

Original Research Article

Prevalence of non-communicable disease and their life style risk factors among elderly in India: an analysis of WHO SAGE data

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ABSTRACT

Background: Non communicable diseases (NCDs) are an important global health concern, especially among older adults. Understanding the prevalence and lifestyle factors contribute to NCD will help to tailor specific interventions in young age to prevent the NCDs in the old age.

Methods: Cross sectional study, secondary analysis of nationally representative data from WHO study on global AGEing and adult health (SAGE). The total sample size taken for analysis is 3971 considering only age group 60 years and above.

Results: Prevalence of NCDs were stroke (2.6%), angina (5.1%), diabetes (7.2%), chronic lung disease (4.2%), asthma (7.9%) and depression (4.3%). Significant associations were found between tobacco and alcohol consumption with depression, chronic lung disease and asthma. Vegetable and fruit consumption were associated with diabetes.

Conclusions: Study highlights a strong association of lifestyle factors on NCDs among the old age population in India. Interventions targeting substance abuse dietary habit and physical activity are important for reducing the growing burden of NCDs in India.

Keywords: Noncommunicable diseases, Lifestyle factors, Elderly health, SAGE, Risk factors

INTRODUCTION

Non communicable diseases (NCDs) are the major cause of death worldwide.¹ Currently, NCD contributes to 70% of all the death in the globe and it is expected to rise to 90% in 2030.² The rapid growth of NCDs not only affects the health of people but also have an influence over the development and economic growth of the country.³ The low-middle income countries are continuous victims of NCD, since the negative impacts of globalization and urbanization that leads to the over use of tobacco, exposure to air pollutants, consumption of alcohol, tinned food rather using traditional homely food, change in the culture and overuse of vehicles etc.⁴ Developing countries contribute to four out of five NCD deaths in the world.

Death due to cardiovascular diseases, chronic obstructive pulmonary disease (COPD), diabetes and cancer are more in developing countries.⁵ An increase in NCDs hinders global progress and the achievement of the sustainable development goals (SDGs) in low- middle-income nations.⁶ Especially cardiovascular diseases play a major role in NCD related burden and affects the economic growth of the country.⁷ Cardio-vascular diseases (CVDs) are a key burden in the Asia-Pacific region. The region's overall number of disabilities adjusted life years (DALYs) lost to CVDs in 2005 accounted for almost half of the global total. The total number of diabetics in the Asia-Pacific area alone increased from 84.5 million to 132.3 million between 2000 and 2010, a 57% increase. In the Asia-Pacific area, 13% of all fatalities are caused by

cancer. Globally, low- and middle-income nations accounted for 70% of all cancer-related fatalities.⁸

India contributes to 2/3rd of NCD deaths in South East Asian Region.⁹ In India, individual risk factors, social risk factors and socio-economic risk factors play a significant role in the shaping of health of an individual.¹⁰ A rapid transition in diseases burden has seen in India from communicable to NCDs over the past decades.¹¹ Lifestyle modification is an effective approach to prevent and reduce the NCD burden.¹²

Chronic non communicable diseases occurs in the middle age of an individual due to the life style factors in young age such as tobacco usage, alcohol consumption, lack of physical activity, intake of large amount of salt, sugar, lipids and fat content food items etc.¹³ Understanding and Preventing the life style factors helps to prevent the chronic non communicable diseases to an extent.¹² current study aims to understand the prevalence of major non communicable diseases in India among 60 above age group and its major risk factors.

METHODS

This study analysed the secondary data from the second wave of the World Health Organization's Study on global AGEing and adult health (SAGE), conducted in India in 2015 September 2014 to October 2015.

SAGE collected household data primarily from 6 countries including Ghana, China, India, Russia, Mexico and South Africa. In India, data were collected from six states; West Bengal, Assam, Karnataka, Uttar Pradesh, Rajasthan, and Maharashtra-using a multistage stratified cluster random sampling Considering the development and geographical position, 6 states were selected.

