



PREVALENCE AND ASSOCIATED RISK FACTORS OF NON-COMMUNICABLE DISEASES AND THEIR TRENDS IN INDIA.

Dr.P.Sharmila Nirojini¹, Naramdha S², Neelufer Naz D³, Niveda S⁴

Professor and HOD, Vth Pharm D, Vth Pharm D, Vth Pharm D

Department of Pharmacy Practice

Swamy Vivekanandha College of Pharmacy, Namakkal, India.

ABSTRACT:

Background:

Non-communicable diseases (NCDs) are on the rise and affecting people worldwide, with 41 million deaths annually attributed to them. Low- and middle-income countries are most affected, with four groups of NCDs - cardiovascular, cancer, respiratory, and diabetes - causing 80% of premature deaths. Risk factors include tobacco use, inactivity, alcohol misuse, and unhealthy diets. The study used WHO STEPS to assess risk factors, finding high prevalence rates of smoking, inactivity, poor diet, overweight, and obesity. Age is a strong predictor of NCD risk factors. Specific recommendations and collaboration are needed to address the issue.

KEYWORDS: Non-communicable diseases, risk factors, WHO STEPS.

INTRODUCTION:

It is important to recognize that non-communicable diseases (NCDs) are a significant challenge to socio-economic development, accounting for four out of five global deaths, with a higher impact on individuals aged 25 to 65. Unfortunately, only half of the countries worldwide have documented workers' health profiles, and NCDs and other lifestyle hazards do not receive adequate coverage. However, setting-based health promotion can be available solution to address this issue,

significantly reducing the burden of NCDs among employees¹⁻⁹. The development of NCDs is driven by various risk factors, including tobacco use, physical inactivity, unhealthy diets, and elevated levels of blood pressure, blood glucose, and cholesterol. India has made commendable progress in preventing and controlling NCDs through public health programs and surveys, but data on NCD risk factors among the population is limited. Moreover, women are more susceptible to various diseases than men, and multi-morbidity is a growing issue in LMICs. Therefore, collaboration and targeted interventions are needed to address this issue and ensure a healthier future for all.¹⁰⁻¹⁶

EPIDEMIOLOGY:

Studies have shown that multi-morbidity is a severe public health concern in India, affecting 18% of people aged 45 or older. This condition is linked to high healthcare utilization and spending, poor quality of life, low self-rated health, increased frailty, disability, and mortality. However, effective multi-morbidity management has gained the attention it deserves after the COVID-19 pandemic.¹⁷⁻²⁶

Although existing literature on multi-morbidity in India is based on smaller sub-samples, the current study aims to unravel the intricacies of several non-communicable diseases affecting older persons in India.²⁷⁻³⁴ The study also visualizes disease networks. Non-communicable diseases are the leading cause of death in India, accounting for 61.8% of deaths in 2016.^{35,36}

Moreover, risk factors such as tobacco and alcohol use, physical inactivity, and unhealthy dietary habits are linked to the development of NCDs. India has shown dedication to implementing the Global Strategy for the Prevention and Control of NCDs Action Plan presented by the WHO.³⁷⁻⁴⁵ Numerous national public health programs and routine surveys have been conducted to directly or indirectly target NCDs at different levels.⁴⁶

RISK FACTORS OF NCD:

Non-communicable diseases (NCDs) are a global health concern that affects people of all ages, regions and countries. While these diseases are more common in the elderly population, there is evidence that 17 million people under 70 die from NCDs.⁴⁷ Unfortunately, it is estimated that 86% of these premature deaths occur in low- and middle-income countries. This means that children, adults and the elderly are all vulnerable to risk factors for NCDs such as unhealthy diets, lack of exercise, smoking and harmful alcohol consumption.⁴⁸

NCDs are caused by a variety of factors such as rapid unplanned urbanization, globalization of unhealthy lifestyles, ageing population, and more. An unhealthy diet and lack of physical activity can manifest in people with high blood pressure, high blood sugar, high blood lipids, and obesity.

