

# EPIDEMIOLOGICAL STUDY OF DEPRESSION AMONG POPULATION ABOVE 60 YEARS IN VISAKHAPATNAM, INDIA

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## ABSTRACT

**Background:** As the World's population is ageing, there is growing interest in various morbidity patterns among the elderly. Depression and depressive symptoms are common in elder people. Often depression is difficult to recognize.

**Aims & Objective:** The study aims to assess the prevalence of Depression among study population and its relationship with socio demographic factors, co-morbid illness and functional impairment.

**Material and Methods:** A community based cross-sectional study was done in selected rural & urban field practice areas of Department of SPM by means of simple random sampling. 17,415 populations were screened from 3383 households in both rural and urban areas to identify 1200 elderly aged 60 and above were administered with pretested questionnaire incorporating geriatric depression scale for assessing Depression.

**Results:** The prevalence of Depression among study population was 31.7% (317/1000). The prevalence was high in rural areas (36%), as compared to urban areas (27%) and increasing with increasing age. It was significantly high among females (37.5%), singles (46%), staying alone (65%), low socio-economic group (34%), those with stressful life events (71%). The most common illnesses among the study population with depression were osteoarthritis (43.9%) cataract (25.2%), hypertension (17.6%), diabetes (7.6%) and heart diseases (3.9%). It was observed that functional impairment was high among those who have depression (6.5%).

**Conclusion:** Depression is relatively high in rural area, females, illiterates, singles and sufferers of stressful life events or chronic diseases. There is a significant functional impairment with presence of Depression.

**KEY-WORDS:** Geriatric; Depression; Socio-Demographic Factors; Co-Morbid Illness; Functional Impairment

## Introduction

As the World's population is ageing, there is growing interest in various morbidity patterns among the elderly. Depression and depressive symptoms are common in elder people. Often depression is difficult to recognize. Sometimes slowing of activity, fear or lack of pleasure or lack of interest in work is thought to be due to normal ageing. Around 200 million people suffer from mood disorders such as chronic and manic depression. World Bank report on Global burden of disease (GBD) 2000 shows depression accounted for 10% of all DALYs with a projected rise up to 15% by year 2020.<sup>[1]</sup>

Depression is likely to increase in number due to increase in life expectancy, rapidly changing social and physical environment that gives rise to psychological stress, breaking of traditional protective measures, increase in morbidity due to chronic non communicable disease and increase

in medicaments and alcohol. Depression is not a normal part of ageing. Various studies have reported prevalence rates ranging from 25 -50%. As it is often undiagnosed and untreated in the elderly, depression causes needless suffering for the individual & for the family. Elderly people with untreated depression are more likely to have worse outcomes from conditions like hypertension, diabetes mellitus and heart disease. Depression may accompany a chronic illness or a condition that causes pain & suffering.

The risk factors for depression include gender, age, marital status and heredity. Depression is the leading cause of disability worldwide. It takes a significant toll on individuals, families & society. Unfortunately depression is often undiagnosed and untreated. The most common reason for the failure is ignorance about the symptoms of depression. Therefore, the study aims to assess the prevalence of Depression and its relationship with socio demographic factors, co-morbid illness

and functional impairment among elderly (60 years and above) in the urban and rural population of Visakhapatnam District in Andhra Pradesh.

## Materials and Methods

**Sampling Frame:** The study was conducted in the urban and rural field practice areas attached to the Department of Community Medicine, Andhra Medical College, Visakhapatnam.

**Sampling Procedure:** Urban and Rural areas were listed alphabetically and selected randomly using random numbers table to conduct the study. Rural areas include Mogalipuram, Mallunaidupalem, Shivashaktinagar, Bottuvanipalem and Swathantranagar. Urban areas include Simhagiri colony, Indira colony, Yatapalem, Nerellakoneru and Chaluvathota.

