Original Article

Distribution of depressive disorders in the elderly

Ankur Barua, MK Ghosh, N Kar, MA Basilio

Sikkim Manipal Institute of Medical Sciences, Sikkim, & Kasturba Medical College Manipal, Karnataka, India

ABSTRACT

Background: The community-based mental health studies have revealed that the point prevalence of depressive disorders in the elderly population of the world varies between 10% and 20% depending on cultural situations. **Objective:** To determine the median prevalence rates of depressive disorders in the elderly population of India and various other countries in the world. **Materials and Methods:** A retrospective study based on meta-analysis of various study reports. **Setting:** Community-based mental health surveys on geriatric depressive disorders conducted in the continents of Asia, Europe, Australia, North America, and South America. **Study Period:** All the studies that constituted the sample were conducted between 1955 and 2005. Sample Size: After applying the inclusion and exclusion criteria on published and indexed articles, 74 original research studies that surveyed a total of 4,87,275 elderly individuals in the age group of 60 years and above, residing in various parts of the world were included for the final analysis. **Inclusion Criteria:** 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 elderly population in the world, who were selected by simple random sampling technique. **Exclusion Criteria:** All the unpublished reports and unavailable or unanalyzed or inaccessible articles from the internet were excluded from the study. **Statistical Analysis:** The median prevalence rate and its corresponding interquartile range (IQR), Chi-square test, and Chi-square for Linear Trend were applied. A *P* value < 0.05 was considered as statistically significant. **Results and Conclusion:** The median prevalence rate of depressive disorders in the world for the elderly population was determined to be 10.3% [IQR = (4.7%–16.0%)]. The median prevalence rate of depression among the elderly Indian population was determined to be 21.9% [IQR = (11.6%–31.1%)]. Although there was a significant decrease trend in world prevalence of geriatric depression, it was significantly higher among Indians in recent years than the rest of the world.

Key words: Depressive disorders, elderly, interquartile range, median, prevalence

Introduction

The World Health Organization estimated that the overall prevalence rate of depressive disorders among the elderly generally varies between 10% and 20% depending on cultural situations.[1,2] The community-based mental health studies in India have revealed that the point prevalence of depressive disorders in the elderly Indian population varies between 13% and 25%.[3,4] Although India is the second most populated country in the world in terms of elderly population of 60 years and above,[1,2] depression in the elderly is not yet perceived as a public health problem in India. A very few community-based studies have been conducted in India so far, to address this issue.

Materials and Methods

Study design

A retrospective study based on the meta-analysis on the prevalence of depressive disorders in the elderly population.

Setting

Community-based mental health surveys on depressive disorders in the elderly, conducted in the continents 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 (ie, within the last 51 years) would constitute the sample. This is decided on the observed fact that it normally took around 2–3 years time for a project report to get accepted and published in an indexed journal. So, a study conducted during 2005 was expected to get published in an indexed journal by the year 2008. The sample size for this project was finalized during the year 2008.

Address for correspondence:
Dr. Ankur Barua, Department of Community Medicine, Melaka-Manipal Medical College (MMMC), Jalan Batu Hampar, Bukit Baru, 75150 Melaka, Malaysia. E-mail: ankurbarua26@yahoo.com

Sample size

All the published articles on the prevalence of depressive disorders in the elderly 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 sources. All the articles included for the final analysis were in the English language.

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 January 1, 1955 and December 31, 2005 using the two sets of search items: "Prevalence of Depression in Elderly" and "Prevalence of Geriatric Depression."

Sampling procedures

Only 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 meta-analysis. Overlapping studies from the same geographic areas were also included for the analysis.

Inclusion criteria

To avoid undesired bias due to design effects from various epidemiologic study designs, the researchers had included only community-based cross-sectional surveys on the prevalence of depressive disorders and some prospective study designs that had not excluded depression on baseline. All these studies were conducted on homogenous community of elderly 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 correlates of depression in the elderly, only those articles were included that had studied at least one risk factor of depression.

