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ORIGINAL RESEARCH

NCD risk factors and Socioeconomic inequalities – A cross-sectional study from fieldpractice of Madhubani Medical College

[1]Dr. Nipendra Anand, [2]Dr. Randhir Kumar, [3]Dr. Nishant Kumar, [4]Dr. Sazid Hussain

[1]Associate Professor, Department of community medicine, Netaji Subhas Medical College, Patna, Bihar, India
[2]Associate Professor, Department of Community Medicine, Netaji Subhas Medical College, Patna, Bihar, India
[3]SR/Tutor, Department of Community Medicine, Darbhanga Medical College, Darbhanga, Bihar, India
[4]Associate Professor, Department of Community Medicine, Madhubani Medical College, Madhubani, Bihar, India

Correspondence:
Dr. Sazid Hussain
Associate Professor, Department of Community Medicine, Madhubani Medical College, Madhubani, Bihar, India

Abstract

Introduction: NCDs are the leading cause of morbidity and mortality in low- and middle-income countries; we wanted to ascertain the relationship between socioeconomic status and NCD risk factors in our field practice area.

Methodology: The present study is a descriptive cross-sectional study by design carried out among the adult population residing in Madhubani Medical college's field practice area.

Result: The present study showed that 35.4% of study subjects were overweight/Obesity, 27.3% consumed tobacco,22.7% had hypertension, 11.4% finished alcohol, and 10.5% were diabetic. Binary logistic regression found that males and those belonging to middle or below SES have higher odds of developing NCD risk factors. Individuals who belonged to Upper lower SES (Grade IV) had a higher prevalence of NCD risk factors than otherSES grades. This association was found to be statistically significant.

Conclusion: The high prevalence of NCD risk factors among low socioeconomic status is of grave concern. It may increase their OOP and push them back into poverty and significantly increase the public health system's financial constraints.

Introduction

The five major modifiable risk factors for NCD are current tobacco usage, harmful alcohol use, Obesity, diabetes, and hypertension(1). It leads to cardiovascular disease, cerebrovascular accidents, cancer, andchronic respiratory illness, accounting for 2/3rd disease burden in India when measured by DALYs(2).

The socioeconomic disparity is a significant determinant for the outcome of a disease. It plays a critical role in exposure to the risk factors, disease progression, early detection, and prompt treatment and limitation of disabilitythrough accessible quality health care services. Studies(3) (4)have shown that the socioeconomic weaker section of the population tends to have a high incidence of premature and low birth babies.

The state of Bihar in India is ranked last among all the present 32 states of India based on Gross Domestic Product(5). The District of Madhubani, in Bihar, is surrounded by Nepal on the northern side and is bordering Darbhanga district in the south; it is notable for its unique

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painting style, which is famous worldwide. It is ranked 520th among India's 588 districts based on the district development index. Based on the 2011 census report, 96.4% of the district population reside in the rural area, and based on the gross domestic product; it is ranked 33rd among the 38 districts of Bihar(6). The report published on the district's nutrition status by POSHAN showed that thought the district had good progress in reducing undernutrition and anemia among under-five children, adolescents, and women of reproductive age group, but about overnutrition, there is a paucity of data(7). The NHFS V survey reports do show an increasing trend in overnutrition among and other NCD risk factors when compared with the NFHS IV survey(8), but the data is silent on a possible association with other factors.
The establishment of the Department of Community Medicine under the aegis of Madhubani Medical college in the year 2019 provides us an opportunity to carry to a survey in our field practice area to ascertain the burden of NCD risk factors and their association with socioeconomic status.

Objectives

1. To estimate the prevalence of NCD risk factor among the adult population residing in the field practice area of Madhubani Medical college
2. To ascertain the association between the NCD risk factor with a various grade of socioeconomic status of the study population

Methodology

The present study was a descriptive cross-sectional study by design carried among the adult population, i.e., among individuals who were more than 18-year-old residing in Madhubani Medical college's urban and rural field practice area. The sample size was calculated using the formula ($n=z^2\ p*q/d^2$) with assuming the prevalence of NCD risk factor to be 30% based on studies (8) (9) with 95% CI and 5 % absolute error and adding the design effect of 1.5 and 30% non-response rate the minimum sample size is rounded to be 600. The final sample enrolled for the present study was 913. The study sample was collected using five-stage sampling (figure 1) from a sampling frame of 26 villages with 6525 households and 42070 in the field practice area. The initial study sample selected for the study was 1012. However, 45 individuals did not consent, and 55 could be contacted during the household survey, the final study sample of 913 individuals was enrolled in the study. The study participants who did not consent or were not present during the study or were seriously ill were excluded from the study. The study participants were prior informed of our visit to their household and its purpose. The data was collected using a pretested predesign questionnaire in which sociodemographic details, personal history, and history of any illness were recorded after obtaining written consent from the participants and explaining the study's purpose.