**Study Population:** All individuals aged 60 years and above were included in the study

**Determination of Sample Size:** A review of international studies suggested a prevalence range of 10.1% - 46.2%.<sup>[2,3]</sup> Studies in India indicated a prevalence range of 6%- 52.2%.<sup>[4,5]</sup> No similar studies were found in Andhra Pradesh. Because of wide range, the prevalence of depression among elderly was assessed by a pilot study among 50 individuals aged 60 yrs and above in Rellivedhi of Visakhapatnam city. The prevalence of depression assessed in the pilot study was 25%. This prevalence has been used in the calculation of the sample size. Studies showing similar prevalence are Nandi DN et al (1975), Ramachandran V et al (1979), Wada T et al (2005), Papadopoulos FC et al (2005) and Maharaj RG et al (2005).<sup>[6-10]</sup>

Sample size is calculated by,

Sample Size (n) =  $4pq/L^2 = (4 \times 25 \times 75) / (2.5 \times 2.5) = 1200$  where, p = prevalence of depression (25%); q = 100-p = 75%; L = allowable error (= 10% of p =  $25 \times 10 / 100 = 2.5$ ).

**Study Design:** A cross sectional descriptive study.

**Collection of Data:** House to house survey was

done and all the subjects were personally contacted at their homes, interviewed and examined using the pre tested questionnaire. It included,

- (1) Socio Demographic Factors: Age, Sex, Religion, Social status, Marital status, Education, Occupation (present and past), type of family, Family income, No. of members of the family;
- (2) Clinical Examination: Complaints, History of previous illness, Personal history, diet, Smoking, Alcohol, History of intake of medicines, Any recent bereavement or stressful life event, Family history of depression, General examination, Vital data, Systemic examination;
- (3) Geriatric Depression Scale (GDS): This scale was developed specifically for use in Elderly. It has been successfully translated into many languages (Chinese, Dutch, French, Hindi etc.) and extensively validated in many types of elderly population and settings (Yesavage 1983, Sheikh et al 1991, Mary Ganguly 1999). It consists of 15 depressive symptoms each of which is scored as 1 if present and 0 if absent. It has a minimum score of 0 to maximum 15. GDS with a score of 0- 4 is said to be no depression, GDS with a score of 5- 10 is considered as mild depression and GDS with a score of 11- 15 is considered as severe depression<sup>[11-16]</sup>;
- (4) Everyday Abilities Scale for India (EASI): The scale consists of 12 items focussed on basic activities of daily living and instrumental activities. It is a two -point scale. Respondents were therefore asked whether the subject could (coded as 0) or could not (coded as 1) generally perform the activity. Scoring is done on scale 0 - 12. Score greater than 2 is considered as functionally impaired.<sup>[17]</sup>

**Data Analysis:** Data was entered in Microsoft Excel and analyzed using Epiinfo Software. Appropriate tests of significance were used wherever necessary. Pearson correlation coefficient was used for quantitative data. Standard error of difference in proportions and Chi-square test were used for qualitative data. Suitable diagrams were also drawn for representing the data. Vancouver style was used in writing Bibliography.

## Results

A total of 17,415 population was screened from 3,383 households in both rural and urban areas to identify 1200 (6.8%) elderly (aged 60years and above). The age range of the study population was 60 – 102 years. The 60% of the study population were females. Majority of the study population were singles {widowed (41%), divorced/ Separated (1%) and unmarried (0.5%)}. Out of total, 22.5% of the elderly population was employed. Majority of the study population (63%) belonged to class V socio economic strata. Majority (98.9%) of the study population was taking mixed diet. The 9.6% have chronic energy deficiency while 34% of the study population was overweight and obese. More than half of the study population had normal body mass index. Among female 17% were smokers and in males 66%.