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, Karnataka, and the Central Library of Sikkim-Manipal Institute of Medical Sciences (SMIMS), Sikkim, on studies regarding the prevalence of depressive disorders in the elderly population were excluded from this study. But it was perceived by the researchers that the proportion of excluded reports on account of inaccessibility or unavailability would constitute less than 5% of the available articles on the relevant topic. Hence, this was expected to have a minimal impact on the final results. Studies in which the 95% Confidence Interval of the prevalence rate estimation exceeded more than 20 units were excluded on account of possible improper sample size estimation. Studies conducted on migrant populations, old age homes, and health care institutions were also excluded from this meta-analysis in order to avoid bias. 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 physiologic or financial needs.

Selection of articles

In the first step, while searching through all the selected databases, the key words "depression," "prevalence," "elderly," "geriatric," and "aged" and the text word "community" were used. In the second step, after applying the inclusion and exclusion criteria, all the 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 the retrieved articles were screened to determine which met the following six inclusion criteria: (1) original research published in English, (2) study group of community residents, (3) 60 years or older subjects, (4) cross-sectional study design that included both old and new cases of depressed elderly individuals in the community, (5) prospective or follow-up studies that have not excluded the depressed elderly individuals at baseline, and (6) acceptable definition of depression (either recognized diagnostic criteria or cutoff on a depression rating scale).

List of studies included in the meta-analysis

Essen-Moller (Sweden, 1956), Kay (Australia, 1964), Parsons (UK, 1965), Nandi D.N. *et al.* (India, 1972–73), Copeland J.R. *et al.* (UK, 1976), Ramachandran V. *et al* (India, 1979), Blazer D. *et al.* (North Carolina, 1979), Balzer (USA, 1980), Eaton (USA, 1981), Stanley A.M. (USA, 1981), Rao Venkoba A. *et al.* (India, 1982), Penninx Brenda W.J. *et al.* (New Haven, 1982–88), Broadhead W.E. *et al.* (USA, 1982–84), Murrel (USA, 1983), Gurland (USA, 1983), Kennedy G.J. *et al.* (USA, 1984–85), Kay (Australia, 1985), O'Hara (USA, 1985), Kay (Hobart, 1985), Kay D.W. *et al.* (Hobart, 1985), Berkman (USA, 1986), Copeland (UK, 1987), Copeland *et al.* (UK, 1987), Morgan (UK, 1987), Bland (Canada, 1988), Kivela (Finland, 1988), Weissman (USA, 1988), Kivela *et al.* (Finland, 1988), Kennedy (USA, 1989), Lindesay (UK, 1989), Cwikel (Israel, 1989), Bosma (Netherlands, 1990), Schoevers R.A *et al.* (Amsterdam, 1990–97), Geerlings M.I. *et al.* (Amsterdam, 1990–96), Blazer (USA, 1991),

Fuhrer (France, 1992), Kua (Singapore, 1992), Madianos (Greece, 1992), Johnson J. *et al*. (USA, 1992), Henderson (Australia, 1993), Ihara (Japan, 1993), Saunders (UK, 1993), Liu C.Y. *et al*. (China, 1993), Woo (Hong Kong, 1994), Komahashi (Japan, 1994), Pahkala K *et al*. (Finland, 1994), Beekman (Netherlands, 1995), Hooijer (Netherlands, 1995), Lobo *et al*. (Southern Euro, 1995), Roberts R.E. *et al*. (USA, 1995), Ramin M. *et al*. (USA, 1996), Komer A. *et al*. (Denmark, 1996), Geraldine F.M. (USA, 1996), Lauritzen (Denmark, 1996), Chong M.Y. *et al*. (Taiwan, 1996–98), Nandi P.S. *et al*. (India, 1997), Prince M.J. *et al*. (UK, 1997–98),[5] McCracken C.F. (UK, 1997),[6] Kirby M. *et al*. (Dublin, 1997),[7] Braune B.T. *et al*. (Germany, 1997–98), Newman S.C. *et al*. (Canada, 1998), Newman S.C. *et al*. (Canada, 1998), Tiwari S.C. (India, 1999), Chen R. *et al*. (China, 1999), Beekman A.T. *et al*. (Netherlands, 1999), Deise A.A. (Brazil, 2001), Stella A. (Greece, 2001), Heun R. *et al*. (Germany, 2001), Mine E. *et al*. (Turkey, 2001–02), Barua A. (India, 2002), Daniel W.L. *et al*. (Canada, 2004), Copeland J.R. *et al*. (Berlin, 2004), Ostbye T. *et al*. (Canada, 2005), and Chen R. *et al*. (China, 2005).

