International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2013): 6.14 | Impact Factor (2013): 4.438

Epidemiological Study of Unnatural Death in Elderly in Varanasi (India)

Dr. Awdhesh Kumar

M.D (Resident 3rd Year), Department of Forensic Medicine and Toxicology Institute of Medical Sciences, Banaras Hindu University, Varanasi, India

Abstract: ***Introduction: Aging process is inevitable, irreversible, progressive once it starts, always associated with physical and biological decline. In present study we consider geriatric age (elderly) ≥60 years. Aim of the study: To determines the epidemiological features and highlight outcome of geriatric unnatural deaths in Varanasi area. Material & method: The present retrospective study has been conducted for the period of 5 consecutive years i.e. 2009 to 2013 based on autopsy record of the unnatural death cases among elderly deaths. During study period total numbers of unnatural death cases were 10195 and deaths among elderly were 1310.These cases were brought to the Department of Forensic Medicine, IMS, BHU, Varanasi and have been analyzed retrospectively. Result: geriatrics autopsy 12.85% of total unnatural deaths. In present study we consider geriatric age (elderly) ≥60 years. Male to female ratio were 3.68:1. Most of the deaths were accidentals i.e. 626 cases (17.79%). Road traffic accidents 567 cases 43.28% were more common. Rural habitat outnumbers 73.89% urban habitat only 4.81%. Hindu outnumbers 76.03%, Muslim 2.52%. Summer season 480(36.64%), rainy season 422(32.21%) and in winter season 408(31.15%). Conclusion: Analysis of data for retrospective study suggests that prevalence, age, gender, manner of death, cause of death, habitat, religion and seasonal variations significantly affect community.***

Keywords: Geriatric age group, forensic autopsy, medico legal case, unnatural death, forensic medicine

1. Introduction

Aging is generally defined as process of deterioration in the functional capacity of organism that after maturity resulting from structural changes and it is a consequence of the inability of the organism to restore homeostasis when given a challenge. The aging human experiences a gradual decline in almost all body functions, mainly in the cardiac performances, respiratory and functions, sensory faculties, nerve impulse conduction, muscle strength, endurance, agility and ability to maintain coordinated muscular effort, which may be due to structural and functional changes resulting in inability to restore homeostasis **[1].** Elderly (geriatrics, gerantology) or geriatrics medicine which s a branch of medicine deals with disease of the old age**.** Aging process is inevitable, irreversible, progressive once it starts, always associated with physical and biological decline. For the sake of global comparison between countries, a cut- off point has been established by the United Nations at 60 years. Any individual of this age and above is regarded as elderly individual. Thus for sake of comparison, aged individuals are broadly divided into three categories: **young old up to the age of 75 years** during which their biological function is almost comparable to an adult person; **old-old individual up to 85 years** of age during which their biological functions have declined significantly and the person has many physiological and mental limitation; and **very old individual over the age of 85 years** where the biological limitations are quite significant and this group most often require the help of care-giver for their daily living **[2].**The aging process is a biological reality and has its own dynamics, which is largely beyond human control. Each society makes sense of old age in its own constructs. In the developed world, chronological time (the age of education, working age, retirement age) play a paramount role in life **[3].** In general, the incidence of adverse drug reactions is much higher in elderly [13]. Improvement in environmental and behavioral factors and the treatment and prevention of infectious diseases are largely responsible for the 30 year increase in life expectancy since 1900 [14].

2. Aim of the Study

To determines the epidemiological features and highlight outcome of geriatric unnatural deaths in Varanasi area to detect factors influencing mortality and morbidities in geriatric age group.

3. Material and Methods

Present study is carried out at forensic medicine department, Institute of Medical Sciences, Banaras Hindu University, Varanasi. Relevant information and subjective data like age, sex, habitat, marital status and manner of death among geriatrics have been collected from medico legal autopsy register. Data are analyzed retrospectivly for periods of five years from 2009 to 2013. Cases were included in death among geriatric age group on the basis of confirmation by investigating officer and corroborative finding at medico legal examination.

