



Research Article

Aging and Depression: Studies on Rural Populations in Bulgaria during Communist and Post Communist Period

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Abstract

Purpose: The mental health of older people from the Bulgarian rural population has been studied at two different historical periods.

Sample and methods: Between 1971 and 1984 a comprehensive cross-sectional and longitudinal investigation on the mental health of 708 people of 70 years and over, representing 20% random sample of the population in that age of 46 villages near Sofia, was carried out by the first author. In that study, we used an interview, 9 psychometric (cognitive and psycho-motor) tests, and The Self-Evaluation Test (SET) which involved respondents situating themselves on scales represented by vertical lines. The SET was fulfilled in 1972. In 2007 we studied a sample of 80 persons of 60 years and over living in two of the same Bulgarian villages. In 2008 the same older persons, from the two villages, were studied again using also three depressive scales (HAD-D of Zigmond and Snaith, the Geriatric depression scale of Yesavage et al., and the Zung self-rating depression scale) as well as SET. Then we compared the self-evaluation as well the level of depression in 1972 and 2008 among the people aged 70 and over.

Results and discussion: At 1972 we estimated the depressive prevalence at the age group 70+ as 22.2%. In 2007 we found much higher depression states, surpassing 50% of the elderly from the two villages. The follow-up in 2008 confirmed that finding. The results indicated also close relations between depression and self-evalu-

ation. The SET used is sensitive towards depressive symptoms; at the same time it has projective qualities giving information about personality values and motives of dissatisfaction. Depressive prevalence among Bulgarian rural people aged 70 and over seemed to be higher and the self-evaluation of these people, especially their self-evaluation of health, was lower in 2008 than it was in 1972. The leading motives of personal dissatisfaction, including lower self-evaluation on the scale of happiness of SET, according to the results of the 2008 study, proved to be ill health and financial difficulties, these motives being significantly more prevalent in 2008 than in 1972. The differences found might partly reflect social and cultural differences between the two historical periods. We discuss whether the rapid social and economic changes in Bulgaria after 1990 may contribute to some psychogenic increase of the number of depressive states together with a lowering of the self-evaluation.

Background

Aging is a 'universal experience' since at the present time almost all individuals have the chance to reach old or very old age. Mental and somatic illnesses are common in late life: they both could develop independently of natural ageing, but in many cases these phenomena combine, overlap and aggravate one another. Dementias and depressions are among the commonest mental health problems in later life. The data on the prevalence of depressions in older age vary, but on the whole they are present in 10-15% or 15-20% of the people aged 65 and over [1,2]. At older ages the major depressions are not more prevalent than in middle age. The depressions with late onset are predominantly 'minor' and some parts of them seem to lie in the border area between characteristics common to aging and mental disorder.

Not only the incidence of (minor) depression, but also actual suicides increase with advancing age, especially among men. One part of old age suicides seem to be related with real life difficulties (e.g., loneliness in older men) and another part probably occurs as an outcome of major depression [3]. It is necessary to consider whether there is a phenomenal likeness between aging and depression or a causal pathogenic relationship. Natural aging itself resembles depression with some of its common characteristics: the retardation of reactions and behavior; the trends towards introversion of interests and mode of life; attitudes of increased uncertainty, cautiousness and anxiety; some 'normal' decrease in feelings of joy; familiarization with thoughts of death [3]. The gradual drop in vitality, spontaneous activity and drive are also present in the course of the natural ageing of humans and animals. Social activities and interests also decline in humans despite their communal character. Behavior requiring physical and mental strain or competition decline as well as activities involving a broader extent of communication and contacts. Individual and quiet occupations within family life become more prevalent. As a result interests and activities do become more introverted and lose strength, swing, fight and strife [4]. Studying life satisfaction in different age groups, Traeldal calculated that the orientation toward personality compared to the orientation toward the environment could be 1:8 (between 18 and 29 years of age); 1: 4 (at 30-44 years); 1:2 (50-69 years) and 1:1 (over the age of 70 years), i.e., the trend towards introversion increases eight times with aging.

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The lessening of spontaneous activity as well as the slowing of reactions are primary age-related changes. The trends towards incertitude, cautiousness, anxiousness, introversion and rigidity at older age are more complex in their origin. They also could be partly related with biological involution, including age decline in cognitive and psychomotor abilities. But at the same time they are influenced by adverse environmental factors e.g., the stereotypical undervaluation and rejection of the older people by younger people and society. The drop of vitality and of the adaptive capacities along with the trends toward incertitude and anxiousness contribute to an age change in value orientations with a concentration on vital themes of health, family and past life.

