

Depressive symptoms in community-dwelling persons aged ≥ 60 years in Inanda, Ntuzuma and KwaMashu in eThekweni, KwaZulu-Natal

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Background. Physical and psychological ailments increase with age; while the physical ailments are well documented, mental health issues have received less attention.

Objective. To determine the prevalence of depressive symptoms and associated risk factors in individuals aged ≥ 60 years living in a low-resource peri-urban area in South Africa.

Methods. Secondary analysis was performed on data obtained from a primary study conducted to determine the influence of socioeconomic and environmental factors on the health status and quality of life in older persons living in the Inanda, Ntuzuma and KwaMashu (INK) area. The Center for Epidemiologic Studies Short Depression Scale (CES-D 10) was used to screen for depressive symptoms in the week preceding the interview, and respondents were categorised as having no (score < 10), mild (10 - 14), or severe (> 14) depressive symptoms. Risk factor associations were tested using Pearson's χ^2 tests and logistic regression.

Results. There were 1 008 respondents (mean (standard deviation) age 68.9 (7.4) years), of whom 503 (49.1%) did not meet criteria for depressive symptoms. Of the 505 (50.1%) respondents who met the CES-D 10 criteria for depressive symptoms, 422 (41.9%) had mild and 83 (8.2%) had severe depressive symptoms. In the univariate analysis, significant associations were found with age ($p=0.011$), household size ($p=0.007$), income ($p=0.033$), disability ($p=0.001$), nutritional status ($p\leq 0.001$), the inability to count on family ($p=0.008$) and lack of mastery ($p\leq 0.001$). In direct binary logistic regression, there were significant associations with lack of mastery ($p\leq 0.001$), inability to count on family ($p=0.027$), malnutrition ($p\leq 0.001$) and household size ($p=0.024$).

Conclusion. This study highlights the high prevalence of depressive symptoms in the elderly in the INK area, and the need to promote successful ageing of the elderly population in this area.

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The number of people over 60 years old is expected to double by 2025 worldwide, and to reach 2 billion by 2050.^[1] The elderly population faces unique stressors that contribute to an increase in disease, affecting their biopsychosocial wellbeing. The South African

(SA) older population is faced with inherent stressors that increase their predisposition to depression and other health issues.^[2] The HIV/AIDS pandemic and other communicable diseases, especially tuberculosis, have placed an enormous financial and emotional burden on the elderly population, who may be either infected or affected. Older people often support entire households and take over the rearing of orphaned children.^[3] Furthermore, the monthly pension received is not a substantial amount in view of inflation costs, and many older-person-headed households are living below the poverty line.

Psychological distress and specifically depression may prevent successful ageing. The available data on depression in SA reflect a varied prevalence among the different ethnic groups, age categories and areas in which the studies were conducted. Using the present state exam, which is a screening tool assessing an individual's mental state at the time of the interview, the prevalence of depression in a

population of mixed ethnicity > 65 years old living in Cape Town in 1987 was 13%.^[4] In 2008, 3 840 South Africans aged ≥ 50 years participated in the Study of Global Ageing and Adult Health, with 4% reporting depressive symptoms in the preceding 12 months.^[2]

The population in the Inanda, Ntuzuma and KwaMashu (INK) area is estimated to be 510 000, with 6% of the population aged ≥ 60 years. This is a densely populated peri-urban area with poor infrastructure and unemployment. There is a paucity of data available on depression in the SA older population in general and even less on peri-urban populations such as those in the INK area. The objectives of this study were to determine if depression or depressive symptoms were significant problems in this population and to identify possible risk factors.

Method

This study was a secondary quantitative data analysis study of data collected in a primary cross-sectional study. The primary study was undertaken to assess the influence of socioeconomic and environmental factors on the health status and quality of life in older persons in the INK area. A total of 1 010 respondents was randomly

selected (using cluster sampling and a Kish grid) from the 18 812 older persons living in the INK area. Ethical approval was granted for the original study and for this study by the Biomedical Research Ethics Committee of the University of KwaZulu-Natal and the Department of Health. Sample size in the original study was calculated based on a conservative percentage of 50%, as the prevalence was not known for all the conditions being investigated, and a precision of 3% to give smaller confidence intervals. Questionnaires were available in the local indigenous language, isiZulu, or English. The data were collected from face-to-face interviews after obtaining informed consent by trained field interviewers. The questionnaire included a number of well-validated instruments relevant to older persons' health (Table 1). Depressive symptoms were captured using the Center for Epidemiologic Studies Short Depression Scale (CES-D 10). The CES-D scale and the Beck Depression Inventory (BDI) are the two most-used screening tests for depressive symptom; however, they measure different aspects of the construct for depressive symptoms. Reports have shown that the BDI has higher specificity and the CES-D has higher sensitivity.^[5] The CES-D 10 comprises 10 questions with negative responses graded as follows: rarely or none of the time = 0; some of the time = 1; occasionally = 2 or all of the time = 3, with a total score of 30. Two items (numbers 5 and 8) require positive responses and were reverse-scored. A CES-D 10 score of <10 indicates no depressive symptoms, 10 - 14 mild depressive symptoms and >14 severe depressive symptoms.

