Review Article: Trend of the prevalence of geriatric depression: a modern silent epidemic

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Abstract

Introduction: Unipolar Major Depression is predicted to become the second-most important cause of morbidity throughout the world by the year 2020 by the World Health Organization (WHO). This systematic review on the prevalence rates of geriatric depression was conducted to draw the attention of all health care personnel for focussing their intense endeavours in addressing this burning issue.

Objectives:
(1) To determine the Median Prevalence Rates of geriatric depression of the world and in India.
(2) To conduct a Time-Trend Analysis on prevalence of geriatric depression in the world.

Materials & Methods: This Retrospective study based on Systematic review on prevalence of geriatric depression was conducted on the community based mental health surveys on geriatric depression conducted in continents of Asia, Europe, Australia, North America, and South America. All the studies that constituted the sample were conducted between 1956 and 2005. After applying the inclusion and exclusion criteria, 65 original research studies that surveyed a total of 99,297 elderly individuals in the age group of 60 years and above, residing in various parts of the world were included for the final analysis. Statistical procedures applied were the median prevalence rate and its corresponding inter-quartile range as well as the Chi-square for Linear Trend. *P* value <0.05 was considered as statistically significant.

Results: The Median Prevalence Rate of geriatric depression in the world was determined to be 10.3% with Interquartile Range varying between 4.6% and 16.0%. The Median Prevalence Rate of geriatric depression in Indian population was determined to be 21.9% with Interquartile Range varying between 11.6% and 31.1%.

Conclusion: The high prevalence rate of geriatric depression could be attributed to the fact that better diagnostic instruments with optimum validity and reliability had been developed during the recent years to diagnose geriatric depression at an early stage in the community.

Introduction

Depression is a silent killer of modern era. According to the future projection of Disability Adjusted Life Years (DALY), it has been predicted by the WHO that, Unipolar Major Depression, would become the second-most important cause of morbidity throughout the world by the year 2020.[1] A significant number of the elderly people today are likely to have physical and mental morbidity besides having psychosocial problems[1]. Among the various mental disorders of old age, depression was the commonest problem observed in the community. According to the estimates of the World Health Organization, the overall prevalence rate of geriatric depression generally varies between 10% and 20% depending on cultural situations.[2] A recent study in Edmonton by Newman et al. (1998) on a community sample of people over 65 years of age, found the rate of depression as 11.2%.[3,4]

In India, the principal mental disorders of later life were mood disorders (predominantly depressions) and dementias.[1] The community-based mental health studies have revealed that the point prevalence of depression among the geriatric population in India varies between 13 and 25 per cent.[1,5,6,7]

According to the observations made by the World Health Organization, the correlates of depression in old age were reported as: (1) Genetic susceptibility, (2) chronic disease and disability, (3) pain, frustration with limitations in activities of daily living, (4) personality trait (dependent, anxious or avoidant), (5) adverse life-events (widowhood, separation, divorce, bereavement, poverty, social isolation) and (6) lack of adequate social support.[2,4,8,9,10]

Though the suicidal tendencies among the aged, occur frequently as a result of major depression,[4,11] studies show that only 8–20% of the elderly, suffering from depression, were being cared for in the community.[11,12]

Currently, India was entering the grey revolution. The proportion of those, who were aged 60 years and above, were estimated to be 7.7% for the year 2000, and this proportion were expected to reach 12.6% in 2025. The Indian aged population was currently the second largest in the world.[13]

However, in India, due importance was not given to determine the magnitude of geriatric mental health problems and to assess their long-term effects on general health. This was

evident from the fact that only a few studies were available that have explored geriatric health problems, particularly the mental health problems.[5,6,7,14,15]

Though India was the second-most populated country in the world in terms of elderly population of sixty years and above, yet geriatric depression was not yet perceived as a public health problem in India. So, there was a need to conduct a systematic review and compare the prevalence rates of geriatric depression in India and the rest of the world, in order to draw the attention of all health care personnel for focussing their intense endeavours to address this issue.

Materials and Methods

Study Design: Retrospective study based on Systematic review on prevalence of geriatric depression.

Setting: Community based mental health surveys on geriatric depression conducted in continents of Asia, Europe, Australia, North America, and South America.

Study Period: All the studies that were conducted and published in indexed journals between 1956 and 2005 (i.e., within the last fifty years) constituted the sample.

Sample Size: All published articles on prevalence of geriatric depression that were available, adequately analyzed and accessible from the internet, the Central Library of Kasturba Medical College Manipal in Karnataka and the Central Library of Sikkim-Manipal Institute of Medical Sciences (SMIMS) in Sikkim, constituted the study universe of sixty five articles which are enlisted in Table A.

Sampling Procedures: Simple Random Sampling Method was applied to identify the study subjects in all the individual and independent surveys conducted in the constituent studies.

