

## Socio-demographic Factors of Geriatric Depression

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### ABSTRACT

**Background:** Depression is a common mental health problem in geriatric population and the overall prevalence rate of depression in this age group varies between 10 and 20%. **Objective:** To study the socio-demographic factors associated with depression in geriatric population. **Materials and Methods:** A systematic review was done on 74 community-based mental health surveys on depression in geriatric population, which were conducted in the continents of Asia, Europe, Australia, North America, and South America. All the studies were conducted between 1955 and 2005. The researchers had included only community-based cross-sectional surveys and some prospective studies that had not excluded depression on baseline. These studies were conducted on homogenous community of geriatric population in the world, who were selected by simple random sampling technique. A qualitative analysis was conducted to study the socio-demographic factors of depression. **Results and Conclusion:** The two non-modifiable risk factors found to be significantly associated with depression in geriatric population were “older age group” and “female gender”. However, the potentially modifiable risk factors for depression in the geriatric population were identified as low socioeconomic status, loss of spouse, living alone, chronic co-morbidities, cognitive impairment, bereavement and restricted activities of daily living (ADL).

**Key words:** Depression, factors, geriatric, prevalence, socio-demographic

### INTRODUCTION

The World Health Organization estimated that the overall prevalence rate of depression in geriatric population generally varies between 10% and 20% depending on cultural situations.<sup>[1,2]</sup> The community-based mental health studies in India have revealed that the point prevalence of depression in geriatric population Indian population varies between 13% and 25%.<sup>[3,4]</sup>

According to the observations made by the World Health Organization, the factors of depression in old age are reported as genetic susceptibility, chronic disease and disability, pain, frustration with limitations in activities of daily living (ADL), personality trait (dependent, anxious or avoidant), adverse life events (widowhood, separation, divorce, bereavement, poverty, social isolation) and lack of adequate social support.<sup>[1,5]</sup>

### MATERIALS AND METHODS

#### Study design

This was a retrospective study based on systematic review on prevalence of depression in geriatric population.

#### Setting

Community-based mental health surveys on depression in geriatric population, conducted in the continents

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of Asia, Europe, Australia, North America, and South America, were included in this analysis.

### Study period

All the studies that were conducted and published in indexed journals between 1955 and 2005 (i.e., within the last 51 years) constituted the sample.

### Sample size

All published articles on prevalence of depression in geriatric population that were available, adequately analyzed and accessible from the Internet, the Central Library of Kasturba Medical College, Manipal, Karnataka, and the Central Library of Sikkim-Manipal Institute of Medical Sciences (SMIMS), Sikkim, constituted the study universe.

### Databases

The search engines that were utilized for electronic data from the Internet were MEDLINE, PUBMED, GOOGLE, YAHOO, EMBASE, PsycINFO and the Cochrane Collaboration Database for original human research articles in the English literature published through 1 January 1955 and 31 December 2005, using the two sets of search items: "Prevalence of Depression in Geriatric Population" and "Prevalence of Geriatric Depression".

### Sampling procedures

Only those studies that either covered the total population of study area or applied simple random sampling method to identify the study subjects in their corresponding research projects were included for this final systematic review.

### Inclusion criteria

To avoid undesired bias due to design effects from various epidemiological study designs, the researchers had included only community-based cross-sectional surveys on prevalence of depression and some prospective study designs that had not excluded depression on baseline. All these studies were conducted on homogenous community of geriatric population in the world, who were either selected by simple random sampling technique or covered under whole population of the study area. For determining the various factors of depression in geriatric population, only those articles in which at least one risk factor of depression was studied were included.

### Exclusion criteria

All the unpublished reports and unavailable or unanalyzed or inaccessible articles from the Internet as well as the Central Library of Kasturba Medical College, Manipal in Karnataka and Central Library of SMIMS, Sikkim, on studies regarding the prevalence of depression in geriatric population were excluded from this study.

Studies conducted on migrant populations, old age homes and health care institutions were also excluded from this systematic review in order to avoid biasness. High prevalence rate of depression was very common among isolated groups of individuals in the community, who had migrated to some other place either due to political force or to meet their physiological or financial needs.

### Selection of articles

In the first step, while searching through all the selected databases, the key words "depression," "prevalence", "risk factor", "geriatric population", "elderly" and "aged" and the text word "community" were used. In the second step, after applying the inclusion and exclusion criteria, all relevant articles (judged on the basis of the title and abstract) were retrieved for more detailed evaluation. In the third step, the bibliographies of relevant articles were searched for additional references. Finally, all retrieved articles were screened to determine which one of these met the following six inclusion criteria: 1) original research published in English, 2) study group of community residents, 3) subjects age 60 years or older, 4) cross-sectional study design that included both old and new cases of depressed geriatric individuals in the community, 5) prospective or follow-up studies that have not excluded the depressed geriatric individuals at the baseline and 6) acceptable definition of depression (either recognized diagnostic criteria or cut-off on a depression rating scale).

