents of elderly home institutions (EH) compared to those residing in their home environment. In all the three tests used in our study, the worst scores were obtained for the group of subjects living at home and visiting elderly day care centers (EDC). Regarding the complex and causally bidirectional relationship between depression and cognitive impairment in older adults (Annerieke et al. 2010), our findings of the most intense mood disorder symptomatology in the EDC group could be explained by possible early dementia in these subjects. Concerning individual symptoms and signs of depression and anxiety compared to the other two study groups, the elders from the EDC group presented with a significantly greater weight loss, dissatisfaction, irritability, indecisiveness, easy fatigability, reduced libido, difficulty falling asleep, restlessness, physical pain and paresthesiae. As most of these symptoms also occur within the scope of the clinical presentation of dementia (Korczyn & Halperin 2009), this could be another finding supporting the possibility of dementia associated with mood disorders in the subjects from the EDC group. This could be explained by the fact that depression often occurs as a very early response to cognitive decline and is characteristic of the prodromal phase of dementia. On the other hand, preexisting depression also significantly affects the threshold for dementia

manifestation and represents one of its important risk factors (Korczyn & Halperin 2009, Annerieke et al. 2010).

Further analysis which controlled for the effects of different degrees of cognitive impairment in our study groups revealed that cognitive functioning or residential status alone could not account for the between-group differences in depression and anxiety levels. Instead, the between-group differences in depression symptomatology were mostly accounted for by the interaction between cognitive functioning and residential environment, in accordance with the prior finding that wellbeing in the elderly is mostly affected by the mutual balance between a person's environment and cognitive capacities, and not the two factors per se (Lawton & Nahemow 1973). Olbrich & Diegrist (1995) further confirmed this finding, since they reported that within the German elderly population, individuals living in substandard housing conditions expressed higher levels of personal dissatisfaction, as well as a greater need for external help with their personal care and day-to-day activities. The general underlying principle found in similar studies states that the greater the discrepancy between one's needs and the environmental resources available, the lower the levels of personal satisfaction (Kahana et al. 1980, Knipscheer et al. 2000, Wahl & Lang 2003). The specifics of the interaction between a person's environment and his/her cognitive functioning are complex. On one hand, individuals choose an environment which maximizes the resources necessary to fulfill their needs and thus gives them a sense of satisfaction (Kahana et al. 1980). On the other hand, the levels of cognitive functioning and independence in decision-making define and limit the types of environment in which a person can live (Izal et al. 2005). Among the elderly population, their needs usually revolve around a sense of security, personal importance or non-triviality, and a sense of independence (Wahl & Lang 2003), while the ability to satisfy these needs depends on their levels of cognitive functioning. Unfortunately, any deeper understanding of these interactions in the cohort of our study is limited, even though differences in mood and general cognitive functioning were found between the study groups. Elders who visit elderly clubs (EC) are given the possibility of being actively involved in various activities, all organized by EC members themselves. This, together with their living at home, provides an important background to their sense of independence and security. On the other hand, for elders living in EH, a variety of activities is provided by the institution. Independent residents are given the possibility of curfew flexibility, as well as voluntary leave for vacation, while the opposite holds true of the cognitively impaired and less independent EH residents (Voljč 2009). The wellbeing and mood of elders who are limited in their day-to-day activities depend on the balance between the level of their psychophysical impairment and help provided by their relatives or