The selected states were divided into two strata. Therefore, totally for 6 states, there were 12 strata. Three stage sampling method was used for urban area, while two staged sampling was used in rural areas. The primary sampling units were selected proportional to its size.

Systematic sampling was used for secondary sampling units, for the households within each stratum. Individuals were the tertiary sampling units. They were selected using Kish tables. Totally there were 9116 samples from India. The inclusion criteria for the current study were individuals aged 60 years and above, thereby excluding participants aged 18–59 years to focus solely on the elderly population. Considering the age group and removing the missing data the total sample size for the current study analysis is 3971.

The variables were decided to meet the objectives. The independent variables were socio-demographic factors such as age, gender, educational status, marital status, area of residence, income, religion and Life style risk factors such as tobacco & alcohol consumption, physical

activity, dietary habits. The dependent variable was self-reported chronic non-communicable diseases (stroke, angina, chronic lung diseases, depression, asthma and diabetes)

Descriptive statistical measures were expressed as frequency and percentage for categorical variables and the mean standard deviation for the continuous variable. Cross tabulations were done using chi-square tests and fishers' exact test.

Binary logistic regression analysis was performed to determine strength of associations between independent variables and NCD status. the associations. Data were presented as tables and graphs as appropriate. P value less than 0.05 was considered statistically significant.

RESULTS

The total sample size used for the analysis was 3971. A total of 2094 males (52.7%) and 1877 females (47.3%) were included in the analysis. Mean age of the sample was 68.18 with standard deviation of 7.152 years. Majority of the study sample (59.5%) had no schooling. More than half of the sample were currently married (65.4%). Sociodemographic characterised of the study sample are presented in Table 1.

The prevalence of stroke was 2.6%, while angina was 5.1%. Diabetes was diagnosed in 7.2% of the population, and chronic lung diseases were reported in 4.2%. the prevalence of asthma was 7.9%, and depression was observed in 4.3% of the population in India (Figure 1).

The chi-square test showed significant association between vegetable consumption and diagnosed stroke ($X^2=4.87$, $p<0.05$). Other sociodemographic and lifestyle factors were not showed any association with stroke among the study participants.

For depression, significant associations were found between tobacco consumption ($X^2=6.86$, $p<0.05$), alcohol consumption ($X^2=12.86$, $p<0.05$), vegetable consumption ($X^2=14.48$, $p<0.001$), fruit consumption ($X^2=48.6$, $p<0.001$). Regarding diabetes, a significant association was observed between tobacco consumption ($X^2=15.56$, $p<0.001$), vegetable consumption ($X^2=12.86$, $p<0.001$), fruit consumption ($X^2=29.76$, $p<0.001$) and vigorous physical activity ($X^2=70.86$, $p<0.001$).

Significant association was found between chronic lung diseases and alcohol consumption ($X^2=12.24$, $p<0.05$), tobacco consumption ($X^2=9.84$, $p<0.05$), vegetable consumption ($X^2=12.86$, $p<0.05$) and fruit consumption ($X^2=9.76$, $p<0.05$). Regarding angina, significant associations found in vegetable consumption ($X^2=43.06$, $p<0.001$) and fruit consumption ($X^2=18.15$, $p<0.001$). For asthma significant associations were found with tobacco consumption ($X^2=11.91$, $p<0.05$), alcohol consumption ($X^2=6.85$, $p<0.05$) and vegetable consumption ($X^2=26.05$,

$p < 0.001$). Binary logistic regression was conducted to assess the strength of association. The analysis revealed risk factors of listed NCDs in the study. For diabetes, vegetable consumption (OR= 7.02, 95% CI: 3.66-13.46, $p < 0.05$) was very strong risk factor. Fruit consumption

(OR= 2.243, 95% CI: 1.53-3.28, $p < 0.05$) and vigorous physical activity (OR= 2.23, 95% CI: 1.52-3.26, $p < 0.05$) shows moderate positive association with diabetes. Tobacco usage (OR= 1.22, 95% CI: 1.18-2.10, $p < 0.05$) had a weak positive association.

