ORIGINAL ARTICLE

Prevalence and pattern of non-communicable diseases among elderly in a sub-urban area of Delhi

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Abstract

Background: With increasing proportion of geriatric population across societies, the occurrence and prevalence of non-communicable diseases has been steadily increasing as well. The study tries to showcase the pattern and proportion of NCDs among the elderly population in a sub-urban part of Delhi. **Aim & Objective**: To assess the prevalence and study the morbidity profile of NCDs among geriatric population of Delhi. **Materials & Methods**: A community based cross sectional study was done in 350 elderly participants in Mehrauli, Delhi. Data was collected using a semi-structured questionnaire. Detailed general and systemic examination was also done. **Results**: A total of 87.4% of the study population was suffering from at least one NCD; 68% were having an already known NCD(s) while 19.4% were newly diagnosed during the study. 2.41 NCDs were found per patient. The prevalence of hypertension was 58%, 49.4% suffered from senile cataract, 32.9% had osteoarthritis, 30.3% had diabetes mellitus, and 26.9% had obesity. Hypertension and diabetes mellitus together were present in 18.3% while the combination of hypertension, diabetes mellitus and obesity was seen in 9.4% of the study participants. **Conclusion**: Burden of NCDs among the elderly was notably high with a large proportion of them having multimorbidity. It gets important to focus on preventive measures to delay the onset and stem the progression of NCDs to facilitate healthy ageing.

Keywords

Non-Communicable Diseases; Elderly; India

Introduction

World population ageing is swelling; the proportion of older persons has been rising steadily, from one in fifteen in 1950 to one in seven currently, with that figure expected to double by 2050. Globally the population of older persons is growing at a considerably faster rate compared to the population as a whole.(1)

Progression from childhood to adulthood and eventually to old age naturally results in a large diversity and inequity with respect to determinants of health. This makes the elderly one of the most

vulnerable and high-risk groups in terms of health status.

Reform of the medical and health system and increased life expectancy of patients, both give rise to increased prevalence of Non-communicable diseases (NCDs), especially among the elderly. NCDs among the geriatric age group is an area that requires special focus as morbidity impact is more accentuated and disabling and often require multiple drug treatment, physiotherapy, and long-term rehabilitation.

The prevalence pattern of NCDs is closely related to economy, society, population, behaviour, environment, type of illness and so forth.

This study aims to estimate the prevalence of select non-communicable diseases and their pattern among the elderly residing in a sub-urban locality of Delhi.

Aims & Objectives

1. To assess the prevalence of NCDs among elderly over 60 years of age in Delhi.
2. To study the morbidity profile of NCDs among elderly over 60 years of age in Delhi.

Material & Methods

A community based observational cross sectional study was conducted among study participants in Mehrauli area of Delhi (a field practice area of the Dept. of Community Medicine in Lady Hardinge Medical College).

The study was done among the elderly population over 60 years of age who had been residing in the study area for at least a year and were willing to participate. Those who were seriously moribund or bed ridden or were unable to respond to the interview due to physically limiting disabilities were excluded.

The sample size was calculated using $N = Z^2 p q / l^2$. Taking 64% (2,3) as prevalence of NCDs, the sample size calculated for 95% level of significance, 10% allowable error, and design effect= 1.5 was found to be 337 participants and that was rounded off to 350. Three out of eight wards of Mehrauli area were selected randomly and subsequently systematic random sampling was done. The collective approximate population of the selected wards was found to be around 34,000. Sampling frame that included the elderly > 60 years was assessed using national population percentage of elderly (8.6% of total population). It was found that every eighth house needed to be visited in order to fulfil the sample size. The first house was decided by selecting a random number between 1 and 10 using lottery method and visiting the house that corresponded with the number. In case there were two or more elderly in a household, only one was randomly selected for the study. In case, there was no elderly person in a household, the next house was selected. In case a house was found locked even after three consecutive visits, the next house was selected. Whenever a crossroad came up, the road to the left was taken. The interview and examination was conducted by the first author and average time taken for it was around 30 minutes. The data collection was done from January to December 2019.

A self-designed, pre-tested, semi-structured interview schedule was used which included socio-demographic particulars, screening for selected Non-Communicable Diseases (Diabetes mellitus, hypertension, osteoarthritis, senile cataract, obesity) and other known NCDs. It was followed with detailed general and systemic examination. Operational definitions used for diagnosing new cases were-

Diabetes Mellitus- In asymptomatic patients if the fasting plasma glucose (FPG) value is ≥ 126 mg/dl) or if the casual plasma glucose value is ≥ 200 mg/dl. Symptomatic patients were those having increased frequency of urination, thirst and/or hunger. First Random blood Glucose of the participants was measured. In case RBS ≤ 200 mg/dl, the individual was classified as Normoglycemic. If RBS ≥ 200 mg/dl and symptoms were present diagnosis of diabetes mellitus was confirmed. If RBS ≥ 200 mg/dl and symptoms were not present, Fasting Blood Glucose was measured the next day to confirm the diagnosis. If FBS ≥ 126 mg/dl diagnosis of diabetes mellitus was confirmed.(4)