4. Observations and Result

Table 1: Total number of cases which were autopsied in the 5 year study period was 10195 out of which total geriatrics autopsy 1310(12.85%) of total unnatural deaths. % of geriatric autopsy on the basis of year wise distribution from 2009 to 2013 for 5 consecutive years were 19.31, 20.00, 19.54, 19.16, and 21.98 % respectively which is more or less static i.e. average 20.00%. Male cases were outnumbers 1030(78.63%) female 280(21.37%) i.e. male to female ratio 3.68:1. **Table 2**: **Age** wise distribution of unnatural death in the geriatrics age group showed that most of deaths in the 60-65 age groups i.e. 90.76% followed by 75-85 years 7.63% and in more than 85 year were 1.60%. **Table 3:** Distribution of **manner** of death by death among geriatrics

Licensed Under Creative Commons Attribution CC BY

age group showed that most of the deaths were accidentals i.e. 626 cases (17.79%), suicidal 33(2.52%), Homicidal 91(6.95%). **Table 4**: Distribution of **pattern of death** in geriatrics age group showed that road traffic accidental 567 cases 43.28% followed by railways accident 99(7.56%), burn 73(5.57%), poisoning 60(4.58%), drowning 50(3.82%) etc. **Table 5:** Distribution of death among geriatrics age group according to **habitat** showed that rural habitat outnumbers 968(73.89%) urban habitat only 63(4.81%). **Table 6**: Distribution of unnatural death among geriatrics age group according to **religions** showed that Hindu outnumbers 996(76.03%), Muslim 33(2.52%) and Christian only 5(0.38%). **Table 7**: Distribution of **seasonal variation** among geriatrics age group showed that most of the cases in summer season 480(36.64%), rainy season 422(32.21%) and in winter season 408(31.15%).

5. Discussion

5.1 Prevalence of Deaths

In our study we find that total number of autopsied in the 5 year study period was 10195 out of which total geriatrics autopsy 12.85% of total unnatural deaths. On the basis of year wise distribution geriatric autopsy from 2009 to 2013 for 5 consecutive years which is more or less static i.e. average 20.00%. Other studies find that prevalence of geriatric autopsy comparatively more i.e. 20.26% of more than 60 year of age **[4].** Other study **[10]** find it is 7.2% for those aged ≥60 years. In Norway, 48% of medico- legal deaths were recorded in the elderly **[11].** The difference may be related to the difference in life expectancy (78.7 years in Norway versus 51.3 years in Nigeria) **[12].** It may also reflect the value placed on the life of the elderly. Owing to the shorter life expectancy in Nigeria, investigating the cause of death in the elderly may not be considered worthwhile.

5.2 Age

In present study we find that most of deaths in the young old 60-65 year age groups i.e. 90.76% followed by 75-85 years 7.63% and in more than 85 year were 1.60%.

5.3 Gender

In present study we find that male elder lies unnatural death cases were outnumbers 78.63%, female 21.37% i.e. male to female ratio 3.68:1. These difference are due to Men are more commonly victims perhaps as they are generally working outdoors and are more exposed to stress, frustrations and violence and women often become victims of domestic homicides due to physical disadvantage and incapability of resistance to violence. Similar finding by other study **[4]** that every year, throughout the ten-year study period, the number of unnatural deaths in elderly males was more than elderly females.

5.4 Manner of Death

Presenting work in our study regarding distribution of manner of death among geriatrics age group showed that most of the deaths were accidentals 17.79%, suicidal 2.52%, homicidal 6.95%. Other study **[4]** find that homicidal deaths were the most common manner of unnatural deaths (83.85%), followed by accidental deaths (14.98%) then suicidal deaths (1.17%). Other study **[10]** which finds that accidents were the most common cause followed by homicides and suicide in geriatric age group. Ambade et al. **[9]** who found that suicide rate per year was higher than homicide rate per year over a period of three years 1998–2000 in Maharashtra, India. In our study suicidal elderly was 2.52 % which is slightly less than study conducted by Aadamali et al (2014) [15] i.e. 3%.

5.5 Cause of Death

Regarding distribution of pattern of death in our study showed that geriatrics age group showed that road traffic accidents 567 cases 43.28% followed by railways accident 7.56%, burn 5.57%, poisoning 4.58%, drowning 3.82% etc. In other study **[4, 10]** find traumas were the most common cause of death (78.71%), followed by undetermined causes (13.36%) and toxicological causes (7.93%).

5.6 Habitat

In our study regarding distribution of death among geriatrics age group according to habitat showed that rural habitat outnumbers 73.89% urban habitat only 4.81%. Other study **[4, 8]** also find similar result that unnatural deaths were higher in rural than in urban areas.

5.7 Religious

In our study we find that distribution of unnatural death among geriatrics age group according to religions showed that Hindu outnumbers 76.03%, Muslim 2.52% and Christian only 0.38%.

5.8 Seasonal Variation

Distribution of seasonal variation among geriatrics age group showed that most of the cases in summer season 480(36.64%), rainy season 422(32.21%) and in winter season 408(31.15%).