Study instruments
Clinical Diagnoses by Psychiatrists were based on Diagnostic and Statistical Manual of Mental Disorders, editions DSM-III-R and DSM-IV, and ICD-10 criteria. Other standardized study instruments used were Geriatric Mental State Schedule (GMS), Automated Elderly Examination for Computer-Assisted Taxonomy (AGECAT), Composite International Diagnostic Inventory, Center for Epidemiologic Studies Depression Scale (CES-D), Beck's Depression Inventory, Hamilton Depression Scale (HDS/HAMD), Yesavage Geriatric Depression Scale, Mini-Mental Status Examination (MMSE), , Clinical Rating Scale for Depression, Elderly Depression Screening Scale, and Mastering Depression In Primary Care, Version 1998 [Table 1].

Assessment of validity
The validity of each of these study instruments was verified with their individual validity and reliability reports and reconfirmed with renowned psychiatrists. Some of the studies used the clinical assessment by the individual psychiatrists where the diagnostic criteria were never mentioned. In these cases, the impact factor of the journals in which the research articles 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 the Kasturba Medical College, Manipal, Karnataka, and the Sikkim-Manipal Institute of Medical Sciences (SMIMS), Sikkim, on how to interpret the results from different community-based psychiatric evaluation studies. The diagnoses generated by the questionnaires used as study instruments were kept strictly confidential and reconfirmed by consulting the senior psychiatrists for confirmation of their acceptability, content validity, and reliability, before arriving at a final diagnosis for data analysis.

At the beginning, a pilot study was conducted with randomly chosen data from 25 original research articles that surveyed elderly 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.

Anytime a relevant article was found inaccessible on the Internet or in designated libraries, all attempts were made to contact the corresponding author(s) through postal letters, telephone, fax, or email requesting them to provide the investigators with a soft or hard copy of that article. In case the investigators failed to procure a relevant article even after five attempts, spread over 1 year, it was considered as unavailable and excluded from the final analysis.

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

Data analysis: The collected data were tabulated and analyzed by using the statistical package SPSS (Statistical Package for Social Sciences) version 10.0 is IBM Company in US for Windows and EPI INFO version windows 2000. The findings were described in terms of Median Prevalence Rates of depressive disorders in the elderly and their corresponding interquartile range (IQR). Proportions and their 95% confidence intervals (CI) were used for the same purpose. Chi-square test and Chi-square for Linear Trend were applied for studying prevalence rates of the depressive disorders of the elderly in the various countries of the world, including India. Here, a *P* value < 0.05 was considered as statistically significant.

