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Prevalence of and factors contributing to anxiety, depression and cognitive disorders among urban elderly in Odisha – A study through the health systems' Lens

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ABSTRACT

Introduction: Growing geriatric mental health needs of urban population in India pose several programmatic challenges. This study aimed to assess anxiety, depression and cognitive disorders among urban elderly, and explore availability of social support mechanisms and of a responsive health system to implement the national mental health programme.

Methods: 244 respondents were randomly selected from Berhampur city. We administered a semi-structured interview schedule to assess substance abuse, chronic morbidity, anxiety, depression and cognitive abilities. Further, in-depth interviews were conducted with 25 key informants including district officials, psychiatrists, and programme managers. We used R software and 'thematic framework' approach, respectively, for quantitative and qualitative data analysis. Ethical standards were complied with.

Results: About half of the respondents were economically dependent; 57.3% had moderate to severe anxiety; 46.7% had moderate to severe depression; while about 25% had severe cognitive impairments. We found association of chewing tobacco (1.34(0.28–2.40)) and depression (0.52(0.37–0.68)) with anxiety; negative perception about elderly-friendly society (1.64(0.75–2.53)) and physical inactivity (2.88(1.60–4.16)) with depression; and age (-0.11(-0.20 – -0.02)) and physical inactivity (-3.44(-5.13 – -1.74)) with cognitive disorders. Qualitative analysis revealed lack of awareness, social stigma, poor availability of trained human resources, and poor political commitment as important systemic barriers to early detection and treatment of mental ailments among the elderly.

Conclusion: Establishing tobacco cessation centres, sensitizing community about mental health needs of elderly, incentivizing physical activity of elderly, integrating mental health with primary care, multi-skilling providers and developing a cadre of community counsellors need urgent attention of policy makers and programme implementers.

1. Background

Aging is an infallible phenomenon of life, and the mental health needs of an ever-growing elderly population is fast increasing (Abdul Manaf, Mustafa, Abdul Rahman, Yusof, & Abd Aziz, 2016; Banjare, Dwivedi, & Pradhan, 2015; Dai et al., 2016). The onset of old age is an insidious process; however, the signs and symptoms of onset of old age begins much earlier, these days, due to increased stress in family life, professional competition, irregular sleep, improper dietary habits, and lack of physical and mental relaxation opportunities. The World Health Organization (WHO) has estimated that the proportion of the world's elderly people over 60 years will be doubled from 11% to 22% between the year 2000 and 2050 (Abdul Manaf et al., 2016; Dai et al., 2016). Another estimation points that by 2020 there would be about one billion elderly people (65 + years) in the world (Banjare & Pradhan, 2014). This increase in the proportion of aging population is mostly due to increase in life expectancy (Abdul Manaf et al., 2016; Dai et al., 2016). In India the elderly constitutes about a tenth of the total population, estimated to touch 198 million by 2030 (Banjare & Pradhan, 2014).

Mental disorders are a leading contributor to the global disease burden (Charara et al., 2017). In India the burden of mental and behavioural disorders in the community ranges from 9.5 to 103 per 1000

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population (Paul & Asirvatham, 2016). Although accepted as normal, some of the mental health problems could turn pathological unless identified and treated early (Abdul Manaf et al., 2016). Recent studies indicate that over 20% of the elderly suffer from some or other mental illnesses - anxiety, depression and cognitive disorders (ADC) being the commonest (Abdul Manaf et al., 2016; Cao et al., 2016). From the health systems' point of view, old age poses many physical, mental and social health challenges (Abdul Manaf et al., 2016; Dai et al., 2016; National Human Rights Commission, N. D., 2011).

Both, demand- and supply-side factors through complex set of interactive processes pose significant challenges to programme managers in addressing mental health needs of a vast majority of elderly population in India (Abdul Manaf et al., 2016; Maulik, Tewari, Devarapalli, Kallakuri, & Patel, 2016). Moreover, state governments including Odisha are struggling with the task of reducing this burden (World Health Organization, 2005).

Eaton has categorized mental disorders among adults into eleven major types (Eaton et al., 2008). However, there is little known evidence regarding the spectrum of mental health problems among the elderly population in Odisha in general and those residing in urban/peri-urban pockets in particular. The importance of this study may be construed from the fact that most of the mental health studies in Odisha so far have focused on singular mental traits of rural population. This paper aims to a) assess the prevalence of depression, anxiety and dementia among the urban elderly in Odisha; and b) explore about availability of social support mechanisms and a responsive health system to implement the national mental health programme.