6. Conclusion

To make non-violent community: To control unnatural death manner accidental, homicidal and suicidal cases. More **comprehensive and strict legislation** should be considered to promote an improvement of roadways as well as strict traffic laws must be proposed to control traumatic road side accidental deaths. **Education of agrichemical workers and formers** about risk factors that lead to accidental poisoning with pesticides and insecticides should be done. Lastly, strict rules should be present to control marketing of pesticides, insecticide and pharmacologic agents. Many factors are possible contributors to the increased mortality and injury incidence rates observed among rural populations. Most injury mechanisms may occur more frequently in rural than urban populations; for example, road traffic accidents may occur more frequently on rural roadways because of their bad design as regard guiding marks, road condition and proper illumination.

Licensed Under Creative Commons Attribution CC BY

7. Future Scope

Based upon the present study following point may need in future planning regarding prevention of unnatural deaths among elderly:-To plan effective preventive strategies regarding road traffic accident as it was most common cause of death. A need for further similar studies is stressed & maintenance of elderly MLC registers to know the pattern of old age fatalities and legal complications and further reducing the geriatric fatalities in future.

8. Acknowledgement

Author would like to thank faculty and staff of department of Forensic Medicine IMS, BHU Varanasi for their valuable support and full help in data collection from autopsied cases.

9. Conflict of Interest

Nil

10. Source of Funding

This research was not financially supported by any funding agencies.

11. Ethical Clearance

The present study was approved by "Institutional Ethical Committee" of Institute of Medical Sciences, Banaras Hindu University Varanasi. All the information has been taken under consideration of medical ethical committee.

12. Tables

Table 1: Prevalence of unnatural deaths among **geriatrics** age group

Year	*Total number of autopsy*	*Number of autopsy of geriatrics*	*% of deaths among geriatrics*	*No. of male cases*	*% of male cases*	*No. of female cases*	*% of female cases*
2009	1986	253	19.31	201	19.51	52	18.57
2010	2025	262	20.00	209	20.29	53	18.93
2011	1974	256	19.54	186	18.06	70	25.00
2012	2081	251	19.16	197	19.13	54	19.29
2013	2129	288	21.98	237	23.01	51	18.21
Total	10195	1310	12.85	1030	78.63	280	21.37

Table 2: Age wise distribution of unnatural death in **geriatrics** age

Age group	Total No. of cases	% of total No. of cases	No. of male cases	% of male cases	No. of female cases	% of female cases
60-75	1189	90.76	942	91.46	247	88.21
75-85	100	7.63	70	6.80	30	10.71
>85	21	1.60	18	1.75	3	1.07
Total	1310	100.00	1030	100.00	280	100.00

Table 3: Distribution of **manner** of death by death among **geriatrics** age group

Manner	**No. of cases**	**% of cases**
Accidentals	626	47.79
Suicidal	33	2.52
Homicidal	91	6.95
Natural	355	27.10
Unknown	205	15.65
Total	1310	100.00

Table 4: Distribution of pattern of death in geriatrics age group

Sr. No.	*Cause of death*	*No. of male cases*	*% of male cases*	*No. female cases*	*% of female cases*	*Total No. of cases*	*% of total cases*
1.	Road traffic accident	469	45.53	98	35.00	567	43.28
2.	Natural cause	298	28.93	59	21.07	357	27.25
3.	Railways accident	73	2.52	26	9.29	99	7.56
4.	Burn	26	2.52	47	16.79	73	5.57
5.	Poisoning	45	4.37	15	5.36	60	4.58
6.	Drowning	37	3.59	13	4.64	50	3.82
7.	Hanging	24	2.33	3	1.07	27	2.06
8.	Fall from height	12	1.17	8	2.86	20	1.53
9.	Firearm injury	14	1.36	0	0.00	14	1.07
10.	Unknown	7	0.68	4	1.43	11	0.84
11.	Suffocation	4	0.39	4	1.43	8	0.61
12.	Electrocution	5	0.49	1	0.36	6	0.46
13.	Strangulation	3	0.29	1	0.36	4	0.31
14.	Heat stroke	3	0.29	0	0.00	3	0.23
15.	Hypothermia	3	0.29	0	0.00	3	0.23
16.	Infected wound	3	0.29	0	0.00	3	0.23
17.	Other (Bomb blast injury, Bull attack,	4	0.39	1	0.36	5	0.38

Licensed Under Creative Commons Attribution CC BY

	Chemical burn, Lightning)						
Total		1030	78.63	280	21.37	1310	100.00

Table 5: Distribution of death among **geriatrics** age group according to **habitat**