Hypertension- According to JNC 8 Blood Pressure Guideline, in people above 60 years, pharmacological therapy should be started at a BP of ≥ 150/90 mm Hg. In diabetic population aged 18 years or older, the target blood pressure is < 140/90 mm Hg. Average blood pressure higher than the aforementioned cut-offs was considered to diagnose Hypertension.(5)

Obesity- By measuring Body Mass Index (BMI) participants were categorized as underweight (<18.5 kg/m^2), normal or lean BMI (18.5–22.9 kg/m^2), overweight (23.0 –24.9 kg/m^2) and obese (≥25 kg/m^2) based on the revised consensus guidelines for India.(6)

Osteoarthritis- History of any significant pain and restriction in movement of large joints was used to diagnose osteoarthritis. Severity was assessed using WOMAC and KATZ tool.(7)

Senile Cataract- Torch Light examination was used to assess the presence of senile cataract. Greyish to white discolouration of lens with or without iris shadow was considered positive for senile cataract.

Data collected from proforma was coded and entered in SPSS. All quantitative variables were analysed in terms of mean and standard deviation while qualitative variables were analysed through proportions.

Results

A total of 350 elderly above 60 years were enrolled in the study of whom 191 (54.6%) were women and 159 (45.4%) were men. [Table 1] Mean age of the study participants was 68.26 ± 6.45 years (Range = 60 – 86 years). Almost two-thirds [n= 231 (66%)] of the study group belonged to young old (60-69 years) age group. More than two-thirds [n=243 (69.4%)] were currently married; the remaining were widowed. More than one-third [n= 118 (33.7%)] of the participants had no formal education whereas 115 (32.9%) had completed at least high school. More than half [n= 188 (53.7%)] of the study participants belonged to upper middle (52.9%) or upper (0.9%) class. Majority of the study participants [n= 250 (71.4%)] were living in joint families while 2.9% were living by themselves.

A total of 306 ie. 87.4% of the study population was suffering from at least one NCD. [Table 2] More than two-thirds [n= 238 (68%)] of the study participants were having an already known NCD(s) while almost one-fifth [n= 68 (19.4%)], though having an NCD, were not aware of it. A higher proportion of female participants had an already diagnosed NCD [n= 148 (77.5%)] as compared to men [n= 90 (56.6%)]. Prevalence of NCD increased with age, from 77.0% (n= 101) in 60-65 years age group to 100% in 76 years and above. It was seen that 238 study participants with known NCDs had a total of 428 NCDs i.e. 1.79 NCD per patient. At the end of the study it was found that the 306 participants had a total of 736 NCDs; that is 2.41 NCDs per patient. Of these, 136 male participants had 263 NCDs (1.93 NCD per patient) while 170 female participants had 473 NCDs (2.78 NCD per patient). The proportion of study participants having hypertension was 58% (n= 203) while 173 (49.4%) suffered from senile cataract; 115 (32.9%) had osteoarthritis, 106 (30.3%) had diabetes mellitus, and 96 (26.9%) had obesity. [Table 3]

At the beginning of the study, of the 238 study participants who had an NCD, 103 (43.3%) had a single NCD, while 138 (56.7%) had two or more NCDs. During the study 67 of those with a single NCD were diagnosed to have at least one another NCD. In the 68 new patients who were identified during the study, close to two-thirds [n= 44 (64.7%)] had a single NCD while the remaining had two or more. Overall, 80 out of the total 350 study participants (22.9%) had a single NCD, while 226 (64.6%) had two or more NCDs. Hypertension and diabetes mellitus together were present in 64 (18.3%) of the study population while the combination of hypertension, diabetes mellitus and obesity was seen in 33 (9.4%) of them.[Table 4] [Figure 1]

Discussion

With each passing day the relevance of the words 'population ageing' and 'non-communicable diseases' becomes greater. This can be ascribed directly to the fact that the numbers of both are going to increase in times to come and so is their degree of attribution. The present study focused on major non-communicable illnesses in the field practice area. Prevalence of known NCDs was assessed along with relevant screening for selected NCDs helped figure out the overall burden of these chronic morbidities.

Seven out of eight individuals ie. 87% participants in our study were having an NCD. The prevalence of common NCDs varied from 14.1% (8) to 98.2% (9) among studies conducted by various researchers in the past. However, studies from metro cities showed similar prevalence of NCDs among elderly- 87% in Chandigarh by Kaur et al(10) and 84% in Shimla by Sharma et al (11).