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 that 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 as well as the Central Library of Kasturba Medical College Manipal in Karnataka and Central Library of Sikkim-Manipal Institute of Medical Sciences (SMIMS), Sikkim on studies regarding the prevalence of geriatric depression were excluded from the study.

Any study, where the 95% Confidence Interval for the prevalence rate estimation exceeded 20 units; the study was excluded from analysis on accounts of probable inappropriate sample size calculation. But it was perceived by the researchers that the proportion of excluded reports would constitute less than 5% of the available articles on relevant topic. Hence, it was expected to have minimal impact on the final results.

Study Instruments: Clinical Diagnoses by Psychiatrists was based on Diagnostic Statistical Manual version III (DSM-III-R), Diagnostic Statistical Manual version IV (DSM IV) and International Codes for Diseases (ICD-10) criteria. Other standardized study instruments used were Geriatric Mental State Examination (GMS), Automated Geriatric Examination for Computer Assisted Taxonomy (AGECAT), Composite International Diagnostic Inventory (CIDI-SF), Centre for Epidemiological studies Depression scale (CES-D), Beck's Depression Inventory (BDI), HDS, Yesavage Geriatric Depression Scale, Centre for Epidemiologic Studies Depression Scale, Mini Mental Status Examination (MMSE), Clinical Rating Scale for Depression and Geriatric Depression Screening Scale and Mastering Depression In Primary Care Version 1998.

Data Collection Procedure

The investigators were trained by the renowned psychiatrists of Kasturba Medical College Manipal, Karnataka and Sikkim-Manipal Institute of Medical Sciences (SMIMS) on how to interpret the results form different community based psychiatric evaluation studies. The diagnoses generated by the questionnaires used as study instruments were strictly kept confidential and were reconfirmed by consulting the senior psychiatrists for confirmation of their acceptability, content validity and reliability, before arriving at a final ICD-10 diagnosis for data analysis.

After applying the inclusion and exclusion criteria, a Pilot study was conducted at the initial stage with data from 20 randomly chosen original research studies that surveyed a total of 3800 elderly individuals in the age group of 60 years and above, residing in various parts of the world. The data from the pilot study were later included in the statistical analysis of the final research project.

Anytime a relevant article was found inaccessible on internet, all attempts were made to contact the corresponding author(s) through postal letters, telephone, fax or email and sincerely requested to provide us with a soft or hard copy of that article. In case after repeated five attempts, spread over three months, if the investigators fail to procure a relevant article, then that article was considered as unavailable and it was excluded from the analysis.

Data Analysis

The collected data was tabulated and analysed by using the statistical package SPSS (Statistical Package for Social Sciences) version 10.0 for Windows. The Median prevalence of geriatric depression was estimated along with its corresponding inter-quartile range. Chi-square for Linear Trend was applied to conduct the time-trend analysis of geriatric depression in India and major continents in the world. *P* value <0.05 was considered as statistically significant.

Results and Discussions

From Table 1, the Median Prevalence Rate of geriatric depression in the world was determined to be 10.3% with Interquartile Range varying between 4.6% and 16.0%.

From Table 2, the Median Prevalence Rate of geriatric depression in Indian population was determined to be 21.9% with Interquartile Range varying between 11.6% and 31.1%. This finding is similar to the observations from the community-based mental health studies conducted in various parts of India which had revealed that the point prevalence of geriatric depression in India varied between 13 and 25 per cent. [1,5,6,7]

Apart from an increase in stress related injuries of brain due to fast-paced modernization and industrial development, there was also an element of social isolation due to the failure of social support and network systems for elderly population in India.

The high prevalence rate of geriatric depression could also be attributed to the fact that better diagnostic instruments with optimum validity and reliability had been developed during the recent years to diagnose geriatric depression at an early stage in the community.

Though the Time-Trend Analysis on prevalence of geriatric depression from Table3, revealed that the prevalence of geriatric depression was significantly on decrease from 1956-2005 (x^2 for linear trend = 10.2 and *p= 0.00144*)*, but the number of individuals affected in recent years was more. This could also be attributed to the fact that the study instruments that were applied during the year 1956-1983 were not specially devised to specifically detect depression in the community and they could have falsely identified more cases of dementia as depressive disorders.

Conclusion

A high prevalence rate of geriatric depression was observed in this study. This could be due to the use of better diagnostic instruments with optimum validity and reliability that had been developed during the recent years to diagnose geriatric depression at an early stage in the community. Though the Time-Trend Analysis revealed that the prevalence of

geriatric depression significantly decreased from 1956-2005, but the number of individuals affected in recent years was comparatively higher.

Competing interests: NIL

Authors' contributions:
Ankur Barua had conceptualized this project, formed the protocol, collected the data, did the statistical analysis and composed the final report.