These metabolic risk factors can lead to cardiovascular disease, which is the most prominent NCD leading to premature death.⁴⁹

MODIFIABLE BEHAVIOURAL RISK FACTORS:



Fig.1

It is worth noting that there are modifiable behavioural risk factors that increase the risk of NCDs. These include smoking, physical inactivity, unhealthy diet, and harmful alcohol consumption. For example, tobacco kills more than 8 million people yearly, including second-hand smoke deaths. It is believed that 1.8 million people die each year from excessive salt and sodium intake. Additionally, of the three million annual deaths attributed to alcohol consumption, more than half are due to NCDs such as cancer. Finally, it is essential to mention that 830,000 people die each year from lack of physical activity.

It's important to keep in mind that there are several behavioural risk factors that can increase the likelihood of developing non-communicable diseases (NCDs). These factors include smoking, not getting enough physical activity, unhealthy eating habits, and harmful alcohol consumption. For example, tobacco is responsible for over 8 million deaths every year, including those related to second-hand smoke exposure. Additionally, it's estimated that excessive salt and sodium intake leads to about 1.8 million deaths annually.

METABOLIC RISK FACTORS:

Metabolic risk factors contribute to four significant metabolic changes that increase the risk of NCDs. Non-communicable diseases (NCDs) are a global health concern that affects people of all ages, regions and countries. While these diseases are more common in the elderly population, there is evidence that 17 million people under 70 die from NCDs. Unfortunately, it is estimated that 86% of these premature deaths occur in low- and middle-income countries. This means that

children, adults and the elderly are all vulnerable to risk factors for NCDs such as unhealthy diets, lack of exercise, smoking and harmful alcohol consumption.

Obesity is defined as having a BMI of 30 kg/m² or higher, while overweight is described as having a BMI of 25 kg/m² or more. For men, a cut-off waist circumference of 94 cm and for women, 80 cm was used to identify central obesity. Low intake of fruits and vegetables, with fewer than five servings per day, and low physical activity were also identified as significant risk factors.

Non-communicable diseases (NCDs) are a global health concern that affects people of all ages, regions and countries. While these diseases are more common in the elderly population. Unfortunately, it is estimated that 86% of these premature deaths occur in low- and middle-income countries. This means that children, adults and the elderly are all vulnerable to risk factors for NCDs such as unhealthy diets, lack of exercise, smoking and harmful alcohol consumption.

- Increased blood pressure
- Overweight/obese
- Hyperglycemia (high blood sugar) and
- Hyperlipidemia (high levels of fat in the blood).

Regarding causes of death, the world's leading metabolic risk factor is hypertension (accounting for 19% of deaths worldwide), followed by hyperglycemia, overweight and obesity.