The total proportion of women having at least one NCD (89.0%) was slightly higher than men (85.5%). Longer life expectancy resulting in increased probability of getting a chronic disease could be a reason for the higher proportion among women.

A higher proportion of female participants had an already diagnosed NCD (77.5%) as compared to men (56.6%). This resulted in a larger fraction of apparently healthy male participants. This further resulted in a larger percentage of remaining male participants (66.67%) being diagnosed as having an NCD during study. 51.2% of the previously healthy

women were diagnosed as having an NCD during the study.

Occurrence of NCDs increases naturally as age progresses; this was also evident in this study wherein over 95% of the old and oldest old participants had at least one NCD. Participants belonging to the age group of 60 – 65 years, while having the least overall prevalence of NCDs, also had least awareness regarding an existing NCD. Almost 50% of the presumed healthy participants ended up having an NCD.

Prevalence of NCDs showed little variation among those from different religious backgrounds. The overall prevalence of NCDs in this study didn't vary much according to level of literacy. However, it was seen that newly diagnosed NCDs was highest among illiterate (65.7%) and lowest among those who had education up till high school or above (51.4%). In this study, we found that lower level of education was associated with increased morbidity which could be due to over reporting. Similar results were found by Joshi et al (12) and Kaur et al (10).

All individuals who were living alone had an NCD while 87% of those living with family had one. It can be argued that psychological isolation and loneliness resulting from staying alone has an impact on the physical attributes and health.

Prevalence of NCDs among study participants was lower in families belonging to upper and upper-middle classes (86.2%) when compared to lower-middle class (87.8%) and upper-lower and lower classes (92.3%). This could be attributed to the overall lifestyle choices that were presumably better among the higher classes. Similar results were found in studies by Kaur et al (10) where socio-economic status was responsible for occurrence of NCD (OR = 6.588, 95% CI = 2.404–18.049, p value <0.001).

Hypertension was the most prevalent chronic disease, followed by senile cataract, osteoarthritis, diabetes mellitus and obesity. Similar order of proportion of selected NCDs was seen in studies by Bhat et al (2) and Joshi et al (12). A total of 6.7% (n=16) of the study individuals had hypothyroidism, 5.0% (n= 12) each suffered from asthma and CAD, two participants (0.8%) had COPD and one patient was a known case of Schizophrenia.

The proportion of those having multi-morbidity has been on the rise and is becoming a serious public health concern. Close to one in five people in our study [n=64 (18.3%)] had both diabetes mellitus and hypertension while every tenth individual [n= 33 (9.4%)] had a triad of diabetes mellitus, hypertension and obesity. This exponentially increases the risk of getting cardiovascular diseases and stroke in future. The findings in our study were higher as compared to Kapil et al (13) who conducted the study in Nainital where 8.6% of the study participants had both diabetes mellitus and hypertension. This could be due to the fact that individual prevalence of diabetes mellitus and hypertension was higher in our study population

Conclusion

The study found that the burden of non-communicable diseases among the elderly was notably high and universally present among all strata of the study population.

A fifth of the total study participants were unaware of their illness and were diagnosed for the first time during the study. Multi-morbidity was quite common and in the study it was found to be 2.41 per patient.

NCDs, being universally present among all geriatric strata, calls for new ingenious ways to deal with them.

It is also important to identify types of NCDs that have similar environmental and host attributes and onus should be to focus on preventive health measures that have an umbrella effect on such NCDs.

Recommendation

Increasing awareness among illiterates by using innovative IEC methods, including grass root level workers in screening and service delivery, having separate NCD and geriatric clinics are all ways in which we can hope to reduce occurrence and delay progression of NCDs.

Limitation of the study

The exact prevalence of some relatively common NCDs like Hypothyroidism, asthma, COPD etc. could not be assessed due to diagnostic constraints.

Relevance of the study

The study tries to bring forth the distribution pattern of common NCDs across different strata of elderly society and throw light on the prevalence of hidden NCDs and the burden of multimorbidity.

Authors Contribution

TP: Conception, design, acquisition of data and analysis, drafting and critical revision of article. MKG: Conception, design, analysis, critical revision and final approval of article. ASA: Conception, design, analysis, critical revision and final approval of article.