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Table A: Prevalence Rates of Depressive Disorders in Geriatric Population

Sl. No.	CHIEF INVESTIGATOR/ FIRST AUTHOR	YEAR	STUDY AREA	SAMPLE SIZE	PREVALENCE OF DEPRESSIVE DISORDERS (%)	INSTRUMENT/ DIAGNOSTIC CRITERIA
1.	Essen-Moller	1956	Sweden	443	2.0	Psychiatrist
2.	Kay	1964	Tasmania, Australia	505	1.3	Psychiatrist
3.	Parsons	1965	UK	228	0.9	Psychiatrist
4.	Nandi D.N. et al	1972-73	West Bengal, India	54	22.0	Psychiatric exam. / Operational definition
5.	Copeland J.R.H. et al	1976	Liverpool, UK	1070	11.3	GMS-AGECAT
6.	Ramachandran V. et al	1979	Madras, India	406	24.1	Psychiatric exam. / Operational definition
7.	Blazer Dan et al	1979	Durham county, North Carolina	997	14.7	Duke – OARS; DSM-III
8.	Blazer	1980	USA	997	1.8	DSM-III
9.	Eaton	1981	USA	338	14.8	CES-D
10.	Stanley A. Murrel	1981	US, Kentucky	2517	16.0	Center for Epidemiologic St
11.	Rao Venkoba A. et al	1982	Madurai, India	686	6.0	Psychiatric exam. / Operational definition
12.	Penninx Brenda W.J.H. et al	1982-88	Counties of Iowa, East Boston, New Haven	6247	7.9	CES-D
13.	Broadhead W.E. et al	1982-84	ECA, North Carolina	1265	11.3	DIS, DSM-III
14.	Murrell	1983	USA	2517	16.3	CES-D
15.	Gurland	1983	UK/USA	841	1.9	SHORT-CARE, ICD
16.	Kennedy Gary J. et al	1984-85	ECA, USA	2137	16.9	CES-D
17.	Kay	1985	Tasmania, Australia	274	10.2	GMS, DSM-III
18.	O'Hara	1985	USA	3159	1.2	RDC
19.	Kay	1985	Hobart	274	16.1	GMS
20.	Kay D.W.K. et al	1985	Hobart	274	10.2	GMS, CARE, DSM-III
21.	Berkman	1986	USA	28.6	15.9	CES-D
22.	Copeland	1987	UK	1087	11.2	GMS-AGECAT
23.	Copeland	1987	UK	1070	2.9	GMS-AGECAT
24.	Morgan	1987	UK	1042	9.8	SAD

GMS-Geriatric Mental State Schedule, AGECAT-Automated Geriatric Examination for Computer Assisted Taxonomy, DIS-Diagnostic Interview Schedule, GDS-Geriatric Depression Scale. BDI-Beck's Depression Inventory, CES-D-Centre for Epidemiological studies Depression scale, DSM-III-Diagnostic Statistical Manual version III.

Table A: Prevalence Rates of Depressive Disorders in Geriatric Population (Cont.)

Sl. No.	CHIEF INVESTIGATOR/ FIRST AUTHOR	YEAR	STUDY AREA	SAMPLE SIZE	PREVALENCE OF DEPRESSIVE DISORDERS (%)	INSTRUMENT/ DIAGNOSTIC CRITERIA
25.	Bland	1988	Canada	358	1.2	DIS
26.	Kivela	1988	Finland	1529	3.7	DSM-III
27.	Weissman	1988	USA	5499	1.0	DIS
28.	Kivela	1988	Finland	1529	26.9	DSM-III
29.	Kennedy	1989	USA	2137	16.9	CES-D
30.	Lindesay	1989	UK	890	4.3	SHORT-CARE
31.	Cwikel	1989	Israel	285	34.0	S-GDS
32.	Bosma	1990	Netherlands	328	4.1	DIS
33.	Schoevers R.A. et al	1990-97	Amsterdam	4051	12.9	GMS-AGECAT, CAMDEX
34.	Geerlings M.I. et al	1990-96	Amsterdam	3147	10.5	GMS-AGECAT, CES-D
35.	Blazer	1991	USA	3998	9.0	CES-D
36.	Fuhrer	1992	France	2792	13.6	CES-D
37.	Kua	1992	Singapore	612	5.7	GMS-AGECAT
38.	Madianos	1992	Greece	251	27.1	CES-D
39.	Henderson	1993	Australia	945	1.0	CIE
40.	Ihara	1993	Japan	695	5.3	CES-D
41.	Saunders	1993	UK	5222	10.0	GMS-AGECAT
42.	Liu C.Y. et al	1993	China	1313	12.9	GDS-S , DSM-III-R
43.	Woo	1994	Hong Kong	1611	35.0	GDS
44.	Komahashi	1994	Japan	1914	0.4	DSM-III
45.	Beekman	1995	Netherlands	3056	2.0	DIS
46.	Hooijer	1995	Netherlands	4051	12.0	GMS-AGECAT
47.	Lobo A. et al	1995	Southern Euro	1080	4.8	Psychiatrist

GMS-Geriatric Mental State Schedule, AGECAT-Automated Geriatric Examination for Computer Assisted Taxonomy, DIS-Diagnostic Interview Schedule, GDS-Geriatric Depression Scale. BDI-Beck's Depression Inventory, CES-D-Centre for Epidemiological studies Depression scale, DSM-III-Diagnostic Statistical Manual version III.