caregivers, especially if they live at home (Izal et al. 2005), which is the case in the elders from the EDC group. The relatives who make decisions regarding an older person they care for, who is still capable of sound decision-making regarding his or her own life, seriously limit the importance of that person's impact on their own social network, as well as decrease his or her personal autonomy. By putting such an elderly individual in a passive social role, the relatives negatively influence the person's health and wellbeing (Petek-Šterk & Kersnik 2004). Elders who visit EDC in Slovenia are characterized by the relative loss of independence and autonomy. The EDC represent day care facilities and are often visited by early dementia patients during the time when their primary caregivers are absent (Petek-Šter & Kersnik 2004, Šelb-Šemerl et al. 2004). Regarding MMSE results in our study, all subjects from the EDC group scored within the range of moderate cognitive impairment. Since considerable cognitive decline coincides with a lower capacity to predict, plan and adjust oneself and one's expectations to the actual environment, there is an increased risk for the elders from the EDC group to be forced into a passive social role due to the caregiver's as well as wider social underestimation of their functioning. Consequently, this may contribute to an elder's diminished perception of self-value and meaningful social role. All of these are important risk factors for both mood disorders and cognitive decline (Korczyn & Halperin 2009). Also, it is well known that relocation of an elderly person to an EH is regarded as one of the most stressful events a person can experience (Hertz et al. 2007). Similarly, the fear of having to depend on another person's help or institutionalization into EH is usually more preponderant among elders than fear of death or dying (Brummel-Smith & Mosqueda 2003), and in this respect Slovenian elders are no exception (Petek-Šter & Kersnik 2004, Šelb-Šemerl et al. 2004). It is possible that individuals visiting EDC may interpret their situation as a warning sign of approaching transfer to such an institution and therefore may be subjected to considerable stress, possibly resulting in mood disorders, as well as cognitive deterioration. It is possible that all these differences regarding the sense of personal autonomy and satisfaction between elders from different residential environments could explain our finding of mutual influence of environment and cognitive status on the level of depression sympto-matology. Indeed, the best results in our tests were achieved by members of EC living in their home environment, which is in line with the above mentioned similar foreign studies (Stanley & Beck 2000, Pawlinska-Chmara 2005, Karakaya et al. 2009). It is believed that these individuals are at the lowest risk of mood disorders and significant cognitive decline, primarily due to their higher independence and creativity, wider social network, better defined social roles and stronger sense of purpose in their lives (O'Sullivan et al. 2010). Therefore, it seems likely that

for the Slovenian elderly, home environment is in favor against any type of institutionalization, but only as long as these individuals are active and without any considerable cognitive decline. In a recent Japanese study on the factors of elders' dissatisfaction, it was found that one of the major predictors of their psychological wellbeing was in fact the degree of an elderly person's participation in decision-making about their own future and how much their opinions about this are taken into serious consideration. In this respect, individuals with no considerable cognitive impairment are in favor (Onishi 2010).

Still, considering that in the elderly many signs and symptoms of mood disorders may actually arise from other physiological or pathological conditions (Beekman et al. 2000), and the fact that the subjects in our study were not fully matched in terms of these variables, caution is warranted in the interpretation of our results. For instance, sleep disturbances which have been found to be quite intense in the subjects from the EDC group could also be the result of a pre-clinical physiological degenerative process in the elderly hypothalamus, leading to marked sleep-wake cycle disturbances (Garau et al. 2006).

The reliability of study findings could be increased by controlling for more independent risk and protective factors which influence mood in the elderly, by using more objective mood assessment methods, and by having a higher number of study participants. In further studies of this type, in addition to overcoming these limitations, it would be interesting to elucidate in greater detail the family characteristics of elders living in different residential environments, the reasons for their inclusion in EDC facilities or EH, as well as the positive and negative aspects of particular elderly residential environment in Slovenia. A greater understanding of the underpinnings in environmental characteristics or reasons for inclusion in a certain institution could further help explain the interaction between cognitive functioning and environmental effects on mood disorders.

CONCLUSIONS

Regarding mood disorders in Slovenian elders living in different residential arrangements, home environment may be in favor against institutionalization for subjects with or without mild cognitive decline. Cognitively impaired elderly persons living at home and visiting elderly day care centers should probably receive more attention regarding their social wellbeing, including their possible earlier transfer to an elderly home.