2. Methodology

2.1. Study design

A cross-sectional design was followed for collecting primary data from the sample respondents during April to June 2017 in Berhampur city, Odisha. We chose Berhampur for its large population size and relatively stable pie of city dwellers, mostly locals, while other cities as Bhubaneswar and Cuttack have large number of migrant and non-localite population (Odisha, G. of. (n.d.) (2018)). Berhampur is located about 180 km south of Bhubaneswar; as per Census 2011 report, it is the fourth most populous urban city in Odisha and 126th in India (Odisha, G. of. (n.d.) (2018)).

2.2. Sampling

The catchment area of Berhampur Municipal Corporation (BeMC) has 40 Wards. By using cluster sampling technique, five out of forty Wards were selected at random in the first stage. Data regarding the list of elderly of these five Wards were obtained from the office of the Sub-collector, Ganjam. Further, the list of elderly was verified from the website of the office of the Chief Electoral Officer, Odisha (Chief Electoral Officer, O. (n.d.). (2018)) and of the commissioner, city programme management unit (CPMU) of national urban health mission (NUHM). In absence of context-specific prevalence figures for Berhampur city, we considered the prevalence of depression at an estimated 20% (as found in another Malaysian study). With 5% relative precision, we found 244 sample was sufficient to offer 80% power; design effect was not considered for two reasons: a) Berhampur city has a relatively stable and non-migrant elderly population, thus less inter-cluster variance; b) There was no earlier studies in the city to consider a suitable design effect for this study. We used the following formula for sample size estimation: $Z2*p*q/d2$ where z = 1.96, p = prevalence, q = 100-p, d = precision. After assessing the social and mobility patterns of elderly people residing in the city, we expected a 10% of non-response rate, and thus the total sample size was 268. From each Ward 48 elderly individuals was selected randomly, using a simple random technique. Elderly above 60 years with visual and hearing impairments / seriously ill were excluded from the study.

2.3. Data collection tools

For objective 1, a semi-structured interview schedule was developed and validated beforehand. The schedule consisted of five sections: self-developed sections on a) socio demographic information and on b) chronic morbidity status; standardized assessment tools for c) anxiety-related disorders; d) depression-related disorders; and e) dementia-related disorders. The Generalised Anxiety Disorder-7 (GAD-7) was used to determine presence of anxiety disorders (Kader Maideen, Mohd Sidik, Rampal, & Mukhtar, 2015; Spitzer, Kroenke, Williams, & Löwe, 2006; Swinson, 2006). The scale contained 7 items - each item scored from 0 to 3 and the total score ranged from 0 to 21. We asked respondents to recall up to two weeks prior to interviewing, about occurrence of specific problems; their responses were captured in a three point scale of not at all sure = 0, several days = 1, over half the days = 2, and nearly every day = 3. The scores were added up to get the total GAD score for each respondent. For analysis, we considered the aggregate score of 0–5 as mild anxiety, 6–10 as moderate anxiety, 11–15 as moderately severe anxiety, and 16–21 as severe anxiety.

The Geriatric Depression Scale (GDS 15 item scale) was used for self-rated assessment of depression (Brink et al., 1982; Dias et al., 2017; Kattimani, Roy, Premarajan, Sarkar, & Sarkar, 2015; Marc, Raue, & Bruce, 2008; Sengupta & Benjamin, 2015; Yesavage et al., 2018; Yesavage & Sheikh, 1986). We chose this scale because it could be administered to both healthy, medically ill and cognitively impaired elderly. The scale was composed of 15 self-rating items with a 'yes/no' response option. Each 'yes' scored 1 point and each 'no' scored 0, except questions 1, 5, 7, 11, and 13 which were scored in the converse, that is, each 'no' obtained 1 point and each 'yes' obtained 0 points. The score ranged from minimum 0 to maximum of 15. The aggregate scores were categorized as: 0-4 = normal, 5-8 = mild depression, 9-11 = moderate depression and 12-15 = severe depression.

Finally, the Mini Mental State Examination (MMSE) scale was used for quantitatively estimating the severity of cognitive impairment among elderly population (Chapman et al., 2016; Folstein, Folstein, & McHugh, 1975; Sengupta & Benjamin, 2015). The scale consists of 11 questions or activities on. Scoring was done on the basis of one point for each correct response within each question or activity. Scores ranged from 0 to 30 were interpreted as: 26-30 = no cognitive impairment, 21-25 = mild cognitive impairment, 11-20 = moderate cognitive impairment, and 0-10 = severe cognitive impairment. GAD-7, GDS-15 and MMSE are standardized tools, expressed in terms of self-reported signs and symptoms, therefore their translated versions didn't compromise internal validity.

For objective ll, in order to explore availability of support mechanisms and existence of responsive health system, in-depth interviews were conducted with 25 key informants. Each in-depth interview lasted for 30–40 minutes. District officials of health and family welfare (H&FW) department, political leaders, social activists, administrative department officials, community representatives, physicians and psychiatrists were among those interviewed. The tool contained questions related to availability of support system at family, society levels, social stressors, treatment facilities, barriers in seeking mental health services, and government initiatives aimed at improving mental health of elderly people. It further asked questions on factors contributing to mental illnesses, existence of social stigma, coordination between district health department and local bodies, and suggested approaches to improve the situation.