### Study instruments

Clinical Diagnoses by Psychiatrists were based on DSM-III-R, DSM-IV and ICD-10 criteria. Other standardized study instruments used were Geriatric Mental State Examination (GMS), AGE-CAT, Composite International Diagnostic Inventory (CIDI-SF), CES-D, BDI, HDS, Yesavage Geriatric Depression Scale, Centre for Epidemiologic Studies Depression Scale, Mini Mental Status Examination (MMSE), Hamilton Depression Scale (HDS/HAMD), Clinical Rating Scale for Depression, Mini Mental Status Examination and Geriatric Depression Screening Scale and Mastering Depression In Primary Care Version 1998.

### Assessment of validity

The validity of each of these study instruments was verified with its individual validity and reliability reports and reconfirmed with the renowned psychiatrists. Some of the studies used the clinical assessment by the individual psychiatrists and the diagnostic criteria were never mentioned. In these cases, the impact factor of the journal where the research article got published was taken into consideration for assessing the quality and standard of research.

### Data collection procedure

The investigators were trained by the renowned psychiatrists of Kasturba Medical College Manipal, Karnataka, and SMIMS on how to interpret the results from different community-based psychiatric evaluation studies. At the beginning, a Pilot study was conducted with randomly chosen data from 10 original research articles that surveyed geriatric individuals in the age group of 60 years and above, residing in various parts of the world. After applying the inclusion and exclusion criteria, some of these studies used in the Pilot study were included for statistical analysis in the final research project.

### Abstraction of data

Information about the size of the study group, subjects' age, sampling method, criteria for depression, exclusion criteria at baseline, length of study period, number of prevalent cases of depression, and risk factors was abstracted from each report.

### Data analysis

A qualitative analysis was conducted for studying the various socio-demographic factors associated with depression in geriatric population.

## RESULTS AND DISCUSSION

The search strategy yielded 896 potentially relevant studies; among these, 143 were retrieved for more detailed evaluation. Though 77 studies met the inclusion criteria, we could retrieve main article or structured abstract for only 74 studies which were included for the final analysis. So, only 3 (4%) potentially relevant studies could not be included due to their lack of inaccessibility and unavailability of relevant information elsewhere. Among these 74 selected articles, which formed the study universe for this systematic review of depression in geriatric population, 69 (93.2%) had cross-sectional study design and 5 (6.8%) had prospective study design that had not excluded depression on baseline.

Two meta-analysis reports, one by Chen *et al.* on 10 relevant studies and the other one by Copeland *et al.* on 14 relevant studies, and also, a systematic review report by Beekman *et al.* on 34 relevant studies were included in this meta-analysis project. So, this study had actually taken into consideration the prevalence rates of depression in geriatric population from [74+(10+14+34)=132] survey reports from various parts of the world.

Report from the selected 74 articles was used for estimation of median prevalence of depression in geriatric population; only 24 studies were shortlisted for

analysis of factors of depression in geriatric population as they had focused on at least one risk factor in detail. All other studies were excluded for the following reasons: many did not meet the age criterion, many did not provide detailed information on criteria for confirmation of diagnosis and standard case definition, many were institution-based studies or conducted on migrant population, some study designs were not cross sectional, some had inadequate sample size or faulty sampling technique, some were prospective studies that had excluded depression at baseline, and some did not meet two or more of the inclusion criteria.

### Assessment of factors of depression in geriatric population

Twenty different risk factors were studied by univariate analysis in 24 selected articles. Among these, 14 were in three or more positive studies and 6 were in two positive studies each. Older age group, female gender, chronic co-morbidities, less education, unemployed status in the past, low socioeconomic status, cognitive impairment, unmarried status, loss of spouse, living alone, bereavement, restricted ADL, and vision or hearing or functional impairment were identified as risk factors for depression in at least two studies each. Among these, only "older age group" and "female gender" were considered as non-modifiable risk factors, while the rest were considered as modifiable risk factors in this study.

Nine risk factors were studied by multivariate analysis in eight articles [Table 1]. Among these, four were in three or more positive studies and five in two positive studies each. Older age group, female gender, chronic co-morbidities, low socioeconomic status, cognitive impairment, loss of spouse, living alone, bereavement and restricted ADL were identified as independent risk factors for depression in at least two studies each. Risk factors identified by both univariate and multivariate analysis in at least two studies each included all of the above except unmarried status, low literacy level and unemployment.