Risk factor information was captured using validated instruments for cognition, pain and disability, and nutrition (Table 1). In addition, respondents were asked to grade their general health status as very good, good, average or poor, and medical history was obtained for self-reported presence of common diagnosed medical disorders such as diabetes mellitus, hypertension and arthritis. A direct review of medication was undertaken and stratified into ≤ 2 and >3 drugs. Mobility was categorised as being able to mobilise with or without assistance, and the ability to complete light household tasks and work in the garden. Pain and disability were categorised as none, mild, moderate or severe based on pain rating. Mastery was assessed using questions from the original Perlin Mastery Scale,^[13] namely: did the respondents believe they had control of their future; could they do

everything; and were they in control of things that happen to them? Social integration was assessed using the respondents' ability to count on friends and family, and whether or not they belonged to a social organisation.

Statistical analysis

The data were analysed using the IBM (USA) SPSS Stats version 21 program. The response rate and sample description were analysed using descriptive statistics including frequency, mean and standard deviation (SD) for age, gender, date of birth, marital status, household size and literacy. Data were cleaned and in cases with missing data (items not answered) for the specific scales, the sums were computed after imputation of the missing values. To test the association between depressive symptoms and risk factors, following a review of the literature, the following risk factors were identified as independent variables: health status, medical history, medication history, cognition, pain, disability, nutrition, functional assessment, physical activity, mastery and social integration. Pearson's χ^2 test was used to test for associations between the degree of depressive symptoms and the risk factors; the confidence level was set at 95% ($p < 0.05$). Direct binary logistic regression containing all seven independent variables (age group, household size, income, nutrition, disability, ability to count on family, and ability to control things happening to the respondent) was used to determine the effect of these on the likelihood that respondents would report that they had a problem with depressive symptoms.

Results

Of the 1 010 respondents interviewed, two were excluded as they did not meet the selection criteria, therefore 1 008 respondents who completed the CES-D 10 questionnaire were selected for the study. The average age of the respondents was 68.9 (SD 7.4) years (range 60 - 103). The female-to-male ratio was 3.4:1, and 43% of the respondents were widowed. Most households were multigenerational and included grandchildren (73%), while 10% of the respondents lived alone. Of the respondents, nearly three-quarters (73.9%) were literate (Table 2).

The CES-D 10 had moderate reliability, with a Chronbach's α of 0.687. Of the 1 008 respondents, 505 (50.1%) met the CES-D 10 criteria for reporting depressive symptoms. Of these, 422 (41.9%) reported mild depressive symptoms and 83 (8.2%) severe depressive symptoms. The relationship between depressive symptoms and sociodemographic factors is shown in Table 2. The presence of depressive symptoms increased with age ($\chi^2=11.1$, $p=0.011$). Gender, marital status and literacy showed no significant differences between the categories. There was a significant association between household size and presence of depressive symptoms ($\chi^2=9.9$, $p=0.007$) with 45.4% of respondents who were living alone reporting depressive symptoms compared with 75% of respondents living in larger households with >11 dwellers, though most of these were mild depressive symptoms (55.6%). There was a significant association between low income (<ZAR1 600) and overall depressive symptoms, with 52.3% reporting depressive symptoms ($\chi^2=5.5$, $p=0.033$).

Health-related and social risk factors for depressive symptoms

Health and social risk factors for depressive symptoms are shown in Table 3. Depressive symptoms were strongly associated

Table 1. Instruments used in study

Factor	Instrument	Reliability and validity
Depressive symptoms	CES-D 10 scale ^[6-7]	Reliability 0.90 ^[6] Validity 0.84 ^[7]
Cognition	Short Memory Scale – 6 item ^[8-9] (≥ 8 = impaired)	Reliability 0.91 ^[8] Validity 0.68 - 0.74 ^[9]
Pain and disability	Visual Analogue Scale ^[10-11] (0 = zero pain 10 = maximum pain)	Reliability 0.97 ^[10] Validity 0.76 - 0.84 ^[11]
Nutrition	Mini Nutritional Assessment – short form ^[12] (≤ 7 = malnourished 8 - 11 = risk of malnutrition 12 - 14 = normal nutritional status)	Reliability 0.89 ^[12] Validity 0.94 ^[12]