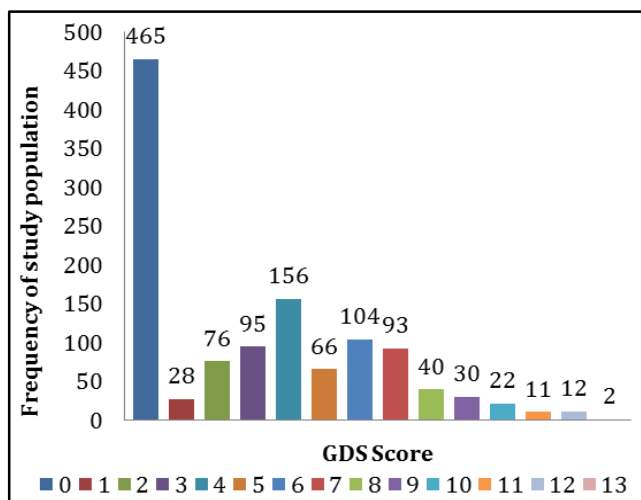


Figure-1: Geriatric Depression Scale (GDS) Score among Study Population

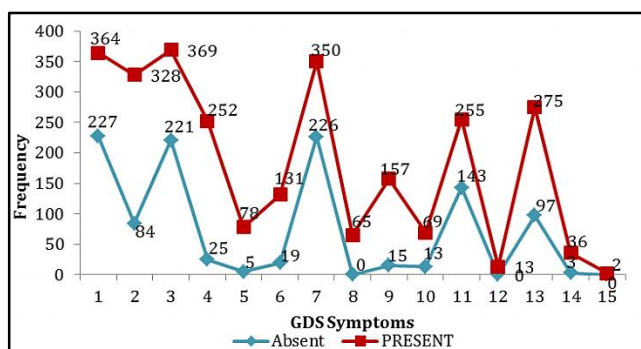


Figure-2: Distribution of Symptoms of Depression as per Geriatric Depression Scale

Among males 65.5% (139) in rural areas and 55.6% (79) in urban areas gave history of alcohol intake. The prevalence of Depression among study population was 31.7% (317/1000). The range of GDS score was 0-13 among study population in

Table-1: Distribution of Study Population with Depression according to Socio-Demographic Factors

Socio-Demographic Factors	Population	Significance
Area	Rural	216 (36%)
	Urban	164 (27%)
Age	60 – 69 years	243 (29%)
	70 – 79 years	110 (36.5%)
	≥ 80 years	27 (43.5%)
Gender	Males	111 (23%)
	Females	270 (37.5%)
Religion	Hindu	352 (32.5%)
	Christian	22 (29%)
	Muslim	6 (16%)
Education	Illiterates	317 (35%)
	Primary	24 (23%)
	Secondary	36 (22%)
	Intermediate/ITI	1 (10%)
	Graduate	2 (18%)
Marital Status	Married	145 (21%)
	Widowed	226 (46%)
	Divorced/separated	6 (54.5%)
	Unmarried	3 (60%)
Occupation	Employed	67 (25%)
	Unemployed	313 (34%)
Type of Family	Nuclear	90 (30%)
	Joint	94 (31%)
	Three generation	174 (31%)
	Staying alone	22 (65%)
Per-capita Income	Class I	3 (30%)
	Class II	11 (11%)
	Class III	25 (35%)
	Class IV	88 (34%)
	Class V	253 (34%)

both the areas. The 38.8 % (465) of the study population did not have any depressive symptom {i.e. score = 0}, 68.3% (820) had score less than 5 indicating no depression, 29.6% (355) had score 5- 10 indicating mild depression while 2.1% (25) had score more than 10 indicating severe depression. The figure 1 shows the distribution of GDS Score among the study population.

Mean GDS of the study population was 3.16 with standard deviation 3.19 while mean GDS of the study population with expression was 7.12 with standard deviation 1.82. The Cumulative frequency of Geriatric Depression scale score among study population showed the median score was 2 and 90th percentile score was 7.5.

As Figure 2 shows, the depressed individuals presented with more number of symptoms than normal individuals. The predominant depressive symptom being not happy most of the time (97%) followed by not satisfied with life (95.7%) and in not in good spirits most of the time (92.1%) in both rural and urban areas.

The relationship between depression and socio-demographic factors is given in table 1. It showed that the prevalence of Depression was significantly high in rural areas (36%), among females (37.5%), illiterates (35%), singles (widowed, divorced/separated, unmarried) (46%), unemployed (34%), staying alone (65%), and low socio-economic group (34%). Elderly of age ≥80years have high prevalence of depression among study population and it is increasing with increasing age.