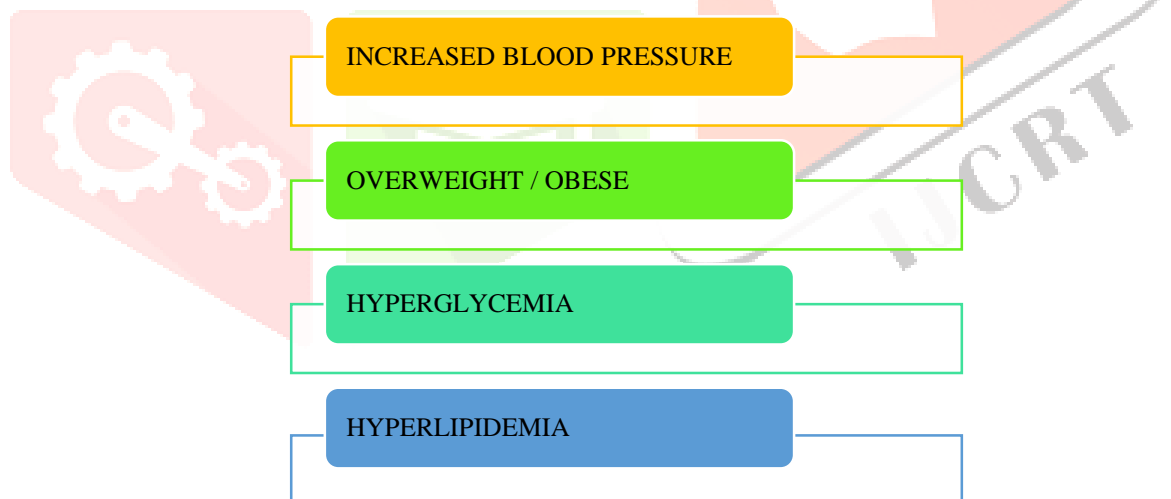


Fig.2

SOCIO-ECONOMIC IMPACT :

Poverty is closely related to non-communicable diseases. The rapid increase in non-communicable diseases is expected to hamper poverty reduction efforts in low-income countries, primarily due to rising budgetary costs related to health care. People who are socially vulnerable or disadvantaged get sick and die sooner than socially privileged people. This is primarily because they are at increased risk of exposure to harmful products such as tobacco, unhealthy diets, and limited access to health care services.

In resource-poor settings, healthcare costs for non-communicable diseases quickly strain household resources. The high price of non-communicable conditions, often requiring lengthy and expensive treatments, combined with lost income, drives millions of people into poverty and hinders development each year.

PREVENTION AND CONTROL:

A meaningful way to combat non-communicable diseases is to reduce the risk factors associated with these diseases. There are cost-effective solutions for governments and other stakeholders to mitigate common modifiable risk factors. Monitoring progress and trends in NCDs and their risks is essential for adjusting policies and priorities.

To reduce the impact of NCDs on individuals and society, all sectors, including health, finance, transport, education, agriculture, planning, etc., should work together to reduce the risks associated with NCDs and implement prevention and prevention interventions. A comprehensive approach is needed to minimize and facilitate control of them.

Investing in better NCD management is critical. Treatment of non-communicable diseases includes detecting, testing and treating these diseases and providing access to palliative care for those in need. Effective and essential interventions for NCDs can be implemented through a primary care approach to improve early detection and timely treatment. There is evidence that such interventions are a sound economic investment, as they can reduce the need for more expensive treatments if made available early to patients. Countries with adequate health insurance will likely provide universal access to crucial NCD interventions.

STEPWISE APPROACH TO NCD RISK FACTOR SURVEILLANCE (STEPS):

The WHO STEPwise Approach to NCD Risk Factor Surveillance (STEPS) is a simple and standardized method for collecting, analyzing and disseminating data on crucial NCD risk factors for each country. This research instrument captures critical behavioural risk factors such as Tobacco use, alcohol consumption, physical inactivity, unhealthy diet, and essential biological risk factors include Overweight and obesity, elevated blood pressure, high blood sugar levels, and abnormal blood fats. Through extension modules, research instruments can be expanded to include other subject areas beyond these risk factors, such as oral health, sexual health and road safety.

Using the same standardized questions and protocols, all countries can use this STEPS information to monitor national trends and cross-country comparisons. This approach encourages regular collection of small amounts of useful information.

The STEPwise approach to non-communicable disease risk factor surveillance (STEPS) focuses on collecting central data on established risk factors determining the significant burden of non-communicable diseases. The survey is divided into 3 steps.

Step 1: Questionnaire

Step 2: Physical measurement

Step 3: Blood and urine samples

STEP 1 (Interview):

The WHO STEPS approach formed the basis of the study protocol. Using a proforma translated into the local tongue, data on socio-demographic variables and behavioural risk factors, such as tobacco, alcohol, exercise, and food, should be collected.