Here, 20 different risk factors were studied by univariate analysis from 24 selected articles. Among these, older age group, female gender, chronic co-morbidities, less education, unemployed status in the past, low socioeconomic status, cognitive impairment, unmarried status, loss of spouse, living alone, bereavement, restricted ADL, and vision or hearing or functional impairment were identified as risk factors for depression in geriatric population. These findings are documented from some important studies mentioned below.

Studies conducted by Copeland *et al.*<sup>[6]</sup> Ramachandran *et al.*<sup>[4]</sup> Penninx Brenda *et al.*<sup>[7]</sup> Broadhead *et al.*<sup>[8]</sup> Kennedy Gary *et al.*<sup>[5]</sup> Schoevers *et al.*<sup>[9]</sup> Liu *et al.*<sup>[10]</sup> Steffens David *et al.*<sup>[11]</sup> Chong *et al.*<sup>[12]</sup> Kirby *et al.*<sup>[13]</sup>

**Table 1: Prevalence of depression in geriatric population according to the major factors: Multivariate analysis**

Socio-demographic factors	Various prevalence studies in the world: Significant association of socio-demographic factors with prevalence of depression in geriatric population								No. of positive studies (n=8)
	Kennedy et al.	Geerlings et al.	Liu et al.	Roberts et al.	Newman et al.	Beekman et al.	Barua et al.	Chen et al.	
Sex									
Male	0			0	0	0	0	0	0
Female	+			+	+	+	0	+	5
Age group (years)									
60–74	0			0	0		0		0
≥75	+			0	0		+		2
Socioeconomic status									
Low/middle	+					+	0		2
High	0					0	0		0
Marital status									
Married	0						0		0
Single (unmarried/widowed)	+						0		1
Living arrangement									
Living alone	+			+			0		2
Living only with children/relatives	0			0			0		0
Living with spouse	0			0			0		0
H/o death in the family within last 12 months	+						+		2
Presence of chronic co-morbidities	+		+	+			+		4
Cognitive impairment	+	+	+				+		4
Restricted ADL	+		+	+					3

\*In all these studies,  $P$  value  $< 0.05$  was considered as significant; †A plus sign indicates a risk factor; Zero indicates the factor had no effect of either type; Blank cells indicate the factor was not studied. Each of the risk factors shown was examined in two or more studies

Beekman *et al.*<sup>[14]</sup> Copeland *et al.*<sup>[15]</sup> Braune<sup>[16]</sup> Ostbye<sup>[17]</sup> Mine Ekinci *et al.*<sup>[18]</sup> and Newman *et al.*<sup>[19]</sup> had documented a high prevalence of depression among the geriatric females.

Chong *et al.*<sup>[12]</sup> Liu *et al.*<sup>[10]</sup> Kennedy Gary *et al.*<sup>[5]</sup> Penninx Brenda *et al.*<sup>[7]</sup> Kay *et al.*<sup>[20]</sup> Schoevers *et al.*<sup>[9]</sup> Braune<sup>[16]</sup> Roberts *et al.*<sup>[21]</sup> Newman *et al.*<sup>[19]</sup> and Barua *et al.*<sup>[22]</sup> had reported a high prevalence of depression among the individuals aged above 74 years.

Studies conducted by Kennedy Gary *et al.*<sup>[5]</sup> Penninx Brenda *et al.*<sup>[7]</sup> Ramachandran *et al.*<sup>[4]</sup> Schoevers *et al.*<sup>[9]</sup> Liu *et al.*<sup>[10]</sup> Chong *et al.*<sup>[12]</sup> Mine Ekinci *et al.*<sup>[18]</sup> and Lobo *et al.*<sup>[23]</sup> had reported a significantly high prevalence of depression among individuals with lower level of education.

Studies conducted by Ramachandran *et al.*<sup>[4]</sup> Kennedy Gary *et al.*<sup>[5]</sup> Blazer *et al.*<sup>[24]</sup> Broadhead *et al.*<sup>[8]</sup> Beekman *et al.*<sup>[14]</sup> and Penninx Brenda *et al.*<sup>[7]</sup> reported a significantly higher prevalence of depression in geriatric population belonging to the low socioeconomic status group.

Studies conducted by Kennedy Gary *et al.*<sup>[5]</sup> Liu *et al.*<sup>[10]</sup> Ramachandran *et al.*<sup>[4]</sup> Broadhead *et al.*<sup>[8]</sup> and Chong *et al.*<sup>[12]</sup> had documented a significantly high prevalence of depression among the singles who were either unmarried or widowed.