Table 2. Demographic profile by depressive symptoms

	No depressive symptoms <10 (<i>n</i> =503), <i>n</i> (%)	Depressive symptoms (<i>n</i> =505), <i>n</i> (%)	Respondents (<i>N</i> =1 008), <i>n</i> (%)	Test statistic (χ^2)	<i>p</i> -value
Age (years)				11.0	0.011*
60 - 69	318 (53.9)	272 (46.1)	590 (58.5)		
70 - 79	144 (45.4)	173 (54.6)	317 (31.4)		
80 - 84	31 (44.3)	39 (55.7)	70 (6.9)		
>85	10 (32.3)	21 (67.7)	31 (3.1)		
Gender				0.5	0.477
Male	119 (52.0)	110 (48)	229 (22.7)		
Female	384 (49.3)	395 (50.7)	779 (77.3)		
Marital status				8.7	0.121
Married	104 (49.3)	107 (50.7)	211 (20.9)		
Living with partner	15 (48.4)	16 (51.6)	31 (3.1)		
Widowed	199 (45.9)	235 (54.1)	434 (43.1)		
Divorced	24 (55.8)	19 (44.2)	43 (4.2)		
Separated	11 (42.3)	15 (57.7)	26 (2.6)		
Never married	146 (56.6)	112 (43.4)	258 (25.6)		
Household size					
Living alone	53 (54.6)	44 (45.4)	97 (9.6)		
≤10	441 (50.4)	434 (49.6)	875 (86.8)		
≥11	59 (25.0)	27 (75.0)	86 (8.5)	9.9	0.007*
Households with grandchildren	357 (48.6)	378 (51.4)	735 (72.9)	1.9	0.166
Literacy: can read	377 (50.6)	368 (49.4)	745 (73.9)	0.5	0.452
Household income (per month)				5.5	0.033*
<ZAR1 600	311 (47.4)	345 (52.3)	656 (65)		
≥ZAR1 600	189 (54.5)	158 (45.5)	347 (34.4)		

*Significance set at $p < 0.05$. Differences between groups tested with Pearson's χ^2 test.

with poor nutrition ($\chi^2=63.3$, $p < 0.001$) and disability ($\chi^2=17.5$, $p=0.001$). Respondents who were either malnourished or at risk for malnutrition reported the highest frequency of depressive symptoms (74.2% and 60.2%, respectively) compared with those with a normal nutritional status (37.5%). Depressive symptoms were also significantly associated with increasing self-reported disability status, and increased from 45.7% in respondents with no disability to 64.0% in those with severe disability ($\chi^2=17.7$, $p=0.001$). There was no significant relationship between degree of pain or functional ability and depressive symptoms.

Though the presence of depressive symptoms was not significantly associated with general health status ($\chi^2=3.7$, $p=0.289$), severe depressive symptoms were strongly associated with a decrease in health status, with depressive symptoms being present in 4% of respondents reporting very good health, 4.5% reporting good health, 8.7% reporting average health and 17.1% reporting poor health ($\chi^2=31.9$, $p < 0.001$). Although the presence of depressive symptoms was higher in those who mobilised without assistance, this did not reach statistical significance ($\chi^2=2.7$, $p=0.258$). However, respondents requiring assistance in mobilising were significantly more likely to have mild depressive symptoms than those who did not (47.0% v. 41.7%; $\chi^2=10.9$,

$p=0.017$). While there was no significant association between depressive symptoms and impaired cognition ($\chi^2=0.01$, $p=0.834$), respondents with impaired cognition reflected a higher percentage of severe depressive symptoms compared with those with normal cognition (11.3% v. 4.3%; $\chi^2=17.9$, $p < 0.001$).

There was a significant association between depressive symptoms and lack of mastery and social support; depressive symptoms were reported by 56.3% of the respondents who reported an inability to control things happening to them ($\chi^2=17.9$, $p < 0.001$) and 51.9% of respondents who did not have a family member to rely on ($\chi^2=17.6$, $p=0.006$). The ability to rely on friends was not related to depressive symptoms.