Results and Discussion

A retrospective study based on meta-analysis on the prevalence of depressive disorders in the elderly

Table 1: Prevalence rates of depressive disorders in elderly population

Chief investigator/first author	Year	Study area	Sample size	Prevalence of depressive disorders (%)	Instrument/diagnostic criteria
Essen-Moller	1956	Sweden	443	2.0	Psychiatrist
Kay	1964	Tasmania, Australia	505	1.3	Psychiatrist
Parsons	1965	UK	228	0.9	Psychiatrist
Nandi *et al.*	1972-73	West Bengal, India	54	22.0	Psychiatric exam./ Operational definition
Copeland *et al.*	1976	Liverpool, UK	1070	11.3	GMS-AGECAT
Ramachandran *et al.*	1979	Madras, India	406	24.1	Psychiatric exam./ Operational definition
Blazer Dan *et al.*	1979	Durham county, North Carolina	997	14.7	Duke – OARS; DSM-III
Blazer	1980	USA	997	1.8	DSM-III
Eaton	1981	USA	338	14.8	CES-D
Stanley A. Murrel	1981	Kentucky, USA	2517	16.0	CES-D
Rao Venkoba *et al.*	1982	Madurai, India	686	6.0	Psychiatric exam./ Operational definition
Penninx Brenda *et al.*	1982-88	Counties of Iowa, East Boston, New Haven	6247	7.9	CES-D
Broadhead *et al.*	1982-84	ECA, North Carolina	1265	11.3	DIS, DSM-III
Murrell	1983	USA	2517	16.3	CES-D
Gurland	1983	UK/USA	841	1.9	SHORT-CARE, ICD
Kennedy Gary *et al.*	1984-85	ECA, USA	2137	16.9	CES-D
Kay	1985	Tasmania, Australia	274	10.2	GMS, DSM-III
O'Hara	1985	USA	3159	1.2	RDC
Kay	1985	Hobart	274	16.1	GMS
Kay *et al.*	1985	Hobart	274	10.2	GMS, CARE, DSM-III
Berkman	1986	USA	28.6	15.9	CES-D
Copeland	1987	UK	1087	11.2	GMS-AGECAT
Copeland	1987	UK	1070	2.9	GMS-AGECAT
Morgan	1987	UK	1042	9.8	SAD
Bland	1988	Canada	358	1.2	DIS
Kivela	1988	Finland	1529	3.7	DSM-III
Weissman	1988	USA	5499	1.0	DIS
Kivela	1988	Finland	1529	26.9	DSM-III
Kennedy	1989	USA	2137	16.9	CES-D
Lindesay	1989	UK	890	4.3	SHORT-CARE
Cwikel	1989	Israel	285	34.0	S-GDS
Bosma	1990	Netherlands	328	4.1	DIS
Schoevers *et al.*	1990-97	Amsterdam	4051	12.9	GMS-AGECAT, CAMDEX
Geerlings *et al.*	1990-96	Amsterdam	3147	10.5	GMS-AGECAT, CES-D
Blazer	1991	USA	3998	9.0	CES-D
Fuhrer	1992	France	2792	13.6	CES-D
Kua	1992	Singapore	612	5.7	GMS-AGECAT
Madianos	1992	Greece	251	27.1	CES-D
Johnson *et al.*	1992	ECA, USA	8571	6.1	Psychiatrist
Henderson	1993	Australia	945	1.0	CIE
Ihara	1993	Japan	695	5.3	CES-D
Saunders	1993	UK	5222	10.0	GMS-AGECAT
Liu *et al.*	1993	China	1313	12.9	GDS-S , DSM-III-R
Woo	1994	Hong Kong	1611	35.0	GDS
Komahashi	1994	Japan	1914	0.4	DSM-III
Pahkala *et al.*	1994	Finland	1225	16.5	DSM-III
Beekman	1995	Netherlands	3056	2.0	DIS
Hooijer	1995	Netherlands	4051	12.0	GMS-AGECAT
Lobo *et al.*	1995	Southern Europe	1080	4.8	Psychiatrist
Roberts *et al.*	1995	Texas	7117	9.0	DSM-IV