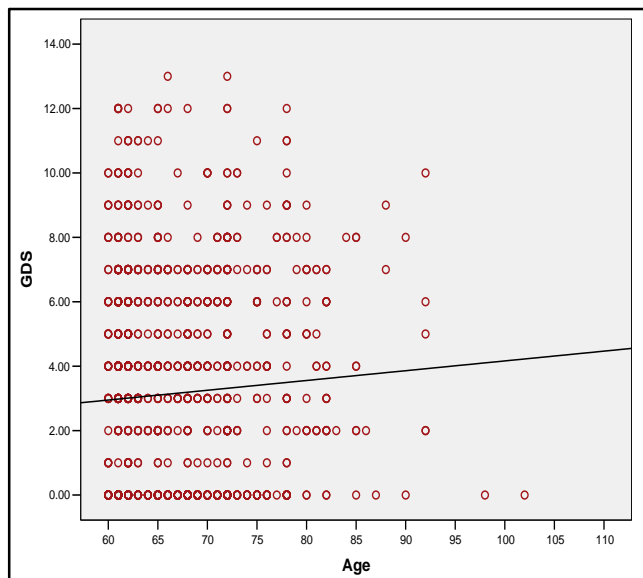


Figure-3: Age wise distribution of depression

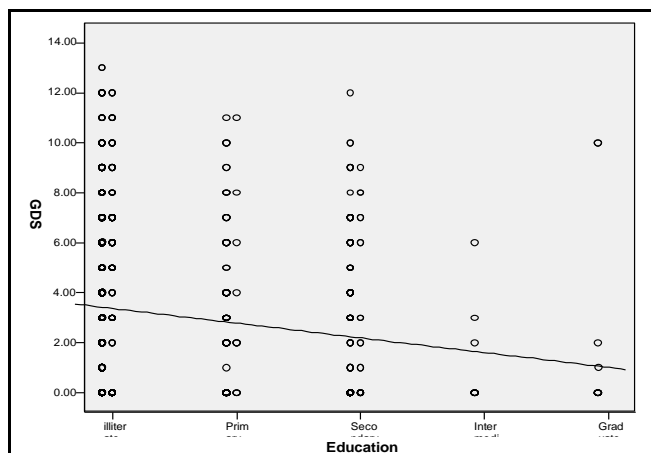


Figure-4: Education wise Distribution of Depression

The line indicating the trend in the figure 3 showed that as age advances GDS score also increases significantly (Pearson correlation coefficient  $r = 0.64$   $p < 0.05$ ). The figure 4 showed that there was negative correlation between education and GDS score. As the educational status increased GDS score decreased and this was statistically significant. (Pearson correlation coefficient  $r = -0.119$ ;  $p < 0.01$ ).

The effect of nutritional status, adverse health behaviour, Stressful life events and Medicinal usage on depression is discussed in table 2. The prevalence of Depression was more among those with poor nutritional status i.e. 43% in underweight. The prevalence of Depression was 33.5% in smokers and 32.7% in non-smokers. On further analysis in males the prevalence of Depression was more among past smokers (39%) and heavy smokers 30% than others. The prevalence of Depression was 32% among those who take alcohol regularly and 20% among those who take occasionally. On further analysis in males the prevalence of Depression was more among regular alcoholics (37%) than occasional (20.5%) and teetotallers (22.7%). In the study 1% had stressful life events. The prevalence of Depression was high among those who had stressful life events (71%), than who do not have stressful life events (31%) and this was found to be statistically significant ( $z=3.33$ ,  $p < 0.05$ ). The prevalence of Depression was more among those who use medicines (42%) than those who do not (28%). Most common type of medicines used was anti-hypertensive followed by anti-diabetic and NSAIDS.

Table-2: Distribution of Study Population with Depression according to Personal History

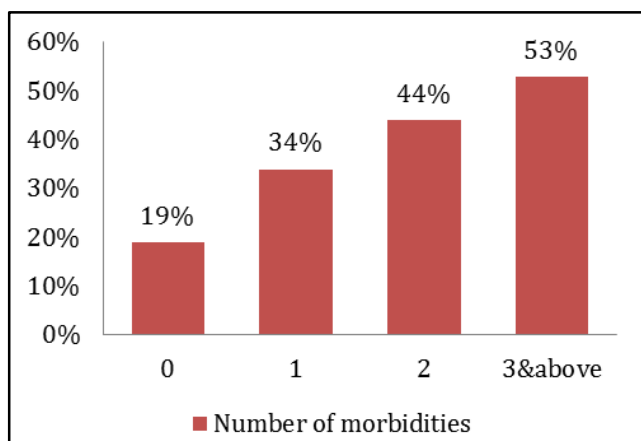
Personal History		Population	Significance
Body Mass Index	Underweight	49 (43%)	
	Normal	228 (34%)	
	Overweight	84 (23%)	
	Obese	17 (36%)	
Smoking	Smokers	131 (33.5%)	
	Non-smokers	249 (32.7%)	
Alcohol	Teetotaller	313 (34%)	
	Occasional	49 (20%)	
	Regular	18 (32%)	
Stressful Life Events	Absent	370 (31%)	$z=3.33$ , $p < 0.05$
	Present	10 (71%)	
Use of Medicines	No	247 (28%)	
	Yes	133 (42%)	