2.4. Data analysis

The collected data were entered into excel sheet and analysed using R open source software. Descriptive and analytical statistics was used to present/infer the results. The distribution of GDS, GAD and MMSE

scores was analysed across age categories. Fisher exact test for categorical variables and ANOVA for continuous variables were used to assess significance of associations. Further, we modelled each of the three outcome variables separately, using linear regression frameworks, based on the equation: $Y = \beta_0 + \beta_1 X + \varepsilon$, where Y is the outcome variable of interest, X is the matrix of exposure and co-variates, β_1 is the fixed-effect regression coefficient, β_0 signifies intercept, and ε is the vector of errors. After the initial estimation of un-adjusted models, we estimated the fully-adjusted strength of associations among all un-adjusted significant outcome variables. For presentation of qualitative, in-depth interviews we adopted a "thematic framework" approach - major concepts were organised into emerging themes.

2.5. Ethical issues

Data collection tools were translated into Odiya language. Interviews were conducted in local language. Informed consent was obtained from each interviewee before conducting interviews. Privacy and confidentiality of the respondents and of the households was ensured through response/household coding. The study obtained ethical approval from an independent institutional ethics committee (IEC) of IIPHB. No financial compensation was offered to any of the respondents during data collection from April to June 2017.

3. Results

3.1. Prevalence of anxiety, depression and congnitive disorders

3.1.1. Socio-demographic features

Of the 244 respondents interviewed, 34.4% were of 60–64 years age, 45% were of 65–75 years and 20.4% of ≥ 75 years. Fifty two percent of the respondents were females. Majority of the respondents (67.2%) were married, while 32.4% were widowed. Less than half (42.7%) respondents were educated up to 10th standard and above. About 50.8% said they were completely 'financially dependent' upon their children and other family members, while about 13.9% felt they 'depended partially'. Further, about 58.6% resided in the joint family system, and 63.5% perceived themselves to be 'physically active'; the average working hours was found to be 5.8 h (± 3.3) a day. About a third felt the city services were not 'elderly-friendly', while 16.4% of them didn't have any knowledge about availability of social support systems in the city (Table 1).

3.1.2. Substance abuse, multi-morbidity and mental status

With respect to the pattern and habit and substance abuse, it was found that almost all study respondents were addicted to some or other forms of substance abuse. Chewing tobacco (36.5%), pan (34%), smoking (18%), alcohol consumption (4.1%), and opium consumption (2%) was found to be in the descending order. In terms of their multi-morbidity status, the most common conditions were osteoarthritis (60.7%), hypertension (53.7%), and diabetes mellitus (25.4%). Other less prevalent conditions were respiratory diseases (10.7%), and a wide variety of other chronic health conditions (48.4%) that included piles, indigestion, skin disorders, thyroid dysfunctions, leukoderma, cataract, Parkinson's disease, enlargement of prostate, and paralysis, among others.

With respect to the anxiety levels we found that about two fifth of the study respondents (42.6%) exhibited symptoms of mild anxiety; whereas 38.1% had moderate level of anxiety, while the rest one fifth (18.4%) had moderately severe anxiety, though very few respondents (0.8%) had very severe anxiety. Analysis of GDS score revealed that about one third of the study respondents (29.5%) had normal score with no symptoms of depression, while about 23.8% had mild depression; about 13.9% had moderate depression and the rest 32.8% respondents had symptoms of severe depression (Table 2). With regard to dementia, it was found that about 13.5% respondents had no cognitive impairment or dementia; whereas about one fourth of the respondents (25%) had mild dementia; while maximum respondents had moderate cognitive impairment or dementia (35.7%), about one-fourth (25.8%) suffered from severe cognitive impairment (Table 2). Moreover, the socio-demographic characters and substance abuse behaviour, multi-morbidity status and mental health status varied significantly across three age groups (Table 1, Table 2).

In the next level of analysis we examined the adjusted association of social and behavioural determinants with mental health status of the study participants as obtained through the GAD, GDS and MMSE scales. Chewing tobacco and geriatric depression emerged as key factors significantly associated with generalized anxiety, with beta coefficient of 1.34(0.28, 2.40) for those chewing tobacco; and of 0.52(0.37, 0.68) for those having high geriatric depression scores, respectively.