Sr. No.	*Habitat*	*Total No. of cases*	*% of cases*	*No. male cases*	*% of No. male cases*	*No. of female cases*	*% of No. of female cases*
1	Rural	968	73.89	761	73.88	207	73.93
2	Urban	63	4.81	47	4.56	16	5.71
3	Unknown	279	21.30	222	21.55	57	20.36
Total		1310	100.00	1030	78.63	280	21.37

Table 6: Distribution of unnatural death among **geriatrics** age group according to religions

Sr. No.	Religions	Total No. of cases	% of cases	No. of male cases	% of male cases	No. of female cases	% of female cases
1	Christian	5	0.38	4	0.39	1	0.36
2	Hindu	996	76.03	779	75.63	217	77.50
3	Muslim	33	2.52	28	2.72	5	1.79
4	Unknown	276	21.07	219	21.26	57	20.36
Total		1310	100.00	1030	78.63	280	21.37

Table 7: Distribution of seasonal variation among **geriatrics** age group

Season	*Total No. of cases*	*% of cases*	*No. of male cases*	*% of male cases*	*No. of female cases*	*% of female cases*
Summer (March-June)	480	36.64	385	37.38	95	33.93
Rainy (July-October)	422	32.21	333	32.33	89	31.79
Winter (Nov.-February)	408	31.15	312	30.29	96	34.29
Total	1310	100.00	1030	78.63	280	21.37

Reference

[1] W. Selvamurthy et al; basic geriatrics; biological process of aging; Indira Gandhi National Open University School of Health Sciences; MME 4; unit 1; PP:14-15.
[2] Dr. Ashish Bose et al; basic geriatrics; demography and epidemiology of aging; Indira Gandhi National Open University School of Health Sciences; MME 4; unit 1; PP: 5-6.
[3] Dr. A.B. Dey et al; basic geriatrics; aging gracefully; Indira Gandhi National Open University School of Health Sciences; MME 4; unit 1; PP:5.
[4] Essam M. Ali et al; a study of elderly unnatural deaths in medicolegal autopsies at dakahlia locality; Mansoura J. Forensic Med. Clin. Toxicol; Volume XV; No. 1; January 2007; PP: 33-43.
[5] Mohanty, M. K.; Kumar, T. S. M.; Mo- hanram, A. and Palimar, V. (2005): "Vic- tims of homicidal deaths - an analysis of variables". J. Clinical Forensic Med., 12: 302-304.
[6] Milroy, C. M. and Ranson, D. L. (1997): "Homicide trends in the state of Victoria, Australia". Am. J. Forensic Med. Pathol., 18:285-289.
[7] Kumar, V.; Li, A. K. M.; Zanial, A. Z.; Lee, D. A. and Salleh, S. A. (2005): "A study of homicidal deaths in medico-legal autopsies at UMMC, Kuala Lumpur". J. Clinical Forensic Med., 12:254-257.
[8] Boland, M.; Staines, A.; Fitzpatrick, P. and Scallan, E. (2005): "Urban-rural variation in mortality and hospital admission rates for unintentional injury in Ireland". Inj. Prev., 11:38-42.
[9] Ambade, V. N.; Godbole, H. V. and Kukde, H. G. (2007): "Suicidal and homicidal deaths: A comparative and circum- stantial approach". J. Forensic and Legal Med., 14:253-260.
[10] WO Akhiwu et al; Deaths with medico- legal implications in the elderly: experience from Benin City, Nigeria; Asian Journal of Gerontology & Geriatrics Volume 6 No 1 June 2011; PP: 35-37.
[11] World life expectancy chart; US Census Bureau, 2000; Available from http: /geography.about.com/library/weekly/aa04200b.htm.; Accessed 28 July 2010.
[12] Amakiri CN. Forensic medicine in the Rivers State of Nigeria: experience in four rural general hospitals. Med Sci Law 2000; 40:71-7.
[13] KD Thripathi; essential of medical pharmacology; Jaypee brother's medical publisher (p) LTD; 4th edition; 1999 PP: 62.
[14] Anthony S. Fauci et al; principle of internal medicine; McGraw Hill Companies;2008;17th edition; geriatric medicine;PP:53.
[15] Aadamali Nadaf et al; psychological autopsy study of suicides among elderly; Indian acad. forensic Med.; April –June; 2014; Volume 36, No. 2; PP: 156 – 159.

Author Profile



Dr. Awdhesh Kumar, M.D. (Resident 3nd Year) Previous PMHS State (Medical officer), Department Of Forensic Medicine and Toxicology, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India

Licensed Under Creative Commons Attribution CC BY