As the Table 3 shows among the study population with depression 22.1% had no morbidity. About 77.9% of the depressive study population presented with morbidity 43.9% have diseases of Musculoskeletal System i.e. osteoarthritis followed by Diseases of Circulatory System (39.4%) i.e. hypertension and heart diseases, Diseases of Eye & Adnexa (25.2%) i.e. cataract and Endocrine, Nutrition & Metabolic diseases (6.8%) i.e. diabetes mellitus.

As the figure 5 showed that the prevalence of Depression was increasing with increase in the number of morbidities. 19% have no morbidity, 34% have one morbidity, 44% have two and 53% have ≥3 morbidities this was found to be statistically significant ( $\chi^2=63.34$ ,  $DF=3$   $p<0.001$ ).

**Table-3: Study Population with Depression according to Diagnosis as per ICD - 10 Classifications**

Diagnosis	Rural (%) n=216	Urban (%) n=164	Total (%) n=380
Infections & Parasitic diseases	6 (2.7%)	14 (8.5%)	20 (5.2%)
Endocrine, Nutrition& Metabolic diseases	10 (4.6%)	16 (9.7%)	26 (6.8%)
Mental& Behavior disorders	2 (0.9%)	0 (0%)	2 (0.5%)
Diseases of Nervous system	2 (0.9%)	5 (3%)	7 (1.8%)
Diseases of Eye &Adnexa	60 (27.7%)	36 (22%)	96 (25.2%)
Diseases of Ear &Mastoid	22 (10%)	13 (8%)	35 (9.2%)
Diseases of Circulatory System	112 (51.8%)	38 (23%)	150 (39.4%)
Diseases of Respiratory System	12 (5.5%)	7 (4.2%)	19 (5%)
Diseases of Digestive System	5 (2.3%)	6 (3.6%)	11 (2.89%)
Diseases of Skin &Subcutaneous tissue	1 (0.46%)	0 (0%)	1 (0.26%)
Diseases of Musculoskeletal System	82 (38%)	85 (51.8%)	167 (43.9%)
Others	2 (0.9%)	1 (0.6%)	3 (0.78%)
No morbidity	53 (24.5%)	31 (19%)	84 (22.1%)



**Figure-5: Study Population with Depression according to Number of Morbidities**

**Table-4: Distribution of Depression among Study Population according to Functional Impairment as per Everyday Abilities Scale for India (EASI) scale**

Functional Impairment (EASI scale)	Depression		Total
	Absent	Present	
Absent (0 -2)	816 (99.5%)	355 (93.5%)	1171 (97.6%)
(>2)	4 (0.5%)	25 (6.5%)	29 (2.4%)
Total	820 (68.4%)	380 (31.6%)	1200 (100%)

( $\chi^2=40.7$ ,  $df = 1$ ,  $p <0.001$ (Yates correction))

Functional impairment was high among those who have depression (6.5%) when compared to those who do not have depression (0.5%) and this was found to be statistically significant as shown in table 4. The most common functional impairment among depressives being not able to work as a member of a team i.e. in a group activity which require different roles (80%) followed by not able to undertake an important task to completion (72%) and does not remember to deliver a message (56%) indicating impairment in instrumental activities of daily living. Functional impairment was more in females as compared to males among the study population with depression. None of the study population diagnosed as depression using GDS scale was not previously diagnosed as depression patients and was not using medication for depression.