The direct binary logistic regression model was statistically significant ($n=986$, $\chi^2=23.2$, $p=0.003$), indicating that the model was able to distinguish between respondents who reported and did not report depressive symptoms. The model as a whole explained between 10.6% (Cox and Snell R^2) and 14.1% (Nagelkerke R^2) of the variance in depressive symptoms, and correctly classified 62.1% of cases. Four of the seven independent variables made a unique statistically significant contribution to the model, namely little control or mastery ($p < 0.001$), inability to count on family ($p=0.027$), malnutrition ($p \leq 0.001$) and household size ($p=0.024$).

Table 3. Health-related and social risk factors by depressive symptom categories

	No depressive symptoms (score <10) (n=503)	Depressive symptoms, (n=505)	Respondents (N=1 008)	Test statistic (χ^2)	p-value
General health status				3.70	<0.289
Very good	42 (42.4)	57 (57.6)	99 (9.8)		
Good	154 (49.4)	158 (50.6)	312 (30.9)		
Average	231 (52.6)	208 (47.4)	439 (43.6)		
Poor	76 (48.1)	82 (51.9)	158 (15.7)		
Mobility				2.70	0.258
Mobile without assistance	433 (49.8)	437 (50.2)	870 (86.3)		
Mobile with assistance	70 (50.7)	68 (49.3)	138 (13.7)		
Medical history (n=1 007)					
Diabetes mellitus	100 (49.8)	101 (50.2)	201 (19.9)	0.04	0.950
Hypertension	314 (48.2)	338 (51.8)	652 (64.7)	0.04	0.134
Arthritis	126 (47.4)	140 (36.4)	266 (26.4)	0.90	0.336
Medication (n=566)				3.40	0.180
0 - 2	228 (46.2)	266 (53.8)	494 (49.0)		
≥3	34 (47.2)	38 (52.8)	72 (7.1)		
Nutrition (n=983)				63.30	<0.001*
Normal	313 (62.5)	188 (37.5)	501 (49.7)		
At risk	167 (39.8)	253 (60.2)	420 (41.7)		
Malnourished	16 (25.8)	46 (74.2)	62 (6.2)		
Disability				17.50	0.001*
No	359 (54.3)	302 (45.7)	661 (65.6)		
Mild	48 (39.7)	73 (60.3)	121 (12.0)		
Moderate	65 (46.4)	75 (53.6)	140 (13.9)		
Severe	31 (36.0)	55 (64.0)	86 (8.5)		
Pain				1.50	0.676
No	359 (49.6)	365 (50.4)	724 (71.8)		
Mild	20 (58.8)	14 (41.2)	34 (3.4)		
Moderate	57 (47.5)	63 (52.5)	120 (11.9)		
Severe	67 (51.5)	63 (48.5)	130 (12.9)		
Functioning				0.02	0.877
Dependent	18 (48.6)	19 (51.4)	37 (3.7)		
Independent	485 (49.9)	486 (50.1)	971 (96.3)		
Physical activity					
Light household task	337 (50.3)	333 (49.7)	670 (66.4)	0.10	0.722
Work in garden	45 (51.1)	43 (48.9)	88 (8.7)	0.10	0.745
Cognition				0.01	0.834
Impaired	285 (50.2)	283 (49.8)	568 (56.3)		
Normal	218 (49.5)	222 (50.5)	440 (43.7)		
Mastery					
Can do everything	247 (52.0)	228 (48.0)	475 (47.1)	1.50	0.208
No control of things that happen	234 (43.7)	302 (56.3)	536 (53.2)	17.90	<0.001*
No control of future	295 (49.2)	304 (50.8)	599 (59.4)	0.50	0.482

Continued ...

Table 3 continued. Health-related and social risk factors by depressive symptom categories

	No depressive symptoms (score <10) (n=503)	Depressive symptoms, (n=505)	Respondents (N=1 008)	Test statistic (χ^2)	p-value
Social integration					
No membership to an organisation	98 (47.1)	110 (52.9)	208 (20.6)	0.80	0.367
Cannot count on family	9 (33.3)	14 (51.9)	23 (2.3)	17.60	0.006*
Can count a little on family	47 (53.4)	32 (36.4)	79 (7.8)		
Can count a great deal on family	441 (50.3)	366 (41.8)	807 (80.1)		
Can count on a close friend	336 (49.5)	293 (43.2)	629 (62.4)	3.00	0.214

*Significance set at $p < 0.05$. Differences between groups tested with χ^2 tests and Fisher's exact tests, where appropriate.