Estimates from fully adjusted models revealed that the Beta coefficient for mean depression score was 1.64(0.75–2.53) among those respondents who felt that the society was 'elderly friendly', and 2.88(1.60–4.16) among 'physically inactive' category of respondents. Further, depression score was also found to be significantly associated with both anxiety score 0.33(0.23 – 0.43) and the mental (cognitive) abilities score -0.2(-0.38 – -0.02). Similarly, increased age (-0.11(-0.20, -0.02)), physical inactivity (-3.44(-5.13 – -1.74)) and geriatric depression score (-0.2(-0.38 to -0.02)) was found to be associated with decreased mean mental (cognitive) state score. (Tables 3 and 4)

3.2. Availability of social support and of a responsive health system

After analysis of the in-depth interview of key informants, we summarized the findings in to specific themes: major psychological problems, difficulties in early diagnosis, social stigma associated with mental conditions, availability of mental health services, creating community awareness, public health programmes, inter-departmental coordination, and recommendations.

3.2.1. Major psychological problems

Key informants cited loneliness, anxiety, insomnia and cognitive impairments as the main problems that elderly in their communities faced. Many of them mentioned about memory loss, irritation, sense of insecurity, feeling neglected by children as associated problems of the elderly. When asked to explain the causes of such problems, domestic conflict in joint families, difference in opinion between generations and family members, misunderstanding were cited as major factors. Overcrowding, poor traffic and unsafe road conditions were also cited as the factors that needed solutions from other departments. Family tension for delay in marriage of daughters and death of spouse or children were also cited as precipitating factors. One of the key informants said "pessimistic attitude towards life, gender inequality often causes more mental distress among females". "Nuclearisation of families, stressful professional life, prolonged legal battles, and lack of mental relaxation platforms contribute to aggravation of the situation", another respondent informed.

3.2.2. Difficulties in early diagnosis

When asked about the difficulties that they were facing in early identification of such problems, most of the informants felt that the family members often chose to hide the mental health problems of elderly, since they think that it would ruin 'dignity' and 'reputation' of the family. Many informants added that lack of awareness among patients and family members, non-cooperation of patients often leads to difficulty in early identification of the mental health issues. A few informants also emphasised on lack of knowledge to differentiate the deranged mental state from normalcy; they further added that no one gives much importance to the altered state of mind as long as it is not fatal.

Table 1
Socio demographic characteristic features of respondents.

	60-64 yrs No. 84	65-74 yrs No. 110	75 yrs and above No. 50	Total No. 244	P-value
Gender					
Male	39 (46.4%)	60 (54.5%)	18 (36.0%)	117 (48.0%)	0.094
Female	45 (53.6%)	50 (45.5%)	32 (64.0%)	127 (52.0%)	
Marital status					
Married	71 (84.5%)	77 (70.0%)	16 (32.0%)	164 (67.2%)	< 0.0001
Widowed	12 (14.3%)	33 (30.0%)	34 (68.0%)	79 (32.4%)	
Divorced	1 (1.2%)	0 (0.0%)	0 (0.0%)	1 (0.4%)	
Educational level					
Illiterate	12 (14.3%)	28 (25.5%)	26 (52.0%)	66 (27.0%)	0.003
Primary	26 (31.0%)	32 (29.1%)	11 (22.0%)	69 (28.3%)	
High school	21 (25.0%)	22 (20.0%)	4 (8.0%)	47 (19.3%)	
Graduation	19 (22.6%)	22 (20.0%)	6 (12.0%)	47 (19.3%)	
Post-graduation	6 (7.1%)	6 (5.5%)	3 (6.0%)	15 (6.1%)	
Economical dependency					
Economically dependent	31 (36.9%)	57 (51.8%)	36 (72.0%)	124 (50.8%)	0.002
Economically Independent	38 (45.2%)	36 (32.7%)	12 (24.0%)	86 (35.2%)	
Economically partially dependent	15 (17.9%)	17 (15.5%)	2 (4.0%)	34 (13.9%)	
Family type					
Joint family	36 (42.9%)	73 (66.4%)	34 (68.0%)	143 (58.6%)	0.002
Nuclear family	48 (57.1%)	37 (33.6%)	16 (32.0%)	101 (41.4%)	
Physical ability					
Physically active	75 (89.3%)	70 (63.6%)	10 (20.0%)	155 (63.5%)	< 0.0001
Physically inactive	9 (10.7%)	40 (36.4%)	40 (80.0%)	89 (36.5%)	
Daily working hours					
Mean (SD)	8.0 (± 2.9)	5.4 (± 2.7)	2.9 (± 2.3)	5.8 (± 3.3)	< 0.0001
Personal monthly income					
Mean (SD)	13,845.2 (± 18,419.1)	8054.5 (± 11,387.1)	6520.0 (± 13,803.6)	9733.6 (± 14,890.0)	0.006
Perception about social support					
Elderly friendly	40 (47.6%)	39 (35.5%)	8 (16.0%)	87 (35.7%)	0.012
Not elderly friendly	30 (35.7%)	50 (45.5%)	26 (52.0%)	106 (43.4%)	
Do not know	12 (14.3%)	17 (15.5%)	11 (22.0%)	40 (16.4%)	

Table 2
Substance abuse, morbidity status and mental health status.