In the study on the representative sample of rural people aged 70 and over we found that the value orientations were focused on their own health, family relations in a narrow circle (children and spouse) and economic security. Their concepts of happiness and unhappiness expressed in many cases their need of help and family ties, the insecurity of the future, the increased dependence with age of the immediate surroundings with the ambivalent experience of (a) dissatisfaction with insufficient care and consideration on the part of the closest relatives and (b) worry to maintain the status achieved in the course of life - both in the family and in the sphere of economic security. The outline of the basic value orientation of older people helps to understand the trends of symptoms in the mental disorders arising in late life [5].

Material and Methods

The mental health of older people from the Bulgarian rural population has been studied at two different historical periods. Between 1971 and 1984 a comprehensive cross-sectional and longitudinal investigation on the rural people aged 70 and over, representing 20% random sample of the population in that age group, from 46 villages near Sofia was carried out. In that study, among others, we firstly used the first part of the Self-Evaluation Test (SET) which involved respondents situating themselves on scales represented by five vertical lines capturing their Self-Evaluation (SE) of happiness, health, mental capacity, character and perceived attitude of others [6,7]. The points chosen on the five vertical lines were classified into a scale of 7 ratings and subsequently compared with a number of variables including social situation, health status and personality [5,6].

In 2007, 80 persons of 60 years and over were interviewed at two of the same Bulgarian villages. The study also covered another 80 older people from one Romanian village of similar socioeconomic status [8]. Using the Hospital Anxiety and Depression-D scale (HAD-D) [9] a significantly higher level of depression in Bulgarian than in Romanian elderly people has been found (mean scores 12.0 versus 7.4). We were surprised by the extent of this difference. To investigate further the high level of depression found in the Bulgarian sample, we carried out in 2008 a follow-up investigation. It proved possible to trace and interview 58 people aged 61-88 of the original Bulgarian sample. In addition to the HAD-D scale, we used also the Zung Self-Rating Depression Scale [10], the Geriatric Depression Scale - GDS [11] and SET [6,7]. In 2008 we used the full range of the SET scales which involved respondents situating themselves on 15 vertical lines capturing the self-evaluation (SE) of:

- health;
- intellectual capacity;

- character or quality of personality;
- perceived attitude of others to the person;
- Happiness

The first five scales or lines constitute the first, obligatory part of the Self-Evaluation Test. They deal with more general categories, the most general and sensitive of them being the notion of happiness. The next 10 vertical lines or questions have more specific meanings and represent the second, optional part of SET. They involve self-evaluation about:

- sight;
- hearing;
- prevailing mood;
- sense of calm;
- energy;
- family life
- economic or financial situation;
- profession, work;
- past life satisfaction;
- current life satisfaction;

Results

The levels of depression among Bulgarians proved to be high in 2008 as well they were in 2007 (according to the HAD-D scale [8]).

We then compared the depression scores from the three depression scales as well as the Self-Evaluation (SE) of 55 persons (38 females and 17 men) studied in 2007 and again in 2008. They were rural Bulgarians, with an age range of 61 to 88 years, living in two villages near to Sofia. The age distribution was as follows: 10 were 61-69; 34 were 70-79; 11 were aged 80-88 years. The rates of depression found by the three depressive scales were concordant. The rates found with the SET also were similar.

Of the 55 persons interviewed in 2008 only 20 had scores below 8 points i.e., within the norm according the HAD-D scale. 35 persons (63.6%) had signs of depression since their scores were 8 and over. Moderate and severe depression showed 25 persons (45.5%) with scores of 11 and more points. According to the GDS 32 elderly persons (59.3%) had probable depression with scores 5 and over and 16 persons (29.6%) had very probable depression with scores of 10 and more. According to the Zung scale 38 persons (69.1%) showed signs of depression with scores 50 and over and 23 (41.8%) had 60 points and over i.e. moderate and heavy depression (Table 1).

Instruments	Probable Depression	Very Probable Depression	N
HAD-D	34 (63.6%) score 8 and over	25 (45.5%) score 11 and over	55
GDS	32 (59.3%) score 5 and over	16 (29.6%) score 10 and over	55
Zung self-rating scale	38 (69.1) score 50 and over	24 (43.6%) score 60 and over	55

Table 1: Rates of depression according to three scales used in 2008.