Table 1: contd……

Chief investigator/first author	Year	Study area	Sample size	Prevalence of depressive disorders (%)	Instrument/diagnostic criteria
Ramin Mojtabai *et al.*	1996	USA	9747	6.6	Psychiatrist
Korner *et al.*	1996	Denmark	701	9.5	BDI, HDS, DSM-III-R,ICD-10
Geraldine Fahy Ma	1996	USA	111	12.6	MMSE, GDS
Lauritzen	1996	Denmark	664	9.6	BDI
Chong *et al.*	1996-98	Taiwan	1500	5.9	GMS-AGECAT
Nandi *et al.*	1997	West Bengal, India	183	52.2	Psychiatric exam./Operational definition
Prince *et al.*	1997-98	London, UK	889	17.7	SHORT-CARE
McCracken	1997	Liverpool	418	12.0	GMS, AGECAT
Kirby *et al.*	1997	ECA, Dublin	1232	10.3	GMS-AGECAT
Braune *et al.*	1997-98	Augsburg, Germany	385	10.4	CES-D
Newman *et al.*	1998	Edmonton, Canada	1119	4.5	DSM-IV, GMS
Newman *et al.*	1998	Edmonton, Canada	1119	11.2	GMS-AGECAT, DSM-IV
Tiwari	1999	Lucknow, India	561	13.5	ICD-9
Chen *et al.*	1999	China	351425	3.9	Meta-analysis of 10 studies, standard diagnostic criteria
Beekman *et al.*	1999	Netherlands	2750	1.8	Systm. Review of 34 studies, standard diagnostic criteria
Deise A.A P Olive	2001	Brazil	118	31.0	Yesavage geriatric depression scale
Stella Argyriadou	2001	Greece	536	24.8	MMSE, GDS
Heun *et al.*	2001	Germany	162	9.0	Psychiatrist
Mine Ekinci *et al.*	2001-02	Erzurum, Turkey	1097	16.0	GDS-Turkish Version
Barua Ankur *et al.*	2002	Karnataka, India	609	21.7	Mastering depression in primary care, Version 1998
Daniel WL Lai *et al.*	2004	Canada	1537	24.2	GDS-SF
Copeland *et al.*	2004	Amsterdam, Berlin	13808	12.3	Meta-analysis of 14 studies, EURO-D, AGECAT and GMS
Ostbye *et al.*	2005	Canada	2341	6.6	Clinical rating scale for depression
Chen *et al.*	2005	China	1600	6.0	AGECAT, GMS

GMS, Geriatric Mental State Schedule; AGECAT, Automated Elderly Examination for Computer-Assisted Taxonomy; DIS, Diagnostic Interview Schedule; GDS, Elderly Depression Scale; HDS/HAMD, Hamilton Depression Scale; BDI, Beck's Depression Inventory; CES-D, Center for Epidemiologic Studies Depression Scale; CIDI-SF, Composite International Diagnostic Inventory; DSM-III, Diagnostic Statistical Manual version III; MMSE, Mini-Mental Status Examination; DSM, Diagnostic and Statistical Manual of Mental Disorders, 3rd and 4th editions.

population was conducted by the investigators where 74 community-based mental health surveys on depression in the elderly were analyzed for determining the median prevalence rates and the trend of depression in the elderly. All the studies, which were included for final analysis, were conducted during the years 1955–2005 in the continents of Asia, Europe, Australia, and North and South Americas [Table 1].

Selection of articles

The search strategy yielded 896 potentially relevant studies; among these 143 were retrieved for more detailed evaluation. Although 77 studies met the inclusion criteria, we could retrieve the 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 inaccessibility and unavailability of relevant information elsewhere. Among these 74 selected articles, which formed the study material for this meta-analysis of depression in

the elderly, 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*[8] (1999, China) on 10 relevant studies and another by Copeland *et al*[9] (2004, Amsterdam) on 14 relevant studies, and also a systematic review report by Beekman *et al*[10] (1999, Netherlands) 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 the elderly from [74 + (10+14+34) = 132] the survey reports from various parts of the world.