## Discussion

Because of our aging population and epidemiological transition the prevalence of geriatric depression is increasing. Similarly our study shows higher prevalence of elderly depression 31.7% (317/1000). A review of various studies suggested a prevalence range of 6% - 52.2% also confirms geriatric depression as an emerging public health problem.<sup>[2-10]</sup> When the role of socio-demographic factors leading to depression was assessed, it was observed that depression was higher in rural areas than urban reason being rural to urban migration and elderly being left alone. Schulman et al (2002) and Ganguli H.C. (2000) also found similar findings.<sup>[18,19]</sup>

Overall the prevalence of some disorders tends to rise with age. Predominant among them is Depression. Mary Ganguli et al (1999), Papadopoulos F.C. et al (2005) and our study showed that depression was significantly increasing with increasing age.<sup>[17,9]</sup>

In general women tend to be more expressive than men also hormonal differences; differing psychosocial stressors give reasons for higher prevalence of depression in females in our study. The prevalence of depression was more in females than in males was observed by both Cankurtaran M et al (2005) Mary Ganguli et al (1999)

studies.<sup>[17,20]</sup>

Bipolar I disorder is more common in persons who did not graduate from college than in college graduates. Literacy provides multiple options for an individual to keep them active. Our study, Mary Ganguli et al (1999) Papadopoulos FC et al (2005) found negative correlation between educational status and GDS score and this was statistically significant.<sup>[17,9]</sup>

Major depressive disorder occurs most often in persons without close interpersonal relationships or in those who are divorced and separated. The environmental stressor most often associated with the onset of an episode of depression is the loss of a spouse. The prevalence of Depression was high among singles (46%) (Unmarried (60%) followed by Divorced/separated (54.5%) and widowed (46%)), than married (21%), and this was found to be statistically significant ( $z=9.29$   $p<0.05$ ). Similarly Hasin Ds et al (2005) and DK. Sharma et al (1985) also found that being widowed separated and divorced increased risk for depression.<sup>[21,22]</sup>

Being employed keeps one active. It was observed that the retired population were more depressed as compared to working population especially women among elderly individuals aged 60 and above in Mumbai, by P. Tank & S.R. Parkar (2002). Our study shows similar findings that the prevalence of Depression was high among unemployed (34%) than employed (25%), and this was found to be statistically significant ( $z=9.29$   $p<0.05$ ).<sup>[23]</sup>

The traditional Indian joint family is considered an excellent supportive environment for emotionally vulnerable, economically weak or unemployed and the old and infirm. Our study shows similar findings that the prevalence of Depression was high among those who were staying alone (65%), than those who have family support (30.7%), and this was found to be statistically significant ( $z=4.1$ ,  $p<0.05$ ). As against in a study among 698 elderly aged 60yrs and above attending The Institute of Psychiatry And Human Behavior Goa, Yvonne Da Silva Pereira et al (2002) found that 59% of patients having depression came from extended families and in a

meta-analysis done by Venkoba Rao (1982) the observations showed that 12% of the healthy and 16% of psychiatrically morbid were living alone, 50% were either in joint or extended family and the remaining 30% in the nuclear type.<sup>[24,25]</sup>

Life events relating to financial problems occurred with greatest frequency in old age depression was observed in a study conducted by DK. Sharma et al (1985) among 50 depressive elderly and normal elderly selected from psychiatric center, Jaipur. The prevalence of Depression was high in our study among low socio-economic status i.e. class V and class IV (33.5%), than other classes (21%), and this was found to be statistically significant ( $z=4.1$ ,  $p<0.05$ ).<sup>[22]</sup>

The prevalence of Depression was more with poor nutritional status with adverse health behavior such as smoking and alcohol disorder as observed in a community study conducted by Averina, et al (2005) at Arkhangelsk, Russia.<sup>[26]</sup> A community survey among 43,000 adults by Hasin Ds et al (2005) in United States found that substance abuse increased risk of depression.<sup>[24]</sup> In our study the prevalence of Depression was more among those with poor nutritional status i.e. 43% in underweight, in males the prevalence of Depression was more among past smokers (39%) and heavy smokers 30% than others. The prevalence of Depression was 32% among those who take alcohol regularly and 20% among those who take occasionally.

Depressives experience significantly more stressful life events. Late life emotional support by the partner is of importance to their psychological health. Death of a spouse renders them vulnerable to mental stress. Similar findings were found in studies by Agarwal N & HP Jhingan (2002); Satija YK et al (1998) and our study.<sup>[27,28]</sup>

Depression may accompany a chronic illness or a condition that causes pain & suffering. Elderly people with untreated depression are more likely to have worse outcomes from conditions like hypertension, diabetes mellitus and heart disease. Worsening of physical symptoms or persistence of unexplained pain or symptoms like headache, palpitation, dyspepsia, chest discomfort may raise the possibility of depression in mind. Depression

may be found in metabolic disorders like diabetes, renal failure or dialysis patients or in Parkinson's disease. It is also found in post myocardial infarction, in congestive cardiac failure or in COPD patients with heart failure. Older peoples on drugs for hypertension, ( $\beta$ -blockers, reserpine, ACTH or drugs used in chemotherapy may have depression. Even, drugs used, but withdrawn now may be a causative factor of depression.