It must be acknowledged that the high prevalence of depression found with the scales used might be slightly exaggerated due to “depressive” answers to such questions like “the feeling to be slowed down” in the HAD-D or the presence of constipation or disturbed sleep in the Zung scale. Such questions refer to ‘symptoms’ which could be linked not only with depressive disorder, but with aging per se [3].

Nevertheless it can be concluded that within the small number of elderly people examined:

- The levels of depression found by the four instruments were considerably concordant. The three depressive scales show rates of probable depression around 34 to 69% and of very probable or severe depression in around 28 to 40% of the sample;
- The majority of people with depression were in the age of 70 and over (with a peak in the age 70-79) but depression was relatively less common in the age range 60-69;
- The rates of depression found in 2008 in these two Bulgarian villages were unexpectedly high;

As to the concordance between the depressive scales used, 35 elderly persons had a score 8 and over on HAD-D; 33 of them or almost all have at the same time scores of 50 and over on the Zung scale, and 27 or four fifths of the sample have also scores of 5 and more on the GDS.

Discussion

There were much higher rates of late life depression evident in Bulgarian villages than in a Romanian one studied. In 2007 the comparison between Romanian and Bulgarian elderly persons on the basis of the HAD-D scale revealed a significant difference in the level of depression (Romanian mean 7.3; Bulgarian mean 12.0) [8]. It is not possible to give a definitive explanation of this striking difference. Despite a common recent history of communist rule followed by a return of capitalism, a number of historical, social and cultural differences between the two countries could play a part. One possible protective factor that has been identified is religious belief and practice. This continues to be much higher in Romanian than Bulgarian society [8,12].

There were consistent negative associations between self-evaluation rates and depression. Using in 2008 the two parts of the Self-Evaluation Test with 15 scales [7] we confirmed that low self-ratings could indicate depressive symptoms. Of the 55 persons considered 24 (43.6%) have chosen positions on the scale of happiness below the middle of the vertical line. Calculating the sum of the positions below the middle on all 15 scales of the test we found 22 persons (40.0%) having 6 or more low positions on different lines. So the findings from the SET are very close to the findings indicating the presence of moderate or severe depression from the three depressive scales, especially from the HAD-D scale (43.6%), and Zung (41.8%).

Our previous study of the 1970's was on 708 elderly representing 20% random sample of all population aged 70 and over from 46 villages near Sofia [5]. Two of the same villages, nowadays already part of Sofia city, were subject of our studies also in 2007 and 2008. The data on prevalence of depression in these studies are difficult to compare because of the differences in historical and social circumstances. Moreover in the 1970's study the appraisal of depressions was mostly

clinical, and we found 22.2% mild or more pronounced depressions. Calculated for the population of the two discussed villages 11 from 50 elderly persons (22.0%) were appraised to be affected by depressions. The cases of another 6 persons from the 1972 study have been thought then to lay in the border zone between normal ageing and depression [5,13,14]. It is well known from numerous studies that the depressive scales find higher prevalence of depressive symptoms than do studies based on clinical appraisal.

In the 1970's rural study we firstly used the SET and we found a significant correlation between the lower self-ratings and the presence of depression. The scale of happiness proved to be the most sensitive $p < 0.001$, followed by the scales of health, intellectual capacity and character (at $p < 0.05$) [5,7,15]. In order to examine more closely the relations between depression and lower Self-Evaluation (SE) we compared two subgroups from the 55 elderly persons examined in 2008:

- 15 elderly persons with scores around the norm on the three depressive scales HAD-D, GDS and Zung Self Rating Depression Scale;
- 10 persons with moderate or severe depression according to the three scales i.e., with HAD-D ≥ 11 , as well GDS ≥ 10 and Zung ≥ 60 ;
- 4 women from the 15 elderly in the group (A) were widows, but all they lived with some of their children and/or grandchildren. No one lived alone. In the group (B) from 10 elderly 8 were widows or widowers and four of them lived lonely
- 9 persons from (A) had positive SE of happiness above the middle score vs. no one from (B), whereas the middle position on the scale of happiness was occupied by 6 persons from (A) vs. only one on from the group (B)
- Low SE with a position below the middle had no one from A, but 9 persons from (B)
- No one from (A), but 9 persons from (B) have chosen six and more positions below the middle rank along all scales