The investigators could obtain full text versions of 44 (59.5%) articles and had retrieved structured abstracts with relevant data for this meta-analysis of 17 (23.0%) articles. Even though the investigators could not directly retrieve the reports of 13 (17.6%) important studies, the relevant information of these studies was obtained from

the introduction and discussion sections of the full text versions of some of the retrieved articles.

Report from the selected 74 articles was used for estimation of median prevalence of depression in the elderly. 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.

Determination of median prevalence rate of depressive disorders in the elderly
The 74 included studies involved 4,87,275 elderly individuals from all parts of the world at baseline [Table 1]. Among these, 6 studies from India involved only 2499 (0.5%) elderly individuals at baseline for assessment of presence of depression. The mean ages of the study population were reported in 68 (85.1%) articles with mean ranging from 62 to 71 years. Here, 68 (91.9%) articles included gender distribution and 36%–64% of the participants were men (median = 46%). The length of the reported study period ranged from 3 to 84 months (median = 9).

Only 52 (70.3%) studies used some of the modern rating scales for diagnosis of depression in the elderly. Among these, 14 used AGECAT/GMS-AGECAT, 4 used Diagnostic Interview Schedule/HDS, 8 used GMS/Geriatric Depression Scale (GDS), 11 used CES-D, and 15 used DSM/ICD criteria for the diagnosis of geriatric depression. Although some studies had used more than one rating scale of depression, only the superior rating scale among these was included as the diagnostic instrument for each study. The prevalence rate of geriatric depression was found to be higher in studies using psychiatric examination and operational definitions and studies using the GDS or Geriatric Mental State Schedule (GMS) alone [Table 1].

The Median Prevalence Rate of depressive disorders in the world for the elderly population from 74 studies was determined to be 10.3% with Inter-Quartile Range varying between 4.7% and 16.0%. Similar findings were reported by Kirby *et al*[11] (1997, Dublin) and Kay *et al*[12] (1985, Hobart). Studies conducted by Geerlings *et al*[13] [(1990–1996), Amsterdam], Newman *et al*[14] (1998, Canada), and Liu *et al*[15] (1993, China) also reported the

prevalence rate of depression among the elderly to be 10.5%, 11.2%, and 12.9%, respectively.

The comparison of median prevalence rates of depression in the elderly population of India and the rest of the world was also studied. It was found that the proportion of depressed elderly population in India (18.2%) was significantly higher than the rest of the world (5.4%) and this difference was found to be statistically highly significant (χ^2 = 770.4 and *P* = 0.000000001*). Although there is an alarming increase in the proportion of depressed elderly in India, we should also keep in mind that there were only 6 relevant studies available from India, covering only 0.5% of elderly participants of the world as compared with 68 studies from the rest of the world covering 99.5% of the participants.

The low prevalence of depression in the elderly during recent years could be due to the presence of better diagnostic instruments with optimum validity and reliability developed during the recent years to diagnose geriatric depression in the community and to rule out cases of dementia, which were often falsely diagnosed as depression in the past. The technologic advancements in recent years on health care delivery systems, including mental health, also provided adequate health support systems, improving the quality of life in the elderly.

However, a high prevalence in the past could be attributed to the fact that the study instruments that were applied during the years (1955–1984) were not specially devised to specifically detect depression in the community and they could have falsely identified more cases of dementia as depressive disorders and a majority of these studies relied on clinical diagnosis and operation definition where the cutoff level for identification of geriatric depression was lower.

Since there is population explosion recorded in many of the developing countries in the world, including India in recent years, we need also to keep in mind the number of depressed elderly individuals who would require adequate mental health care. Although a lower prevalence rate of geriatric depression was recorded in the recent years, there was an alarming increase in the number of elderly individuals suffering from depression, which had a booming 8-fold increase from the period of (1955–1984) to (1995–2005), and this trend was also found to be statistically highly significant. Although there was a significant decrease trend in the world prevalence of geriatric depression, it was significantly higher among Indians in recent years than the rest of the world.