References

1. *Annerieke SR, Sierksma DLA, Van den Hove HWM, Steinbusch HWM & Prickaerts J: Major depression, cognitive dysfunction and Alzheimer's disease: is there a link? European Journal of Pharmacology 2010; 626:72-82.*

2. *Areán PA & Reynolds III CF: The impact of psychosocial factors on late-life depression. Biological Psychiatry 2005; 58:277-282.*

3. *Alexopoulos GS: Depression in the elderly. Lancet 2005; 365:1961-1970.*

4. *Beekman ATF, de Beurs E, van Balkom AJ, Deeg DJ, van Dyck, R & van Tilburg W: Anxiety and depression in later life: co-occurrence and communality of risk factors. The American Journal of Psychiatry 2000; 157:89-95.*

5. *Bruce ML, McAvay GJ, Raue PJ, Brown EL, Meyers BS, Keohane DJ et al.: Major depression in elderly home health care patients. The American Journal of Psychiatry 2002; 159:1367-1374.*

6. *Brummel-Smith K & Mosqueda L: Stages of human development. In: Taylor RB (Ed): Family medicine. Principles and pratice. Springer, New York, 2003, pp. 10-16.*

7. *Cohen S: Social relationships and health. American Psychologist 2004; 59:676-684.*

8. *Feher EP, Larrabee GJ & Crook TH: Factors attenuating the validity of the Geriatric Depression Scale in a dementia population. Journal of the American Geriatrics Society 1992; 40:906-909.*

9. *Field AP: Discovering statistics using SPSS: and sex and drugs and rock 'n' roll, 3rd ed. Sage, London, 2009.*

10. *Folstein MF, Folstein SE & McHugh PR: "Mini mental state". A practical method for grading the cognitive state of patients for clinician. Journal of Psychiatric Research 1975; 12:189-98.*

11. *Gallagher D, Mhaolain AN, Greene E, Walsh C, Denihan A, Brucem I et al.: Late life depression: a comparison of risk factors and symptoms according to age of onset in community dwelling older adults. International Journal of Geriatric Psychiatry 2009; 25:981-987.*

12. *Garau C, Aparicio S, Ruben Rial V, Nicolau MC & Esteban S: Age related changes in the activity -rest circadian rhythms and c-fos expression of ring doves with aging. Effects of tryptophan intake. Experimental Gerontology 2006; 41:430-438.*

13. *Golden J, Conroy RM & Lawlor BA: Social support network structure in older people: underlying dimensions and association with psychological and physical health. Psychology, Health & Medicine 2009; 14:280-290.*

14. *Grenade LE & Boldy DP: Social isolation and loneliness among older people: issues and future challenges in community and residential settings. Australian Health Review 2008; 32:468-478.*

15. *Hertz J, Rossetti J, Koren M, Robertson J, Adams S & Titler M: Evidence-based guideline: management of relocation in cognitively intact older adults. Journal of Gerontological Nursing 2007; 33:12-18.*

16. *Izal M, Montorio I, Marquez M & Losada A: Caregiver's expectations and care receivers' competence. Lawton's ecological model of adaptation and aging revisited 2005; 41:129-140.*

17. *Jang SN, Kawachi I, Chang J, Boo K, Shin HG, Lee H et al: Marital status, gender, and depression: analysis of the baseline survey of the Korean Longitudinal Study of Aging (KLoSA). Social Science & Medicine 2009; 69:1608-1615.*

18. *Kahana E, Liang J & Felton BJ. Alternative models of person environment fit: prediction of morale in three homes for the aged. Journal of Gerontology 1980; 35:584-595.*

19. *Karakaya MG, Bilgin SÇ, Ekici G, Köse N & Otman AS: Functional mobility, depressive symptoms, level of independence, and quality of life of the elderly living at home and in the nursing home. Journal of the American Medical Directors Association 2009; 10:662-666.*

20. *Knipscheer CPM, Briese van Groenou MI, Leene GJF, Beekman ATF & Deeg DJH 2002. The effects of environmental context and personal resources on elderly depressive symptomatology: a preliminary test of the Lawton-model. Ageing & Society 2000; 20:183-202.*

21. *Korczyn AD & Halperin I: Depression and dementia. Journal of the Neurological Sciences 2009; 283:139-142.*

22. *La Gory M: The effects of environmental context on elderly depression. Journal of Aging and Health 1992; 4:459-479.*

23. *Lawton MP & Nahemow L: Ecology and the aging process. In: Eisdorfer C & Lawton MP (Eds). The psychology of adult development and aging. American Psychological Association, Washington DC, 1973, pp.619-674.*