Table 1: Descriptive analysis of study population (n=3971).

Variable	Category	Frequency (N)	%
Gender	Male	2094	52.7
	Female	1877	47.3
Education level	No schooling	2362	59.5
	Less than primary	448	11.3
	Primary	497	12.5
	Secondary	275	6.9
	High school	234	5.9
	College	100	2.5
	Post-graduation	55	1.4
Caste	Scheduled tribe (ST)	187	4.7
	Scheduled caste (SC)	614	15.5
	Others	2500	63.3
	Not specified	666	16.8
Marital status	Never married	40	1
	Currently married	2597	65.4
	Separated	25	0.6
	Widowed	1308	32.9
Religion	Hindu	3432	86.4
	Islam	416	10.5
	Others	123	3.1
Employment	Ever worked	2601	65.5
	Never worked	1370	34.5
Income quintile	Lowest	657	16.5
	Lower middle	751	18.9
	Middle	739	18.6
	Upper middle	822	20.7
	Highest	1002	25.2
Residence	Rural	2974	74.5
	Urban	1022	25.8
Tobacco use	Ever used	2334	58.8
	Never used	1636	41.2
Alcohol use	Ever used	549	13.8
	Never used	3421	86.1
Physical activity	Vigorous work	944	23.8
	Moderate exercise	2579	64.9
	Vigorous fitness work	122	3.1
	Moderate fitness	326	8.2
Dietary habits	No vegetable/fruit intake	1888	47.5
	1-4 servings/day	2060	51.9
	>5 servings/day	23	0.6

For asthma vegetable consumption (OR= 0.91, 95% CI: 0.61-0.99, $p < 0.05$) had protective association, while tobacco usage (OR= 1.883, 95% CI: 1.28-2.76, $p < 0.05$) and alcohol consumption (OR= 1.091, 95% CI: 1.01-1.18, $p < 0.05$) had hazardous associations. For depression, vegetable consumption (OR= 0.977, 95% CI: 0.65-0.99,

$p < 0.05$) showed a very weak protective effect. Fruit consumption (OR= 0.243, 95% CI: 0.16-0.38, $p < 0.05$) was strongly protective while tobacco consumption (OR= 4.729, 95% CI: 3.15-7.09, $p < 0.05$) and alcohol usage (OR= 4.229, 95% CI: 2.82-6.34, $p < 0.05$) were strong risk factors, increasing the odds by more than four times. The

analysis revealed that vegetable consumption was associated with a lower likelihood of developing angina (OR= 0.429, 95% CI: 0.29-0.64, p<0.05), whereas fruit consumption was associated with a higher odd of having angina (OR= 2.38, 95% CI: 1.61-3.52, p<0.05).

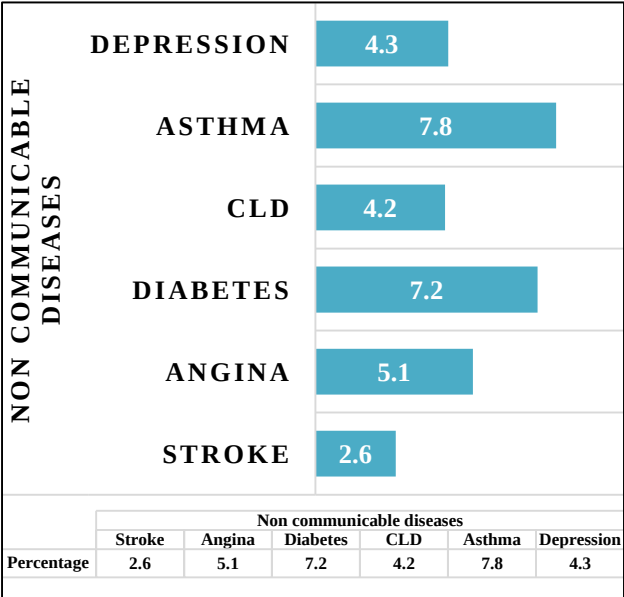


Figure 1: Prevalence of non-communicable disease among study sample (n=3971).