Blazer Dan *et al.*<sup>[24]</sup> Kennedy Gary *et al.*<sup>[5]</sup> Ramachandran *et al.*<sup>[4]</sup> Liu *et al.*<sup>[10]</sup> Chen *et al.*<sup>[25,26]</sup> and Chong *et al.*<sup>[12]</sup> had observed a significantly high prevalence of depression among those living alone.

Broadhead *et al.*<sup>[8]</sup> Ramachandran *et al.*<sup>[4]</sup> and Kennedy Gary *et al.*<sup>[5]</sup> had reported a high prevalence of depression among the unemployed individuals.

Kennedy Gary *et al.*<sup>[5]</sup> Chen *et al.* and Barua *et al.*<sup>[22]</sup> had reported a significantly high prevalence of depression among those who had a history of death in their family within the last 6–12 months.

Kennedy Gary *et al.*<sup>[5]</sup> and Barua *et al.*<sup>[22]</sup> had observed a high prevalence of depression in individuals of geriatric population, who were suffering from four or more co-morbid chronic conditions that included diabetes, arthritis, bronchial asthma/chronic obstructive pulmonary disease (COPD), cerebro-vascular accidents (stroke), mental disorders and visual, hearing and functional impairments.

Presence of chronic co-morbidities associated with depression in geriatric population was also reported from studies conducted by Penninx Brenda *et al.*<sup>[7]</sup> Liu *et al.*<sup>[10]</sup> Braune<sup>[16]</sup> Ostbye<sup>[17]</sup> Mine Ekinci *et al.*<sup>[18]</sup> Roberts *et al.*<sup>[21]</sup> Chen *et al.*<sup>[25,26]</sup> and Pahkala *et al.*<sup>[27]</sup>

The univariate analysis from 11 studies on various chronic co-morbid conditions associated with depression in geriatric population revealed that arthritis, cognitive impairment, visual impairment, functional impairment and restricted ADL had significant association with depression in geriatric population. Majority of these findings were consistent with the observations by Penninx Brenda *et al.*<sup>[7]</sup> Iowa, East Boston, New Haven and Barua *et al.*<sup>[22]</sup>

The prevalence of depression often followed an increasing trend as the number of co-morbid chronic conditions increased and this trend was also found to be statistically significant in the studies conducted by Kennedy Gary *et al.*<sup>[5]</sup> and Barua *et al.*<sup>[22]</sup> where the prevalence of depression was highest among those with four or more co-morbid chronic conditions and this difference as compared with other groups was found to be statistically significant.

Table 1 shows the major factors of depression in geriatric population from multivariate analysis using the Multiple Logistic Regression Model. Here, nine risk factors were studied by multivariate analysis in eight articles. Among these, older age group, female gender, chronic co-morbidities, low socioeconomic status, cognitive impairment, loss of spouse, living alone, bereavement and restricted ADL were identified as independent risk factors for depression in at least two studies each. The potential confounders were low literacy level, unmarried status, and unemployed status in the past. Majority of these findings were consistent with the observations made by Kennedy Gary *et al.*<sup>[5]</sup> and Barua *et al.*<sup>[22]</sup>

There was heterogeneity in the results for some risk factors (i.e., lower education level, functional impairment, cognitive impairment, chronic co-morbidities), perhaps related to different definitions of these variables in different studies and small study groups in some studies; consequently, the results of the systematic review for these risk factors must be interpreted cautiously.<sup>[28]</sup>

It was observed that a large proportion of depression in geriatric population people in the community was attributed to one of these risk factors. Since these risk factors are frequent in geriatric population age group, their modification could be expected to have an important public health impact. Geriatric population could be screened to identify individuals at high risk of depression. Subsequently, these individuals could be targeted for interventions to abate the three potentially modifiable risk factors and reduce the risk of depression. Such interventions might include education about the significance of the risk factors, bereavement counseling

and support, new skills training, “maintenance of routines” protocols, enhancement of social supports, individual or group therapy to facilitate adjustment to loss of function, and sleep enhancement protocols.<sup>[28]</sup>

## CONCLUSIONS

In this systematic review, the potentially modifiable risk factors for depression in geriatric population were identified as low socioeconomic status, loss of spouse, living alone, chronic co-morbidities, cognitive impairment, bereavement and restricted ADL. Despite the methodological limitations of individual studies, these findings might guide efforts to develop effective interventions for preventing geriatric depression.

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