24. *Lee GE: Predictors of adjustment to nursing home life of elderly residents: a cross-sectional survey. International Journal of Nursing Studies 2010; 47:957-964.*

25. *Lenze EJ: Comorbidity of depression and anxiety in the elderly. Current Psychiatry Reports 2003; 5:62-67.*

26. *Manela M, Katona C & Livingston G: How common are the anxiety disorders in old age? International Journal of Geriatric Psychiatry 1996; 11:65-70*

27. *Miller GA & Chapman JP: Misunderstanding analysis of covariance. Journal of Abnormal Psychology 2001; 110:40-48.*

28. *Olbrich E & Diegrist U: Das Zusammenwirken von Person- und Umweltfaktoren in Alltag: Eine kritische Diskussion von Aktivitäten des täglichen Lebens und instrumentalen Aktivitäten des täglichen Lebens. Zeitschrift für Gerontopsychologie und -psychiatrie 1995; 8:199-212.*

29. *Onishi C, Yuasa K, Sei M, Ewis AA, Nakano T, Munakata H et al.: Determinants of life satisfaction among Japanese elderly women attending health care and welfare service facilities. Journal of Medical Investigation 2010; 57:69-80.*

30. *O'Sulllivan C, Mulgan G & Vasconcelos D: Innovating better ways of living in later life. The Young Foundation, London, 2010; pp. 6-11.*

31. *Pawlinska-Chmara R: Symptoms of depression in elderly Silesian women living in old people's homes and their own homes. Acta Medica Lituanica 2005; 12:48-49.*

32. *Petek-Šter M & Kersnik J: Obravnava starostnika v družinski medicini. Zdravniški Vestnik 2004; 73:767-771.*

33. *Schoevers RA, Deeg DHJ & van Tilburg W: Depression and generalized anxiety disorder: co-occurrence and longitudinal patterns in elderly patients. American Journal of Geriatric Psychiatry 2005; 13:31-39.*

34. *St John PD & Montgomery PR: Marital status, partner satisfaction, and depressive symptoms in older men and women. Canadian Journal of Psychiatry; 54:487-492.*

35. *Stanley MA & Beck JG: Anxiety disorders. Clinical Psychology Review 2000; 20:731-54.*

36. *Šelb-Šemerl J, Rok-Simon M, Kelšin N & Ivas N: Staranje prebivalstva v Sloveniji: demografske spremembe in nekaj posledic za zdravstveno varstvo. Zdravniški Vestnik 2004; 73: 527-31.*

37. *Trig R, Jones RW & Skevington SM: Can people with mild to moderate dementia provide reliable answers about their quality of life? Age and Ageing 2007; 36:663-9.*

38. *Trivedi MH: The link between depression and physical symptoms. Primary Care Companion to the Journal of Clinical Psychiatry 2004; 6(suppl 1):12-6.*

39. *Vink D, Aartsen MJ & Schoevers RA: Risk factors for anxiety and depression in the elderly: a review. The Journal of Affective Disorders 2008; 106:29-44.*

40. *Voljč B: Pregled gerontoloških in geriatričnih aktivnosti v Sloveniji in po drugih državah Evropske unije. Kakovostna starost 2009; 12:5-15.*

41. *Wahl HW & Lang FR: Aging in context across adult life course: integrating physical and social environmental research perspectives. In: Schaie KW, Wahl HW, Scheidt RJ & Windley PG (Eds). Aging in context: Socio-physical environments. Springer, New York, 2003, pp.1-33.*

42. *Zung WWK: A self-rating depression scale. Archives of General Psychiatry 1965; 12:63-70.*

43. *Zung WWK: A rating instrument for anxiety disorders. Psychosomatics 1971; 12:371-9.*

44. *Železnik D: Self-care of the home-dwelling elderly people living in Slovenia. Oulu, 2007.*

Correspondence:

Prof. Bojan Zalar, PhD
University Psychiatric Clinic
Studenec 48, 1260 Ljubljana, Slovenia
E-mail: bojan.zalar@psih-klinika.si