For chronic lung disease, vegetable consumption (OR= 0.345, 95% CI: 0.22- 0.54, p<0.05) and fruit consumption (OR= 0.596, 95% CI: 0.40-0.89, p<0.05) showed moderate protective effects. Alcohol usage (OR= 5.074, 95% CI: 3.42-7.53, p<0.05) was a strong risk factor, increasing the odds more than fivefold. Tobacco consumption (OR= 1.22, 95% CI: 1.02-2.32, p<0.05) had a weak positive association with chronic lung disease.

DISCUSSION

This study offers important insights into the prevalence and determinants of NCDs among a representative sample of the elderly population in India. The findings underscore strong links between lifestyle factors and the development of various NCDs. The prevalence of major NCDs observed in this study population aligns with the existing literature on the NCD burden in India.¹⁴⁻¹⁷ The rising prevalence of diabetes is a cause for concern, particularly in low- middle-income countries, where globalization and changing lifestyle practices contribute significantly to this trend. Vegetable and fruit consumption showed associations with different NCDs. Vegetable consumption was found to be a strong risk factor for diabetes, contradictory to existing literature, which may be due to the confounding factors, or those who have diagnosed may have increased their vegetable intake as per the suggestion of healthcare provider.¹⁸ In contrast vegetable consumption showed protective effects against chronic lung disease and angina, which is

consistent with existing literature.¹⁹ Studies says depression reduces with fruits and vegetables intake.²⁰

Tobacco and alcohol use revealed as a significant risk factor for major NCDs. Tobacco and alcohol consumption had a strong association with depression, chronic lung diseases and asthma, which is in line with the existing literature.^{21,22} the findings reinforce the harmful effects of substance abuse and importance of controlling these habits.

Physical activity was another risk factors studied to understand the effects in developing the NCDs. Current study showed a hazardous association with diabetes, which is contradictory to the existing knowledge. Literatures showed physical activity is protective factor for NCD development.²³ Positive association can be due to the reverse effect diagnosed diabetic patients’ awareness about importance of physical activity to manage the disease.

The study emphasizes the need for targeted interventions to improve healthier lifestyles such as including balanced diet, substance abuse control and physical activity promotion. The study had some limitations which may be affected the analysis. The current study’s cross-sectional nature limits the causal implications. Self-reported dependent and independent variables may introduce recall bias and desirability bias. Potential confounders are not accounted during the analysis.

CONCLUSION

The study focused on the factors influencing the chronic non communicable diseases with life style factors among elderly. The factors showed significant associations with the dependent variables of self-reported stroke, angina, asthma, diabetes, chronic lung diseases and depression. The study reinforces the importance of comprehensive public health interventions to control and manage the NCDs. Addressing the substance abuse, dietary pattern and physical activity plays an importance role in reducing the growing burden of NCDs in India.

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REFERENCES

1. Noncommunicable diseases. Who.int. Accessed March 1, 2025. Available at: <https://www.who.int/news-room>. Accessed on 21 December 2024.

2. Raddino R, Della Pina P, Gorga E, Brambilla G, Regazzoni V, Gavazzoni M. Nuovi approcci farmacologici nella cardiopatia ischemica. Giornale Italiano di Cardiologia. 2012;13(10):50.

3. García-Morales C, Heredia-Pi I, Guerrero-López CM. Social and economic impacts of non-

communicable diseases by gender and its correlates: a literature review. *Int J Equity Health*. 2024;23(1):274.