STEP 2 (Physical measurements):

Blood pressure, waist circumference, height, and weight should be measured. To determine BMI (kg/m²), physical measurements such as height and weight should be taken. The analysis used the average value of the blood pressure, which should be taken twice at 5-minute intervals.⁵⁰⁻⁵²

Step 3 (Biochemical Measurements):

Blood glucose, haemoglobin and blood cholesterol level will be measured. The participants will be instructed for 12 hours of overnight fasting on the interview day. Biochemical analysis should be done using dry chemistry under all aseptic precautions.^{53,54}

CONCLUSION:

According to the latest available data, it seems that a number of the key risk factors associated with non-communicable diseases (NCDs) are quite prevalent in our society. These include insufficient physical activity, inadequate intake of fruits and vegetables, being overweight or obese, as well as elevated levels of blood pressure, blood glucose, and cholesterol. Furthermore, smoking, physical inactivity, inadequate fruit and vegetable consumption, and being overweight or obese have all been found to be alarmingly widespread. It is worth noting that age has been identified as a significant predictor of most risk factors, which underscores the importance of developing and implementing tailored policies and programs to address the specific needs of older individuals in order to prevent and manage the increasing burden of NCDs. It is of utmost importance that we take decisive action to address these risk factors and make the health of our most vulnerable populations a top priority.

ACKNOWLEDGMENT:

First and foremost, we thank the almighty for providing us with strength and guidance. We are very grateful to acknowledge our Principal, Dr G. Muruganathan, M.Pharm., PhD, of Swamy Vivekanandha College of Pharmacy, for his advice.

CONFLICT OF INTEREST:

The authors declare that there is no conflict of interest.

REFERENCE:

1. World Health Organization. Key facts of non-communicable diseases. Geneva: WHO; 2021 [Internet]. [Cited 2021 Dec 18]. Available from: <https://www.who.int/news-room/fact-sheets/detail/non-communicable-diseases>.
2. World Health Organization (WHO). WHO global plan of action on workers' health (2008-2017): a baseline for implementation. Geneva: WHO; 2013 [Internet]. [Cited 2021 Dec 21]. Available from: <https://www.who.int/publications/i/item/WHO-FWC-PHE-2013-01>.
3. World Health Organization (WHO). Health promotion/healthy settings [Internet]. [Cited 2021 Jul 18]. Available from: <https://www.who.int/teams/health-workforce/world-directory-of-medical-schools/health-promotion>.
4. Team CM. India's shortage of doctors and nurses may hamper the COVID-19 response. IndiaSpend. 2020 [Internet]. [Cited 2021 Nov 1]. Available from: <https://www.indiaspend.com/indias-shortage-of-doctors-nurses-mayhamper-covid19-response/>
5. Nilan K, McKeever TM, McNeill A, Raw M, Murray RL. Prevalence of tobacco use in healthcare workers: a systematic review and meta-analysis. PLoS One. 2019 Jul 25;14(7). <https://pubmed.ncbi.nlm.nih.gov/31344083/>.
6. Aslam M, Siddiqui AA, Sandeep G, Madhu SV. High prevalence of obesity among nursing personnel working in tertiary care hospitals. Diabetes MetabSyndr Clin Res Rev. 2018 May 1;12(3):313e6. <https://doi.org/10.1016/j.dsx.2017.12.014>
7. Abou Elalla E, Awaad M, Elhabiby M, Khalil S, Naguib M. Substance abuse among nursing staff: prevalence and socio-demographic and clinical characteristics. Addict Disord Their Treat. 2020 Jun 21;19(2):99e107. <https://doi.org/10.1097/ADT.000000000000191>.
8. Sharma D, Vatsa M, Lakshmy R, Narang R, Bahl VK, Gupta SK. Study of cardiovascular risk factors among tertiary hospital employees and their families. Indian Heart J. 2012 Jul;64(4):356e63. <https://doi.org/10.1016/j.ihj.2012.06.001>.