Table A: Prevalence Rates of Depressive Disorders in Geriatric Population (Cont.)

Sl. No.	CHIEF INVESTIGATOR/ FIRST AUTHOR	YEAR	STUDY AREA	SAMPLE SIZE	PREVALENCE OF DEPRESSIVE DISORDERS (%)	INSTRUMENT/ DIAGNOSTIC CRITERIA
48.	Ramin Mojtabai et al	1996	US	9747	6.6	Psychiatrist
49	Korner A et al	1996	Denmark	701	9.5	BDI, HDS, DSM-III-R, ICD-10
50.	Geraldine Fahy Ma	1996	US	111	12.6	MMSE, GDS
51.	Lauritzen	1996	Denmark	664	9.6	BDI
52.	Chong M.Y. et al	1996-98	Taiwan	1500	5.9	GMS-AGECAT
53.	Nandi P. S. et al	1997	West Bengal, India	183	52.2	Psychiatric exam. / Operational definition
54.	Prince M.J. et al	1997-98	London, UK	889	17.7	SHORT-CARE
55.	McCracken C. F. M	1997	Liverpool	418	12.0	GMS, AGECAT
56.	Kirby M. et al	1997	ECA, Dublin	1232	10.3	GMS-AGECAT
57.	Newman S.C. et al	1998	Edmonton, Canada	1119	4.5	DSM-IV, GMS
58.	Newman S.C. et al	1998	Edmonton, Canada	1119	11.2	GMS-AGECAT, DSM-IV
59.	Tiwari S.C.	1999	Lucknow, India	561	13.5	ICD-IX
60.	Deise A A P Olive	2001	Brasil	118	31.0	Yesavage Geriatric Depression Scale
61.	Stella Argyriadou	2001	Greece	536	24.8	MMSE, GDS
62.	Heun R et al	2001	Germany	162	9.0	Psychiatrist
63.	Barua Ankur et al	2002	Karnataka, In	609	21.7	Mastering Depression In Primary Care Version 1998
64.	Daniel WL Lai et	2004	Canada	1537	24.2	GDS-SF
65.	Truls Ostbye et a	2005	Canada	2341	6.6	Clinical Rating Scale for Depression

GMS-Geriatric Mental State Schedule, AGECAT-Automated Geriatric Examination for Computer Assisted Taxonomy, DIS-Diagnostic Interview Schedule, GDS-Geriatric Depression Scale. BDI-Beck's Depression Inventory, CES-D-Centre for Epidemiological studies Depression scale, DSM-III-Diagnostic Statistical Manual version III.

Table 1: Median Prevalence Rate of Depressive Disorders in Elderly Population of the World

MEDIAN PREVALENCE RATE OF DEPRESSIVE DISORDERS IN ELDERLY POPULATION OF THE WORLD (50th Percentile) (%)	INTER-QUARTILE RANGE (25TH Percentile -75TH Percentile) (%)
10.3	*4.6-16.0*

Table 2: Median Prevalence Rate of Depressive Disorders in Elderly Population of India

MEDIAN PREVALENCE RATE OF DEPRESSIVE DISORDERS IN ELDERLY POPULATION OF INDIA (50th Percentile) (%)	INTER-QUARTILE RANGE (25TH Percentile -75TH Percentile) (%)
21.9	*11.6-31.1*

Table 3: Time-Trend Analysis of Prevalence of Depressive Disorders in Elderly Population of the World

STUDY PERIOD	DEPRESSIVE DISORDERS IN ELDERLY		TOTAL
	Present n_1 (%)	Absent n_2 (%)	
Year (1956-1983) (15 studies)	1968 (10.3%)	17143 (89.7%)	19111 (19.2%)
Year (1984-1994) (29 studies)	4800 (9.9%)	43651(90.1%)	48451 (48.8%)
Year (>=1995) (21 studies)	2999 (9.5%)	28735 (90.5%)	31734 (32.0%)
TOTAL	9767 (9.8%)	89529 (90.2%)	99296 (100.0%)

* p value <0.05 was considered as significant

Chi-square for Linear Trend = 10.2 and P value = 0.00144*