In our study 77.9% of the depressive study population presented with morbidity. Ratakonda S. Sagar et al (1992) in their study among 60 elderly attending psychiatric OPD, AIIMS, New Delhi found that among specific illness in depression patients hypertension, osteoarthritis and cataract were significantly more common.<sup>[29]</sup> A study conducted by Cankurtaran M et al (2005) among the patients admitted to geriatric unit in Sihhiye, Turkey also found that the depressive elderly patients suffered from a wide range of other diseases such as Alzheimer's disease (12.5%), hypertension (77.3%), diabetes mellitus (23.4%), osteoporosis (66.7%), Atherosclerotic coronary artery disease (32.6%), cardiac Failure (8.5%), Bronchial Asthma (2.9%), COPD (9.2%) and Osteoarthritis (48.8%). The correlation between depression and concomitant diseases was statistically significant in hypertensive, demented and osteoporosis patients.<sup>[20]</sup> Across sectional survey conducted by Maharaj RG et al (2005) among 734 patients aged over 50 yrs attending chronic disease clinics in South west Trinidad found that there were statistically significant differences in the level of depression by the presence of arthritis, diabetes mellitus, ischemic heart diseases and other chronic diseases.<sup>[10]</sup>

The prevalence of Depression was increasing with increase in the number of morbidities. 19% have no morbidity, 34% have one morbidity, 44% have two and 53% have  $\geq 3$  morbidities this was found to be statistically significant ( $\chi^2=63.34$ ,  $DF=3$   $p<0.001$ ). In a study among 60 elderly attending psychiatric OPD, AIIMS, New Delhi) Ratakonda S. Sagar et al (1992) found that 97.5% subjects of depression patients group have at least one physical illness diagnosis.<sup>[29]</sup>

Depression is the leading cause of disability

worldwide. Subjects with depression had significantly lower scores for Activities of Daily Living (ADL) especially instrumental. Functional impairment was high among those who have depression (6.5%) when compared to those who do not have depression (0.5%) and this was statistically significant. A community study conducted by Mary Ganguli et al (1999) among 1554 rural Ballabgarh elderly aged 55+ found that the scoring 22 or higher on GDS-H (30) was significantly associated with higher EASI score i.e. are more disabled.<sup>[17]</sup> Among 2695 community dwelling elderly subjects aged 60yrs and above living in 5 rural Asian towns (Indonesia 411, Vietnam 379, Japan 1905) Wada T, et al (2005) found that subjects with depression had significantly lower scores for ADL.<sup>[8]</sup>

### Limitations of Study

Further investigations regarding the physical illness were not done due to time and financial constraints. Studies done in Andhra Pradesh were not found during review. Bipolar disorders were not diagnosed, as the scale used does not classify depression into various types. Subjective bias may be encountered with difference in levels of understanding by the study population. Questionnaire used in the study does not contain all symptoms of DSM IV criteria to diagnose depression.

### Conclusion

The prevalence of Depression among study population was 31.7 % (317/1000). As the prevalence of depression was high among the study population, routine screening tool for depression consisting of two questions should be incorporated in general examination of elderly individuals. Health professionals at PHC or CHC should be trained regarding this and those found positive should be given counselling. The most common illness among the study population with depression being osteoarthritis (43.9%), cataract (25.2%), hypertension (17.6%), diabetes mellitus (7.6%) and heart diseases (3.9%). Hence counselling should also be given for those who have chronic diseases. The prevalence of Depression was increasing with increase in the number of morbidities. The functional impairment

was high among those who have depression (6.5%) Depression was high in rural areas, females, illiterates, singles, stressful life events, chronic diseases and functional impairment. There is need of measures to enhance social support systems and social integration like guidance and counselling to the elderly through voluntary agencies and welfare associations.

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