4. Ganju A, Goulart AC, Ray A, et al. Systemic solutions for addressing non-communicable diseases in low- and middle-income countries. *J Multidiscip Health*. 2020;13:693-707.
5. Ndubuisi NE. Noncommunicable diseases prevention in low- and middle-income countries: An overview of health in all policies (HiAP). *Inquiry*. 2021;58:46958020927885.
6. Singh Thakur J, Nangia R, Singh S. Progress and challenges in achieving noncommunicable diseases targets for the sustainable development goals. *FASEB Bioadv*. 2021;3(8):563-8.
7. Sharma M, Gaidhane A, Choudhari SG. A comprehensive review on trends and patterns of non-communicable disease risk factors in India. *Cureus*. 2024;16(3):57027.
8. Etcheverry JL, Gatto E. Cerebellar Ataxias: Clinical and Molecular Description—A Case Series in a Center of Buenos Aires. *Psychiatry*. 2017;88:301-9.
9. Nethan S, Sinha D, Mehrotra R. Non communicable disease risk factors and their trends in India. *Asian Pac J Cancer Prev*. 2017;18(7):2005-10.
10. Chelak K, Chakole S. The role of social determinants of health in promoting health equality: A narrative review. *Cureus*. 2023;15(1):33425.
11. Arokiasamy P. India's escalating burden of non-communicable diseases. *Lancet Glob Health*. 2018;6(12):1262-3.
12. Budreviciute A, Damiati S, Sabir DK. Management and prevention strategies for non-communicable diseases (NCDs) and their risk factors. *Front Public Health*. 2020;8:574111.
13. Sreena TV, Mathews E, Kodali PB, Thankappan KR. Clustering of noncommunicable disease risk factors among adolescents attending higher secondary schools in Kasaragod District, Kerala, India version 2; peer review: 1 approved with reservations. *Wellcome Open Res*. 2021;6:145.
14. Pradeepa R, Mohan V. Epidemiology of type 2 diabetes in India. *Indian J Ophthalmol*. 2021;69(11):2932-8.
15. Kamalakannan S, Gudlavalleti ASV, Gudlavalleti VSM, Goenka S, Kuper H. Incidence & prevalence of stroke in India: A systematic review. *Indian J Med Res*. 2017;146(2):175-85.
16. Arvind BA, Gururaj G, Loganathan S. Prevalence and socioeconomic impact of depressive disorders in India: multisite population-based cross-sectional study. *BMJ Open*. 2019;9(6):27250.
17. Ahmed W, Muhammad T, Maurya C, Akhtar SN. Prevalence and factors associated with undiagnosed and uncontrolled heart disease: A study based on self-reported chronic heart disease and symptom-based angina pectoris among middle-aged and older Indian adults. *PLoS One*. 2023;18(6):287455.
18. Wang, Ping Y. "Higher Intake of Fruits, Vegetables or Their Fiber Reduces the Risk of Type 2 Diabetes: A Meta-Analysis." *J Diab Invest*. 2016;7(1):56–69.
19. Zhai H, Wang Y, Jiang W. Fruit and vegetable intake and the risk of chronic obstructive pulmonary disease: A dose-response meta-analysis of observational studies. *Biomed Res Int*. 2020;2:3783481.
20. Dharmayani PNA, Juergens M, Allman-Farinelli M, Mahrshahi S. Association between fruit and vegetable consumption and depression symptoms in young people and adults aged 15-45: A systematic review of cohort studies. *Int J Environ Res Public Health*. 2021;18(2):780.
21. Fluharty M, Taylor AE, Grabski M, Munafò MR. The association of cigarette smoking with depression and anxiety: A systematic review. *Nicotine Tob Res*. 2017;19(1):3-13.
22. Bellou V, Gogali A, Kostikas K. Asthma and tobacco smoking. *J Pers Med*. 2022;12(8):1231.
23. Saqib ZA, Dai J, Menhas R. Physical activity is a medicine for non-communicable diseases: A survey study regarding the perception of physical activity impact on health wellbeing. *Risk Manag Healthc Policy*. 2020;13:2949-62.

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