The comparison of depressive disorders in the elderly population of various continents of the world was undertaken. Due to unavoidable circumstances, no study from the African continent was available for this meta-analysis. However, the findings suggested that the median prevalence rates of depression in the elderly were similar in Asia, Europe, and America, but it was significantly lower in Australia. Here, we should keep in mind that only 3 studies were available from Australia, which covered only 0.4% elderly population of the world. Although the proportion of elderly individuals affected with depression was significantly lower in Asia (4.2%) than Europe (10.9%) and America (8.4%), the number of depressed elderly individuals was significantly higher in Asia, which was evident from 14 studies conducted in various Asian countries covering 74.5% population of the world. Studies from the developing countries, such as India, had reported a very high prevalence rate of 21.9% with IQR ranging from 11.6 to 31.1. Care and bonding from family support systems, lesser competitive life styles, and improved mental health facilities with their integration with primary health care could account for lesser prevalence rates in some of the developed Asian countries.[1,2,4]

References

1. The World Health Organization (WHO). World Health Report: Mental Health: New Understanding New Hope. In: Rangaswamy SM, editor. Geneva, Switzerland: World Health Organization; 2001.
2. Wig NN. World Health Day, 2001. Indian J Psychiatry 2001;43:1-4.
3. Nandi DN, Ajmany S, Ganguli H, Banerjee G, Boral GC, Ghosh A, *et al*. The Incidence of mental disorders in one year in a rural community in West Bengal. Indian J Psychiatry 1976;18:79-87.
4. Ramachandran V, Menon SM, Arunagiri S. Socio-cultural factors in late onset depression. Indian J Psychiatry 1982;24:268-73.
5. Chong MY, Tsang HY, Chen CS, Tang TC, Chen CC, Yeh TL, *et al*. Community study of depression in old age in Taiwan. The British Journal of Psychiatry 2001; 178: 29-35.
6. Nandi PS, Banerjee G, Mukherjee SP, Nandi S, Nandi DN. A study of Psychiatric morbidity of the elderly population of a rural community in West Bengal. Indian Journal of Psychiatry 1997; 39(2): 122-9.
7. Prince MJ, Lewis G, Bird A, Blizard R, Mann A. A longitudinal study of factors predicting change in cognitive test scores over time, in an older hypertensive population. Psychological Medicine 1996; 26(3): 555-68.
8. Chen R, Copeland JR, Wei L. A meta-analysis of epidemiological studies in depression of older people in the People's Republic of China. Int J Geriatr Psychiatry 1999;14:821-30.
9. Copeland JR, Beekman AT, Braam AW, Dewey ME, Delespaul P, Fuhrer R, *et al*. Depression among older people in Europe: The EURODEP studies. World Psychiatry 2004;3:45-9.
10. Beekman AT, Copeland JR, Prince MJ. Review of community prevalence of depression in later life. Br J Psychiatry 1999;174:307-11.
11. Aisling D, Kirby M, Bruce I, Cunningham C, Coakley D, Lawlor BA. Three-year prognosis of depression in the community-dwelling elderly. Br J Psychiatry 2000;176:453-7.
12. Kay DW, Henderson AS, Scott R, Wilson J, Rickwood D, Grayson DA. Dementia and depression among the elderly living in the Hobart community: The effect of the diagnostic criteria on the prevalence rates. Psychol Med 1985;15:771-88.
13. Schoevers RA, Beekman AT, Tilburg WV, Deeg DJ, Jonker C, Geerlings MI, *et al*. Association of depression and gender with mortality in old age. Br J Psychiatry 2000;177:336-42.
14. Newman SC, Bland RC, Orn HT. The prevalence of mental disorders in the elderly in Edmonton: A community survey using GMS-AGECAT. Can J Psychiatry 1998;43:910-4.
15. Liu CY, Wang SJ, Teng EL, Fuh JL, Lin CC, Lin KN, *et al*. Depressive disorders among older residents in a Chinese rural community. Psychol Med 1997;27:943-9.