	60-64 yrs No. 84	65-74 yrs No. 110	75 yrs and above No. 50	Total No. 244	P-value
Substance abuse					
Chewing tobacco	27 (32.1%)	42 (38.2%)	20 (40.0%)	89 (36.5%)	0.58
Pan	28 (33.3%)	43 (39.1%)	12 (24.0%)	83 (34.0%)	0.17
Smoking	16 (19.0%)	22 (20.0%)	6 (12.0%)	44 (18.0%)	0.49
Alcohol	6 (7.1%)	4 (3.6%)	0 (0.0%)	10 (4.1%)	0.11
Opium	2 (2.4%)	3 (2.7%)	0 (0.0%)	5 (2.0%)	0.72
Chronic morbidity					
Hypertension	39 (46.4%)	62 (56.4%)	30 (60.0%)	131 (53.7%)	0.23
Diabetes Mellitus	24 (28.6%)	29 (26.4%)	9 (18.0%)	62 (25.4%)	0.39
Chronic respiratory diseases	9 (10.7%)	11 (10.0%)	6 (12.0%)	26 (10.7%)	0.96
Osteoarthritis	44 (52.4%)	64 (58.2%)	40 (80.0%)	148 (60.7%)	0.004
Stroke	0 (0.0%)	2 (1.8%)	2 (4.0%)	4 (1.6%)	0.2
Neoplasm	1 (1.2%)	1 (0.9%)	0 (0.0%)	2 (0.8%)	1
Heart disease	2 (2.4%)	4 (3.6%)	2 (4.0%)	8 (3.3%)	0.81
Any other	35 (41.7%)	48 (43.6%)	35 (70.0%)	118 (48.4%)	0.003
Geriatric depression scale (GDS-15)					
Normal	37 (44.0%)	31 (28.2%)	4 (8.0%)	72 (29.5%)	< 0.0001
Mild depression	28 (33.3%)	26 (23.6%)	4 (8.0%)	58 (23.8%)	
Moderate depression	10 (11.9%)	17 (15.5%)	7 (14.0%)	34 (13.9%)	
Severe depression	9 (10.7%)	36 (32.7%)	35 (70.0%)	80 (32.8%)	
Generalized anxiety disorder scale (GAD-7)					
Mild anxiety	50 (59.5%)	37 (33.6%)	17 (34.0%)	104 (42.6%)	0.0009
Moderate anxiety	24 (28.6%)	52 (47.3%)	17 (34.0%)	93 (38.1%)	
Moderately severe anxiety	10 (11.9%)	19 (17.3%)	16 (32.0%)	45 (18.4%)	
Severe anxiety	0 (0.0%)	2 (1.8%)	0 (0.0%)	2 (0.8%)	
Mini - mental state Examination score (MMSE)					
Severe cognitive impairment	9 (10.7%)	23 (20.9%)	31 (62.0%)	63 (25.8%)	< 0.0001
Moderate cognitive impairment	29 (34.5%)	46 (41.8%)	12 (24.0%)	87 (35.7%)	
Mild cognitive impairment	29 (34.5%)	28 (25.5%)	4 (8.0%)	61 (25.0%)	
No cognitive impairment	17 (20.2%)	13 (11.8%)	3 (6.0%)	33 (13.5%)	

Table 3
Social determinants and mental health status.