9. Dutheil F, Baker JS, Mermillod M, De Cesare M, Vidal A, Moustafa F, et al. Shift work, particularly permanent night shifts, promote dyslipidemia: a systematic review and meta-analysis. *Atherosclerosis*. 2020 Nov;313:156e69. <https://doi.org/>.
- 10.1016/j.atherosclerosis.2020.08.015 10. Phiri LP, Draper CE, Lambert EV, Kolbe-Alexander TL. Nurses' lifestyle behaviours, health priorities and barriers to living a healthy lifestyle: a qualitative descriptive study. *BMC Nurs*. 2014;13(1):38. <https://doi.org/10.1186/s12912-014-0038-6>.
11. Katyal S. Burnout among nurses working in government and private hospitals. *Stud Home Community Sci*. 2013 Aug 1;7(2):83e5. <https://doi.org/10.1080/09737189.2013.11885396>.
12. Dandona L, Dandona R, Kumar GA, Shukla DK, Paul VK, Balakrishnan K, et al. Nations within a nation: variations in epidemiological transition across the states of India, 1990–2016 in the Global Burden of Disease Study. *Lancet*. 2017; 390(10111):2437–60. [https://doi.org/10.1016/S0140-6736\(17\)32804-0](https://doi.org/10.1016/S0140-6736(17)32804-0) PMID: 29150201
13. Arokiasamy P, Yadav S. Changing age patterns of morbidity vis-à-vis mortality in India. *J Biosoc Sci*. 2014; 46(4):462–79. <https://doi.org/10.1017/S002193201300062X> PMID: 24229561
14. Puri P, Kothvale A, Singh SK, Pati S. Burden and determinants of multi-morbidity among women in reproductive age-group: a cross-sectional study in India. *Wellcome Open Res [Internet]*. 2021; 5 (275):1–21. Available from: <https://doi.org/10.12688/wellcomeopenres.16398.2> PMID: 34131591
15. Pati S, Swain S, Metsemakers J, Knottnerus JA, Van Den Akker M. Pattern and severity of multi-morbidity among patients attending primary care settings in Odisha, India. *PLoS One*. 2017; 12(9):1–19. <https://doi.org/10.1371/journal.pone.0183966> PMID: 28910309
16. Nunes BP, Flores TR, Mielke GI, Thume' E, Facchini LA. Multi-morbidity and mortality in older adults: A systematic review and meta-analysis. *Arch Gerontol Geriatr [Internet]*. 2016; 67:130–8. Available from: <https://doi.org/10.1016/j.archger.2016.07.008> PMID: 27500661
17. Puri P, Singh SK, Pati S. Temporal dynamics, patterns and correlates of any one morbidity and multi-morbidity in India during 1994–2018 [Internet]. 2020. Available from: <http://ssrn.com/abstract=3780579>.
18. International Institute for Population Sciences (IIPS). Longitudinal Ageing Study in India (LASI) [Internet]. 2020. Available from: https://www.iipsindia.ac.in/sites/default/files/LASI_India_Report_2020_compressed.pdf.
19. Pati S, Agrawal S, Swain S, Lee JT, Vellakkal S, Hussain MA, et al. Non-communicable disease multi-morbidity and associated health care utilization and expenditures in India: Cross-sectional study. *BMC Health Serv Res*. 2014; 14(1):1–9. <https://doi.org/10.1186/1472-6963-14-451> PMID: 25274447