Discussion

The study found that over half of the respondents reported the presence of depressive symptoms. This finding was consistent for all the individual 10 items in the CES-D 10. This is an unusually high prevalence, and should be considered in terms of the findings from other countries, using similar instruments. A Spanish study found a high depression prevalence of 34.5% among 85-year-old community-dwellers using the Geriatric Depression Scale (GDS). In Norway, participants in the 86 - 90-year age group reported a prevalence of 9.6% using the Hospital Anxiety and Depression Scale (HADS-D).^[14] A report from India looking at depression in villages in participants aged ≥ 60 years found a similar prevalence of 47%. The prevalence was highest among those aged ≥ 80 years, and was associated with poor socioeconomic status, female gender, illiteracy and complete dependence.^[15]

In SA studies, different prevalences have been reported. Peltzer,^[2] reported a 4% prevalence of depression in persons aged ≥ 50 years using self-reported depressive symptoms in the preceding 12 months, and Tomlinson *et al.*,^[16] using the World Health Organization Composite International Diagnostic Interview version 3.0 (CIDI 3.0) reported a lifetime prevalence of 9.7% in the overall population and 19.4% in the population > 50 years old, with the highest frequency of depression in the black population (75.4%). The lack of consistent instruments makes comparisons between groups difficult; however, the markedly higher frequency of depressive symptoms in the INK area may be explained by the unique stressors that the elderly in this area face, such as poverty, crime and the HIV and TB pandemic.^[17] Recent crime statistics released by the SA Police Services for 2012/2013 revealed that KwaMashu section E had one of the highest murder rates in the country, with 120 murders recorded for this time period.

The four factors that significantly contributed to the reports of depressive symptoms were malnutrition ($p \leq 0.001$), household size ($p = 0.024$), little control or mastery ($p < 0.001$) and an inability to count on family ($p = 0.027$). Poor nutrition has been identified as a risk factor for depression in studies from both developing and developed countries. A study of institutionalised British elderly, using the Mini-Nutritional Assessment and the Geriatric Depression Scale,^[18] found a significant association between malnutrition and depression, as did a Brazilian study.^[19] The findings in the INK population are consistent with these studies. The burden of poor nutrition may be linked to the dire financial situations in which these individuals find themselves,

as the majority of our respondents live below the poverty line, with a household income of $< \text{ZAR}1\ 600$ per month. Females may be marginalised, with lack of financial independence and in some cases be victims of abuse, which may contribute to the higher prevalence of depressive symptoms. Those individuals in larger households with grandchildren are likely to encounter an increase in financial demands to sustain the household, which may explain our findings.

Social integration and social support have to be addressed in this community, as these will enhance the sense of belonging and will positively affect depressive symptoms, as discussed by Tiesca-Molina *et al.*^[20] The ability to rely on family members for support is proven to be important to the elderly population in the current study, as with other populations.^[21] However, the breakdown of the nuclear family unit is a problem that may be difficult to remedy, as factors such as employment opportunities influence this phenomenon.

Study limitations

In this study, the CES-D 10 scale was used to assess the presence of depressive symptoms. Although the CES-D has not been designed for the clinical diagnosis of depressive disorder, but rather looks at depressive symptoms in the week preceding the interview, reported predictive validity is high, with sensitivities ranging between 97 and 100%, specificities between 84 and 93% and positive predictive values between 38 and 85%.^[22] The CES-D scale was assessed in a black SA student population in 1991, and results were comparable with those in previous reports, with similar reliability and validity scores.^[23] Similar scales, the Kessler Psychological Distress 10-item scale (K10) and the abbreviated 6-item scale (K6), were reported on in a 2011 SA study.^[24] These scales share similarities with the CES-D 10 scale. The study divided the population by ethnicity into a group comprising black individuals and another group with minorities (Indian, white and mixed ethnicity). It was reported that these scales had a lower ability to differentiate between depression and anxiety disorders in the black group, who were more likely to answer affirmatively to the questions 'How often do you feel that everything is an effort?' and 'How often do you feel worthless?'^[25] It remains to be determined if the CES-D scale has a similar limitation in the SA black population.

Conclusion

This study has shown that despite possible limitations of the instrument used, older people in the INK area reported high rates of depressive symptoms, which are comparatively greater than other

prevalence data available to date. Although they share similar risk associations and demographic profile with other populations studied in the past, in this population the additional risk factors associated with depressive symptoms may be influencing the prevalence of these symptoms. International reports have shown that depression is associated with increased overall mortality in the elderly.^[26] The INK population may therefore be at significant risk for both suicide and increased mortality in view of the high frequency of depressive symptoms shown in this study. This information should be used to screen for depressive symptoms and risk factors routinely, and the relevant bodies including healthcare practitioners, community leaders, community elders, social workers, and organisations involved with the elderly should be encouraged to become involved in promoting successful ageing.

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