	Geriatric depression scale (GDS)		Generalized anxiety disorder (GAD)		Mini- Mental state examination (MMSE)	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Gender						
Male	ref	ref	ref	ref	ref	ref
Female	2.79(1.63 – 3.96)	0.53(-0.43 – 1.50)	1.61(0.57 – 2.65)	−0.44(-1.55 – 0.67)	−6.71(-8.38 – -5.05)	−1.02(-2.44 – 0.39)
Age in completed years	0.14(0.07 – 0.22)	0.05(-0.02 – 0.11)	0.34(0.26 – 0.43)	−0.02(-0.10 – 0.06)	−0.51(-0.64 – -0.39)	−0.11(-0.20 – -0.02)
Highest education ~ c						
Illiterate	ref	ref	ref	ref	ref	ref
Primary	−3.04(-4.45 – -1.63)	1.25(0.05 – 2.46)	−2.68(-3.98 – -1.37)	−1.55(-3.04 – -0.06)	7.17(5.73 – 8.62)	4.2(2.70 – 5.70)
High school	−5.67(-7.24 – -4.11)	1.27(-0.34 – 2.88)	−3.77(-5.21 – -2.32)	−1.83(-3.79 – 0.13)	12.9(11.30 – 14.50)	7.8(5.95 – 9.64)
Graduation	−6.06(-7.62 – -4.49)	2.07(0.19 – 3.95)	−4.53(-5.98 – -3.09)	−2.68(-4.90 – -0.46)	14.87(13.27 – 16.47)	8.86(6.67 – 11.04)
Post-graduation	−6.57(-8.91 – -4.23)	1.82(-0.53 – 4.17)	−4.48(-6.65 – -2.31)	−2.77(-5.58 – 0.04)	17.55(15.16 – 19.95)	11.33(8.64 – 14.02)
Family type						
Joint family	ref	———	ref	———	ref	ref
Nuclear family	−0.77(-2.00 – 0.46)	———	0.56(-0.51 – 1.63)	———	4.09(2.27 – 5.92)	1.44(0.37 – 2.51)
Economical dependency						
Economically dependent	ref	ref	ref	———	ref	ref
Economically partially dependent	−2.36(-4.01 – -0.71)	−0.01(-1.19 – 1.17)	−0.66(-2.19 – 0.87)	———	4.28(2.01 – 6.56)	−0.45(-2.01 – 1.11)
Economically Independent	−4.63(-5.83 – -3.43)	−0.94(-1.98 – 0.10)	−2.8(-3.91 – -1.69)	———	9.57(7.92 – 11.22)	0.59(-0.79 – 1.97)
Social support						
Elderly friendly	ref	ref	ref	ref	ref	ref
Not elderly friendly	5.28(4.11 – 6.46)	1.64(0.75 – 2.53)	1.98(0.81 – 3.15)	−1.52(-2.63 – -0.40)	−7.46(-9.29 – -5.63)	−0.92(-2.14 – 0.30)
Do not know	5.41(3.86 – 6.96)	1.6(0.52 – 2.69)	2.24(0.70 – 3.79)	−1.18(-2.55 – 0.18)	−7.81(-10.22 – -5.40)	−0.25(-1.73 – 1.22)
Ability to work						
Physically active	ref	ref	ref	ref	ref	ref
Physically inactive	7.21(6.34 – 8.08)	2.88(1.60 – 4.16)	3.72(2.72 – 4.71)	0.28(-1.32 – 1.87)	−10.33(-11.76 – -8.90)	−3.44(-5.13 – -1.74)

3.2.3. Social stigma associated with mental conditions

Majority of families don't come forward for regular mental health check-ups because they feel detection of any abnormality would cause great social stigma i.e. fear, shyness, and shame. One of the informants told that even today people are having misconception that mental diseases are caused due to some 'curse or past sin', thus they don't discuss it openly, rather go to a traditional faith healer. "People hide the problem because they feel public disclosure would cause delay in finalizing marriage proposals of their children, especially daughters", said one respondent.

Table 4
Behavioural determinants and mental health status.

	Geriatric depression scale (GDS)		Generalized anxiety disorder (GAD)		Mini- Mental state examination (MMSE)	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Substance abuse						
Chewing tobacco	2.53(1.30 – 3.75)	0.04(-0.84 – 0.91)	3.03(2.00 – 4.06)	1.34(0.28 – 2.40)	−6.12(-7.90 – -4.35)	−0.64(-1.78 – 0.50)
Pan	−1.79(-3.05 – -0.52)	0.25(-0.53 – 1.02)	−0.63(-1.74 – 0.49)	———	2.93(0.99 – 4.86)	−0.08(-1.11 – 0.95)
Smoking	−0.84(-2.41 – 0.74)	———	0.34(-1.03 – 1.72)	———	3.52(1.13 – 5.90)	−0.38(-1.76 – 1.01)
Alcohol	−2.91(-5.95 – 0.14)	———	−0.5(-3.17 – 2.17)	———	6.95(2.33 – 11.58)	1.44(-1.05 – 3.93)
Opium	−4.88(-9.13 – -0.63)	−1.54(-3.92 – 0.85)	−0.59(-4.33 – 3.14)	———	7.32(0.79 – 13.84)	0.8(-2.37 – 3.96)
Disease suffering from						
Hypertension	0.58(-0.64 – 1.79)	———	0.75(-0.30 – 1.81)	———	0.41(-1.46 – 2.28)	———
Diabetes Mellitus	−1.02(-2.41 – 0.37)	———	−1.02(-2.23 – 0.19)	———	2.2(0.08 – 4.33)	−0.08(-1.17 – 1.00)
Chronic respiratory diseases	2.2(0.25 – 4.15)	0.23(-0.87 – 1.33)	1.5(-0.21 – 3.21)	0.27(-1.09 – 1.63)	−3.04(-6.04 – -0.04)	−0.25(-1.73 – 1.22)
Osteoarthritis	3.65(2.49 – 4.80)	−0.01(-0.88 – 0.85)	1.85(0.79 – 2.91)	−0.14(-1.20 – 0.92)	−6.87(-8.57 – -5.17)	0.22(-0.94 – 1.37)
Stroke	5.36(0.62 – 10.10)	1.52(-1.17 – 4.22)	3.22(-0.93 – 7.37)	———	−2.37(-9.72 – 4.97)	———
Neoplasm	1.93(-4.81 – 8.67)	———	5.46(-0.37 – 11.30)	———	−0.34(-10.69 – 10.02)	———
Heart disease	3.54(0.16 – 6.92)	1.08(-0.90 – 3.07)	3.53(0.59 – 6.48)	2.08(-0.37 – 4.53)	3.79(-1.43 – 9.01)	———
Geriatric Depression Scale (GDS)	———	———	0.53(0.44 – 0.62)	0.52(0.37 – 0.68)	−1.03(-1.17 – -0.89)	−0.2(-0.38 – -0.02)
Generalized Anxiety Disorder (GAD)	0.7(0.58 – 0.81)	0.33(0.23 – 0.43)	———	———	−0.74(-0.95 – -0.54)	0.08(-0.06 – 0.22)
Mini- Mental State Examination (MMSE)	−0.44(-0.50 – -0.38)	−0.12(-0.23 – -0.02)	−0.24(-0.30 – -0.17)	0.08(-0.04 – 0.21)	———	———