Regarding the motives of dissatisfaction shared along the SET:

- 8 from 10 persons in group B shared health problems vs. 6 from 15 in group A
- 6 from 10 persons within group B shared financial difficulties vs. 5 from 15 in group A
- 5 from 10 persons in group B shared problems in their families including death of a close person vs. 3 from 15 in group A. Three elderly shared they felt loneliness, all women and all from group B
- 4 from 10 persons in group B indicated that they felt themselves physically too weak vs. 1 person from group A
- 4 from 10 persons in the group B spontaneously shared complaints about their memory vs. 1 from group A

Remarkably, to the question related to the self-evaluation of happiness - “what is missing to be higher in happiness” - 4 persons from group A answered approximately that there was nothing needed, that they were fully satisfied with their lives.

Finally, in comparing self-ratings from the SET in 2008 and 1972, we also found statistically significant differences using chi-square test. In 1972 the first part of the test was performed by 228 rural elderly aged 70 years and over. Nearly half of them (106 persons or 46.5%) had mostly positive SE of happiness and chose positions above the middle of the line. The very middle of the scale was chosen by 27.2%. Definitely negative self-evaluation scores with positions below the middle of the line were chose by 60 (26.3%). In 2008 44 from 55 persons were in the age group 70 and over. Of them 14 (31.8%) had positive, 11 (25.0%) mid and 19 persons (43.1%) low SE positions of happiness. There is a trend to lower self-evaluation of happiness in 2008, but without statistical significance according chi-square ($p>0.05$). Striking are the differences on the scale of health. In 1972 89 persons or 39.0% had positive, 28.1% mid and 75 elderly (32.9%) mostly negative SE. In 2008 only 4 persons (9.1%) had positive SE of health, 31.8% chose the middle, and the majority (30 persons or 68.2%) chose ratings below the middle of the line ($p<0.001$). These sharp differences might partly reflect social and cultural differences between the two historical periods. In 2008 elderly people living in the villages near Sofia had undoubtedly higher level of education and much wider information, including health information, than was possible in 1972. It is an open question whether the differences in self-evaluation reflect also a more pessimistic view on the contemporary post-communist-transition period in the history of the country [16].

The content analysis of leading themes of personal dissatisfaction shared verbally during the self-evaluation of happiness showed differences too. In 2008 50.0% of the elderly explaining “what was missing to being happier” noted health problems (vs. 22.4% in 1972) ($p<0.01$) and 43.2% financial difficulties (vs. 28.9% in 1972) ($p<0.05$). The issue of the feelings and attitudes of the people towards the changes in the mode of life during 1990’s is complicated. Some idea of this was given in one small study undertaken by the first author in Sofia in 1992-1993 with independent elderly people living active lives [17,18]. The study was directed on their feelings and attitudes way towards the life changes during the transition from totalitarianism towards democracy. The interviews with 61 elderly women and men (mean age 74 years), and the Self-evaluation test used, revealed a considerable variability of views confirming that old age is psychologically heterogeneous. Notwithstanding the richness of diverse views, 70% of the elderly could be polarized at the extremes: 35% showing a fully positive and optimistic attitude towards the changes and 35% definitely negative ones. The smallest groups had more mixed attitudes. The positive feelings of relief, joy, hope, were connected with ideas of liberation and freedom. The negative feelings of disappointment, pessimism and uncertainty implied worries about economic difficulties, delinquency, moral and cultural degradation, as well as fears of the restoration of communism, possible war and others dire consequences.

Conclusion

Two consecutive studies in 2007 and 2008 on the elderly from two Bulgarian villages revealed an unusually high prevalence of depression - surpassing 50% - in the age 60+. Depressive prevalence in Bulgaria proved to be much higher than it was in Romania at the same time on a similar rural population. The high prevalence in Bulgaria was confirmed by three scales of depression complemented by a Self-Evaluation Test (SET). The SET projects the self-esteem on

the scales of 15 consecutively drawn vertical lines. The scores of the four instruments used are highly concordant, particularly related to the rates of moderate or severe depression which are around 40%. The results indicate close relations between depression and Self-Evaluation (SE). The SET used is sensitive towards depressive symptoms; at the same time it has projective qualities giving information about personality values and motives of dissatisfaction.