20. Pati S, Swain S, Knottnerus JA, Metsemakers JFM, Van Den Akker M. Health-related quality of life in multi-morbidity: A primary-care based study from Odisha, India. *Health Qual Life Outcomes*. 2019; 17 (1):1–11.
21. Arokiasamy P, Uttamacharya U, Jain K, Biritwum RB, Yawson AE, Wu F, et al. The impact of multi-morbidity on adult physical and mental health in low- and middle-income countries: What does the study on global ageing and adult health (SAGE) reveal? *BMC Med [Internet]*. 2015; 13(1). Available from: [http:// dx.doi.org/10.1186/s12916-015-0402-8](http://dx.doi.org/10.1186/s12916-015-0402-8).
22. Arokiasamy P, Uttamacharya, Jain K. Multi-morbidity, functional limitations, and self-rated health among older adults in India: Cross-sectional analysis of LASI pilot survey, 2010. *SAGE Open*. 2015; 5 (1).
23. Vetrano DL, Palmer K, Marengoni A, Marzetti E, Lattanzio F, Roller-wirnsberger R, et al. Frailty and Multi-morbidity: A Systematic Review and Editor's Choice. *Journals Gerontol Med Sci*. 2019; 74 (5):659–66.
24. Jackson CA, Jones M, Tooth L, Mishra GD, Byles J, Dobson A. Multi-morbidity patterns are differentially associated with functional ability and decline in a longitudinal cohort of older women. *Age Ageing*. 2015; 44(5):810–6. <https://doi.org/10.1093/ageing/afv095> PMID: 26220988
25. Pati S, Mahapatra P, Dwivedi R, Athe R, Sahoo KC, Samal M, et al. Multi-morbidity and Its Outcomes Among Patients Attending Psychiatric Care Settings: An Observational Study From Odisha, India. *Front Public Heal*. 2021; 8(April). <https://doi.org/10.3389/fpubh.2020.616480> PMID: 33968863
26. Pati S, Mahapatra P, Kanungo S, Uddin A, Sahoo KC. Managing Multi-morbidity (Multiple Chronic Diseases) Amid COVID-19 Pandemic: A Community-Based Study From Odisha, India. *Front Public Heal*. 2021; 8(February):1–9. <https://doi.org/10.3389/fpubh.2020.584408> PMID: 33598442
27. Mini GK, Thankappan KR. Pattern, correlates and implications of non-communicable disease multi-morbidity among older adults in selected Indian states: A cross-sectional study. *BMJ Open*. 2017; 7(3). <https://doi.org/10.1136/bmjopen-2016-013529> PMID: 28274966
28. Sanghmitra P, Rout SK, Pati S, Swain S. Burden of Diseases among Patients Attending Public Health Care Settings of Odisha. 2015.
29. Puri P, Pati S, Kothavale A, Singh SK. Burden and determinants of multi-morbidity among women in reproductive age group: A cross-sectional study based in India. *Wellcome Open Res [Internet]*. 2021; 5 (May). Available from: <https://doi.org/10.12688/wellcomeopenres.16398.2> PMID: 34131591

30. Pati S, Swain S, Hussain MA, Van Den Akker M, Metsemakers J, Knottnerus JA, et al. Prevalence and outcomes of multi-morbidity in South Asia: A systematic review. *BMJ Open*. 2015; 5(10). <https://doi.org/10.1136/bmjopen-2014-007235> PMID: 26446164
31. Pati S, Swain S, Hussain MA, Kadam S, Salisbury C. Prevalence, Correlates, and Outcomes of Multi-morbidity Among Patients Attending Primary Care in Odisha, India. *Ann Fam Med*. 2015; 13(5):446–50. <https://doi.org/10.1370/afm.1843> PMID: 26371265
32. Srivastava S, J VJK, Dristhi D, Muhammad T. Interaction of physical activity on the related measures association of obesity- - with multi-morbidity among older adults: a population-based cross-sectional study in India. 2021;1–10. <https://doi.org/10.1136/bmjopen-2021-050245> PMID: 34020981.
33. India State-Level Disease Burden Initiative Collaborators. Nations within a nation: Variations in epidemiological transition across the states of India, 1990-2016 in the Global Burden of Disease Study. *Lancet* 2017; 390: 2437-60.
34. Ministry of Tribal Affairs, Government of India. State/Union Territory-wise list of Scheduled Tribes in India. New Delhi: MoTA, GoI; 2021.
35. Registrar General and Census Commissioner India, Ministry of Tribal Affairs Government of India. Scheduled Tribes in India as revealed in census 2011. New Delhi: MoTA, GoI; 2013.
36. Ministry of Tribal Affairs, Government of India. ST statistical profile at a glance. New Delhi: MoTA, GoI; 2021.
37. Kumar GA, Dandona L, Dandona R. Completeness of death registration in the Civil Registration System, India (2005 to 2015). *Indian J Med Res* 2019; 149: 740-7.
38. Office of the Registrar General & Census Commissioner India, Ministry of Home Affairs, Government of India. Vital Statistics Division. Report on medical certification of cause of death 2019. New Delhi: MoHA, GoI; 2019.
39. Jha P, Gajalakshmi V, Gupta PC, Kumar R, Mony P, Dhingra N, et al. Prospective study of one million deaths in India: Rationale, design, and validation results. *PLoS Med* 2006; 3 : e18.
40. Narain JP. The health of tribal populations in India: How long can we afford to neglect? *Indian J Med Res* 2019; 149: 313-6.
41. Tushi A, Rao SR, Pattabi K, Kaur P. Prevalence of risk factors for non-communicable diseases in a rural tribal population of Mokokchung, Nagaland, India. *Natl Med J India* 2018; 31: 11-4.
42. Rizwan SA, Kumar R, Singh AK, Kusuma YS, Yadav K, Pandav CS. Prevalence of hypertension in Indian tribes: A systematic review and meta-analysis of observational studies. *PLoS One* 2014; 9 : e95896.