3.2.4. Availability of mental health services

Most of the informants felt that inadequate human resource or mental health professionals for early diagnosis and treatment of mental illness was the main barrier in providing adequate mental health services. Non-availability, unaffordability and poor accessibility of mental health services were cited as the key systemic bottlenecks for poor state of affairs. Few informants told that non-availability of mental hospitals or mental health services in public health system, and non-availability of social activists, psychotherapists and counsellors in the area were the gaps in service provision.

3.2.5. Creating community awareness

Almost all key informed felt that the community awareness about mental health was abysmally low. They opined that involvement of electronic media, print media, and social media, campaigning by role models, involving school children and youth in road shows, wall paintings, posters, banners, street plays, and AV shows in cinema and theatres could be used as the main strategies to improve awareness about mental health of elderly. Further, introduction of mental health education at school level, workshops in offices and workplaces to control mental stress, sensitizing the public about importance of mental health were felt to be important considerations. Some informants felt that *municipalities* and *panchayats* should be empowered to implement mental health programmes at local level.

3.2.6. Public health programmes

Most of the key informants felt that the government didn't have any macro level policies and micro level programmes directed at elderly people. 'Establishment of 3–4 parks and only one library by BeMC was just a drop in the ocean', said one informant. However, some of them mentioned that geriatric clinic for elderly at district hospital (DH) and medical colleges, 'senior citizens' club (by BeMC), 'senior citizens' desk in every police station, *chardham yatra* are some of the initiatives taken by government to improve sense of self-respect among the elderly.

3.2.7. Inter-departmental coordination

Most of the key informants were dissatisfied about the coordination among health department and other local bodies with respect to implementation of targeted interventions for elderly people in the city. One informant said 'coordination seems futile and that coordination existed only on pen and paper'. A few informants complained that due to poor inter-departmental coordination at district level, the mental health programme couldn't reach the targeted beneficiaries.

3.2.8. Suggested approaches

Appointment psychiatrists, psychologists, counsellors, and social workers to improve mental health of the elderly was the key recommendation. Integration of mental health services at all three levels of service delivery was proposed as the recommended strategy.

Moreover, regular IEC and BCC activities, awareness programmes through media regarding symptoms/effect and scope of treatment for various mental diseases, training of health workers, medical and paramedical workers, surveillance, mandatory yearly health check-up of all elderly, construction of parks, club, and playgrounds in the government abandoned lands, sensitization programmes for doctors, inclusion of mental health as a curriculum in higher secondary and high school syllabus were other key recommendations.

4. Discussion

There is very limited evidence on prevalence of anxiety, depression and cognitive impairments among the urban elderly of Odisha state. Out study found that age is strongly associated with depression and cognitive impairment. For instance, in 60–69 years age group, 59% respondents reported symptoms of depression, the same in 80–90 years age group was almost 90%. About 80% people were having severe cognitive impairment in the age group of 80–90 years as compared to 15.5% in the age group of 60–69 years. Female respondents reported twice more depressive tendencies and five times more cognitive impairment as compared to male counterparts. Married persons with living spouses were less likely to suffer from anxiety disorders, depression and dementia as compared to those without living spouses. Married single women suffered from anxiety and depression due to loneliness, emotional stress, grief and economical dependency. Further, educational status was found to be significantly associated with depression; and the nexus between anxiety, depression and substance abuse (tobacco and alcohol) was clearly evident. Absence of domestic support and care from the children/family members were associated with reporting of anxiety, depression and cognitive impairment. Perception of availability of social support mechanism was directly associated and physical activity was inversely associated with all three (ADC) mental conditions. On the other hand, the delay in diagnosis of ADC disorders was due to lack of awareness, negligence by self or family members, social stigma, and fear and shyness at individual/family level.