The leading motives of personal dissatisfaction, including lower self-evaluation, according to the results of the 2008 study proved to be ill health and financial difficulties. In the 1970’s study they were ill health, financial difficulties and problems in the family. The presence of depression may influence the self-evaluation regarding the ratings chosen. Conversely, the leading self-evaluation motives of personal dissatisfaction may help to understand better the psychosocial sources of depression. In that sense we are reminded of the statements of Martin Roth as well of Felix Post that 85% of late life depressions could be regarded as mostly psychogenic and/or somatogenic [19,20]. Depressive prevalence among Bulgarian rural elderly people in 2008 seemed to be higher and the self-evaluation of these people lower than it was in 1972. The rapid social and economic changes in Bulgaria after 1990 may contribute to some psychogenic increase of the number of depressive states.

References

1. Blazer DG (1993) Depression in late life (2nd edn). Mosby, Missouri, USA.
2. Blazer DG (1994) Epidemiology of late-life depression. In: Schneider LS, Reynolds CF, Lebowitz BD, Fried AJ (eds.). Diagnosis and treatment of depression in late life. American Psychiatric Press, Washington, DC, USA: 9-20.
3. Petrov IC (1983) Aging vs. depression. *Nevrologiya, psihiatriya i nevrohirurgiya* (Sofia) 22: 186-193.
4. Coleman PG, O’Hanlon A (2017) Aging and Development: Social and Emotional Perspectives. Routledge, Abingdon, UK.
5. Petrov IC (1976) Self-evaluation of some personality aspects of the aged by the test of Dembo-Rubinstein. Dissertation. Sofia, Medical Academy. In Bulgarian. Summary in English.
6. Petrov IC (1976) Test of self-evaluation of personality and its social coherence. *Nevrologiya, psihiatriya i nevrohirurgiya* (Sofia) 15: 67-69.
7. Petrov IC (1997) A self-evaluation test in the early diagnostics of cognitive and affective disorders of elderly persons. In First Bologna International Meeting of Cognitive and Affective Disorders in the Elderly. Bologna, Casa Editrice Mattioli. 280-282.
8. Coleman PG, Carare RO, Petrov I, Forbes E, Saigal A, et al. (2011) Spiritual belief, social support, physical functioning and depression among older people in Bulgaria and Romania. *Aging Ment Health* 15: 327-323.
9. Zigmund AS, Snaith RP (1983) The hospital anxiety and depression scale. *Acta Psychiatr Scand* 67: 361-370.
10. Zung WW (1965) A self-rating depression scale. *Arch Gen Psychiatry* 12: 63-70.
11. Yesavage JA, Brink TL, Rose TL, Lum O, Huang V, et al. (1983) Development and validation of a geriatric depression screening scale: A preliminary report. *J Psychiatr Res* 17: 37-49.
12. Coleman PG (2011) Belief and Ageing: Spiritual pathways in later life. Policy Press, England, UK.

13. Petrov IC (2000) Mental health of the rural elderly. A study of a representative sample of Bulgarian Shopp population. Cross-sectional data. In Second Bologna Meeting on Cognitive, Affective and Behavior Disorders in the Elderly, June 2000. Abstract Book. Bologna, Italy. 153-154.
14. Petrov IC (2009) Mental health of the rural elderly population: Focus on depressions. XIX World Congress of Gerontology and Geriatrics, Paris.
15. Petrov IC (1981) Etats depressifs apres l'age de soixante-dix ans. Etude clinique et experimentale sur un groupe homogene de 701 habitants ruraux. *Minerva medica* 72: 3191-3195.
16. Petrov IC, Coleman PG (2011) The high rates of depressions among older Bulgarian rural people: Is there a real depression or a pessimistic self-evaluation? *Aging Clinical and experimental research* 23: 268.
17. Petrov I C (1996) Feelings and attitudes toward the changes during social and economic transition. A study of Sofia autonomous elderly subjects. *Romanian Journal of Gerontology* 17: 73-82.
18. Petrov IC (2007) The elderly in a period of transition: health, personality, and social aspects of adaptation. *Ann N Y Acad Sci* 1114: 300-309.
19. Roth M (1965) Late depressions. In: Davies EB (ed.). *Depression*. A Cambridge post-graduate medical course. Cambridge University Press, Cambridge, UK.
20. Post F (1972) The Management and Nature of Depressive Illnesses in Late Life: A Follow-Through Study. *The British Journal of Psychiatry* 121: 393-404.



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