43. Sajeev P, Soman B. Prevalence of non-communicable disease risk factors among the Kani tribB e in Thiruvananthapuram district, Kerala. *Indian Heart J* 2018; 70: 598-603.
44. Negi PC, Chauhan R, Rana V, Vidyasagar, Lal K. Epidemiological study of non-communicable diseases (NCD) risk factors in the tribal district of Kinnaur, HP: A cross-sectional study. *Indian Heart J* 2016; 68: 655-62.
45. Bhar D, Bhattacharjee S, Das DK. Behavioural and biological risk factors of non-communicable diseases among tribal adults of rural Siliguri in Darjeeling District, West Bengal: A cross-sectional study. *Indian J Public Health* 2019; 63: 119-27.
46. Christian Medical College. Prevalence of non-communicable diseases and their risk factors in tribal south India: A community-based cross-sectional study. Vellore: CMC; 2017.
47. World Health Organization. Obesity: preventing and managing the global epidemic; report of a WHO consultation. Geneva: World Health Organization, 2000. 265 p. (Technical Report Series no. 894).
48. Whitworth JA; World Health Organization, International Society of Hypertension Writing Group. 2003 World Health Organization (WHO)/International Society of Hypertension (ISH) statement on managing hypertension. *J Hypertens* 2003;21:1983-92.
49. Nethan S, Sinha D, Mehrotra R. Non-communicable disease risk factors and their trends in India. *Asian Pacific journal of cancer prevention: APJCP*. 2017;18(7):2005.
50. World Health Organization. WHO STEPS surveillance manual: STEPwise approach to non-communicable disease risk factors surveillance. Geneva: World Health Organization; 2017 Jan [Internet]. [cited 2021 Nov 02] p. 7e1e5. <https://www.who.int/teams/noncommunicable-diseases/surveillance/systemstools/steps/manuals> .
51. Kayaroganam R, Sarkar S, Satheesh S, Tamilmani S, Sivanantham P, Kar SS. Profile of Non-communicable disease risk factors among nurses in a tertiary care hospital in South India. *Asian Nursing Research*. 2022 Oct 1;16(4):241-8.
52. WHO STEPS surveillance manual: the WHO STEPwise approach to chronic disease risk factor surveillance [<http://www.who.int/chp/steps/manual/en/>].
53. Bui TV, Blizzard CL, Luong KN, Truong NL, Tran BQ, Otahal P, Gall S, Nelson MR, Au TB, Ha ST, Phung HN. A national survey of risk factors for non-communicable disease in Vietnam: prevalence estimates and an assessment of their validity. *BMC public health*. 2016 Dec;16:1-2.
54. Poff NL, Allan JD. Functional organization of stream fish assemblages concerning hydrological variability. *Ecology*. 1995 Mar;76(2):606-27.