SKR: Analysis, critical revision and final approval of article

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Tables

TABLE 1 SOCIO-DEMOGRAPHIC VARIABLES AMONG STUDY PARTICIPANTS (N= 350)

Socio-demographic character		Men		Women		Total	
		n	%	n	%	N	%
Total participants		159	45.4	191	54.6	**350**	**100**
Age (in completed years)	60-69	109	31.1	122	34.9	**231**	**66.0**
	70-79	39	11.2	55	15.7	**94**	**26.9**
	≥80	11	3.1	14	4.0	**25**	**7.1**
Level of Literacy	Illiterate	41	11.7	77	22.0	**118**	**33.7**
	Literate, less than middle school	26	7.4	38	10.9	**64**	**18.3**
	Middle school	32	9.1	21	6.0	**53**	**15.1**
	High school certificate	13	3.7	22	6.3	**35**	**10.0**
	Higher Secondary	17	4.9	18	5.1	**35**	**10.0**
	Graduate	28	8.0	14	4.0	**42**	**12.0**
	Post Graduate/ Profession	2	0.6	1	0.3	**3**	**0.9**
Socio-economic status	Lower & Upper Lower	12	3.4	27	7.7	**39**	**11.2**
	Lower Middle	42	12.0	81	23.1	**123**	**35.1**
	Upper Middle & Upper	105	30.0	83	23.7	**188**	**53.7**
Type of family	Nuclear	39	11.1	51	14.6	**90**	**25.7**
	Joint/ Extended	119	34.0	131	37.4	**250**	**71.4**
	Living alone	1	0.3	9	2.6	**10**	**2.9**

TABLE 2 PREVALENCE OF COMMON NCDS AMONG STUDY PARTICIPANTS (N=350)

		Total number of participants	Participants with known NCDs	Participants with newly diagnosed NCDs	Total number of participants with NCDs
Gender	**Men**	159	90 (56.6)	46 (28.9)	**136 (85.5)**
	Women	191	148 (77.5)	22 (11.5)	**170 (89.0)**
Age (in completed years)	**60-69**	237	144 (60.7)	54 (22.8)	**198 (83.5)**
	70-79	89	70 (78.7)	14 (15.7)	**84 (94.4)**
	≥80	24	24 (100)	0	**24 (100)**
Level of Literacy	**Graduate/ post graduate**	45	30 (66.7)	11 (24.4)	**41 (91.1)**
	Higher Secondary	35	29 (82.9)	1 (2.9)	**30 (85.8)**
	High school certificate	35	21 (60.0)	6 (17.1)	**27 (77.1)**
	Middle school	53	35 (66.0)	11 (20.8)	**46 (86.8)**
	Literate, less than middle school	64	40 (62.5)	16 (25.0)	**56 (87.5)**
	Illiterate	118	83 (70.3)	23 (19.5)	**106 (89.8)**
Type of family	**Joint**	250	172 (68.8)	49 (19.6)	**221 (88.4)**
	Nuclear	90	58 (64.4)	17 (18.9)	**75 (83.3)**
	Living alone	10	8 (80.0)	2 (20.0)	**10 (100)**
Socio-economic status	**Upper + Upper-Middle**	188	138 (73.4)	24 (12.8)	**162 (86.2)**
	Lower-Middle	123	75 (61.0)	33 (26.8)	**108 (87.8)**
	Lower + Upper-Lower	39	25 (64.1)	11 (28.2)	**36 (92.3)**
	Total	**350**	**238 (68)**	**68 (19.4)**	**306 (87.4)**

Percentages are given in bracket

TABLE 3 DISTRIBUTION OF NCDS AMONG STUDY PARTICIPANTS (N=238)

	DM	HTN	Osteo-arthritis	Cataract	Obesity	Others*	Total
Already known NCDs (238 participants)	88 (36.9%)	147 (61.8%)	66 (27.7%)	82 (34.5%)	2 (0.8%)	43	**428**
Newly diagnosed NCDs	18 (6.9%)	56 (27.6%)	49 (17.3%)	91 (33.9%)	94 (27.0%)		**308**
Total NCDs (306 participants)	106 (30.3%)	203 (58%)	115 (32.9%)	173 (49.4%)	96 (27.4%)	43	**736**

**Others – hypothyroidism, asthma, CAD, COPD, Obesity, Schizophrenia*

TABLE 4 DISTRIBUTION OF STUDY PARTICIPANTS ACCORDING TO NUMBER OF NCDS (N=238)

No. of NCDs	Participants with known NCDs			Participants with newly diagnosed NCDs		
	Men n=159	Women n=191	Total n=350	Men n=159	Women n=191	Total n=350
1	54 (33.9)	49 (25.7)	103 (29.4)	33 (20.8)	11 (5.8)	44 (12.6)
2	33 (20.8)	60 (31.4)	93 (26.6)	10 (6.3)	7 (3.7)	17 (4.9)
>2	3 (1.9)	39 (20.4)	42 (12.0)	3 (1.9)	4 (2.1)	7 (2.0)
Total	**90 (56.6)**	**148 (77.5)**	**238 (68.0)**	**46 (28.9)**	**22 (11.5)**	**68 (19.4)**

Percentages are given in bracket

Figures

FIGURE 1 RADAR CHART SHOWING COMPARISON BETWEEN PREVALENCE OF KNOWN NCDS AND OVERALL PREVALENCE OF SELECTED NCDS