Recent evidences are in sync with our findings (Abdul Manaf et al., 2016; Banjare et al., 2015; Charara et al., 2017; Giri, Chen, Yu, & Lü, 2016; Perkins et al., 2016; Shidhaye, Gangale, & Patel, 2016). The study by Bansal et al pointed that as compared to Punjab, the Odisha city dwellers were less affected by severe depression and anxiety (Bansal et al., 2015). Using GDS-30, a study in Haryana identified female gender, chronic morbidity, ignoring the elderly during household decision making, idle time, and death of close relatives as significant risk factors of depression in the elderly (Pilania, Bairwa, Khurana, & Kumar, 2017). Yet another study in Ludhiana assessed depression through GDS-15, cognitive impairment through MMSE and physical impairment with the help of Everyday Ability Scale for Indian (EASI), and found prevalence of depression at 8.9%; it further concluded that urban residence, female gender, higher age, nuclear family, poverty, and functional and cognitive impairments are risk factors associated with depression (Sengupta & Benjamin, 2015).

The findings from our study have important policy implications: the key prescriptions of the national health policy 2017, such as, creation of more specialist providers, strengthening the psycho-social support through a network of community members, and using digital technology to connect with Psychiatrists (Ministry of Health & Family Welfare, 2017) need to be systematically studied. Though the national mental health programme (NMHP) of the elderly focuses on Alzheimer's, dementia, Parkinson's disease, depression and psycho-geriatric disorders (National Human Rights Commission, N. D., 2011), specific strategies for the urban residents need special emphasis. Moreover, there is scarcity of systematically collected data on the mental health status of elderly population across the country, though the demand for comparable disaggregated statistics is persistent for almost all types of indicators (Saxena et al., 2007; World Health Organization, 2017). Second, the National Programmes for Health Care for Elderly (NPHCE) aims to improve access to promotive, preventive, curative and rehabilitative services through primary health care approach (Government of Odisha, 2016), but in a city like Berhampur, there aren't many urban health centres. Third, the National Policy for Older Persons (NPOP) of 1999 aims to promote health, safety, social security and wellbeing of the elderly population through the National Council for Older Persons (NCOP) (National Human Rights Commission, N. D., 2011), but it lacks integration with the mainstream primary care (Ferris et al., 2018). Last, India historically has a low median of 0.2 Psychiatrists per 100,000 people as compared to the global median of 1.2 (Zieger et al., 2016). Therefore, the need for early screening, diagnosis and treatment as the main strategy can hardly be overemphasized (Luchesi et al., 2018). Scarcity of mental health professionals, faith in traditional healers and cultural barriers need to be addressed on priority.

This study is the first comprehensive, and contextualized

understanding of mental health status of Berhampur city, Odisha. The findings of this study may be generalized cautiously, since prevalence of mental disorders could vary across settings. Self-reporting and recall for two weeks could have introduced some recall bias. However, it is evident that policy makers and programme implementers need to consider a 'continuum of care' approach to offer geriatric care as a part of universal health coverage strategy. Advocacy to introduce elderly-friendly legislation is as important as offering community-based education about mental health needs of the elderly. Therefore, the national programmes may focus on alleviating loneliness, providing community-based companions and counsellors in urban settings. Early detection and treatment of mental disorders of urban elderly could be further strengthened through improved inter-sectoral coordination, active involvement of media, local municipality, non-government organizations and volunteers. The future course of enquiry need to focus more on understanding the socio-cultural factors contributing to ADC disorders, and on scientific evaluation of national programmes on mental health.

5. Conclusion

The prevalence of ADC disorders among urban residents of Berhampur city in Odisha has variations across age, gender, education, perception of social support and income. Though aging can't be controlled, government policies should focus on encouraging physical activity, offering educational support and improving perception about availability of elderly-friendly environment. Further, improving family support and participation in decision making need interventions at 'family' level which could be facilitated through community awareness campaigns and inter-personal communication. Insufficient primary care centres, non-availability of trained mental health professionals, lack of community awareness, and stigma associated with mental disorders are key systemic barriers to effective implementation of national programmes on mental health. Many of these gaps could be addressed through legislation, resource allocation, and efficient programme implementation.

Conflict of INTERST

The authors declare that there is no conflict of interest whatsoever in conducting and publishing this study.

CONTRIBUTION OF AUTHORS

SN conceptualized the study, collected data, analyzed data and prepared the draft report. MKM analysed the data and contributed to the report preparation. BP contributed in conceptualization of the study, data collection, analysis and report finalization.

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