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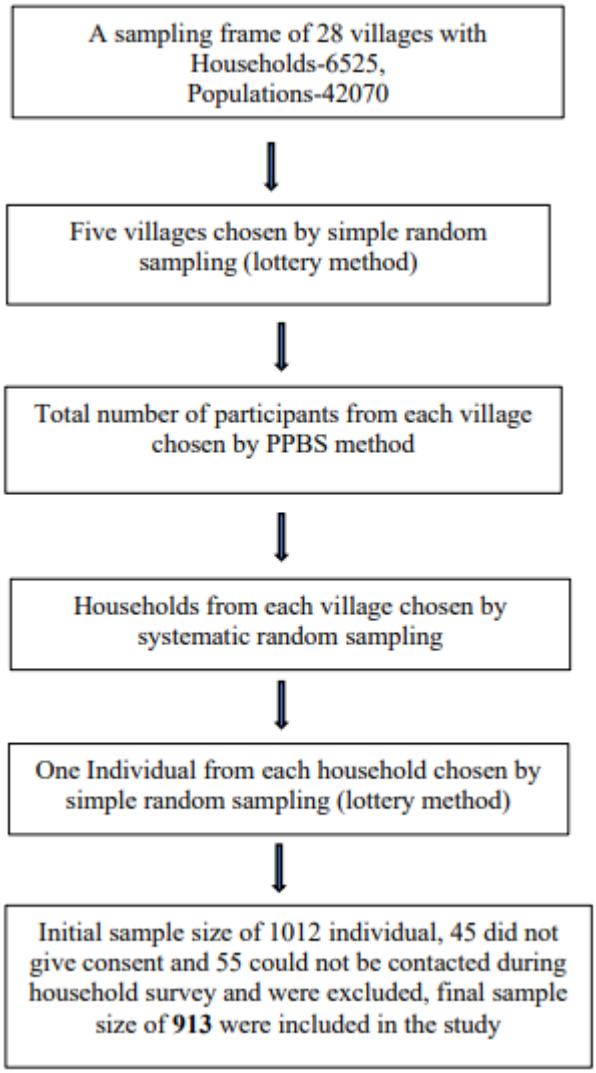
Figure 1: Sampling Technique for the study



Anthropometric measurement, BMI calculation, measurement of blood pressure in right arm followed bycollection of blood for assessment blood sugar were done. The study participants were classified according to standardized operational definition (10) (11)(12)(13)(14)(15) (table 2). The study period was of initially one year. However, data collection was not done during the time COVID 19 outbreak. The study period was extended for six more months; the study's final duration was one and a half years from July 2019 to November 2020. The collected data was entered in Microsoft Excel worksheet; the descriptive statistics is displayed using the appropriate table and graphs. The association between categorical variables is done using the Pearson Chi-square test or Fischer Exact Test. A value less than 0.05 is considered significant. Binary logistic regression is done to ascertain the association between independent and dependent variables. The analysis of data is done using SPSS software version 26.

Results

The present study showed (graph 1) that 35.4% of study subjects were overweight/obesity, 27.3% consumed tobacco,22.7% had hypertension, 11.4% consumed alcohol, and 10.5% were diabetic. Overall (graph 2), 37.8% of the total study population had no risk factors for NCD while 52.1% of study subjects had one to two risk factors,

9.5 % had three to four risk factors, and 0.5% had all the five risk factors. Binary logistic

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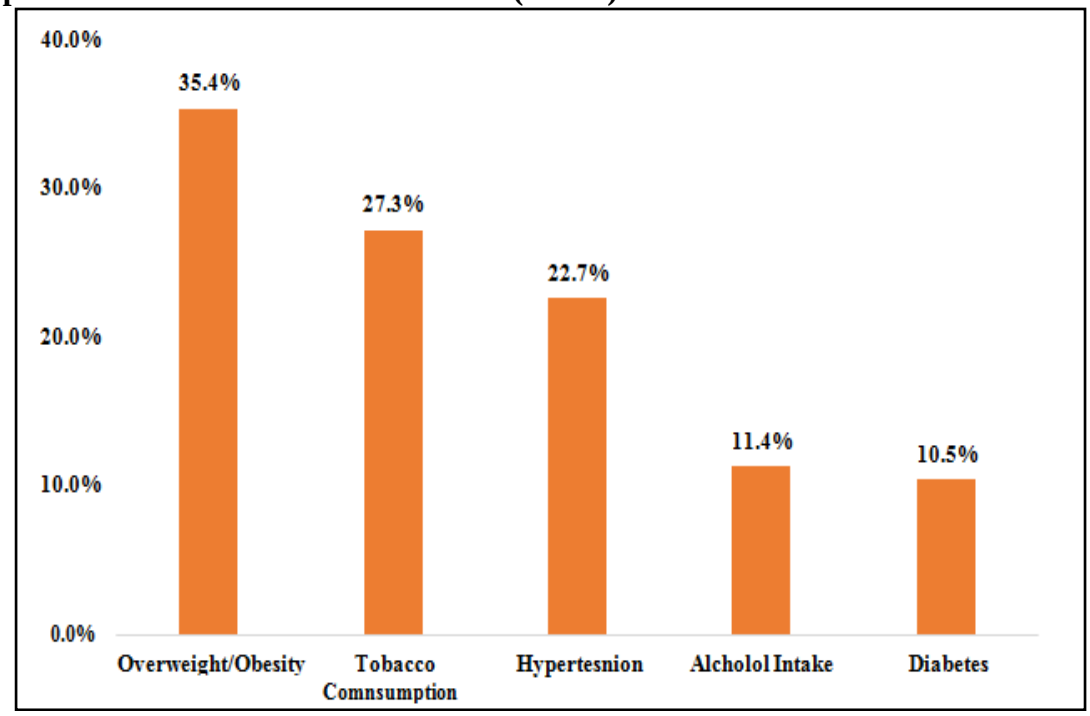
regression (table1) to ascertain the determinants of NCD risk factor found that male and those belonging to middle or below SES has higher odds for development of NCD risk factor, and this association was found to be statistically significant. On further analysis between association between the NCD risk factor and SES scale (table 2), we found that individual those belonged to Upper lower SES (Grade IV) had a higher prevalence of NCD risk factors when compared with other grades of SES and this association was found to be statistically significant.

Graph 1: Prevalence of NCD risk factors (n=913)



Graph 2: Number of Risk factors

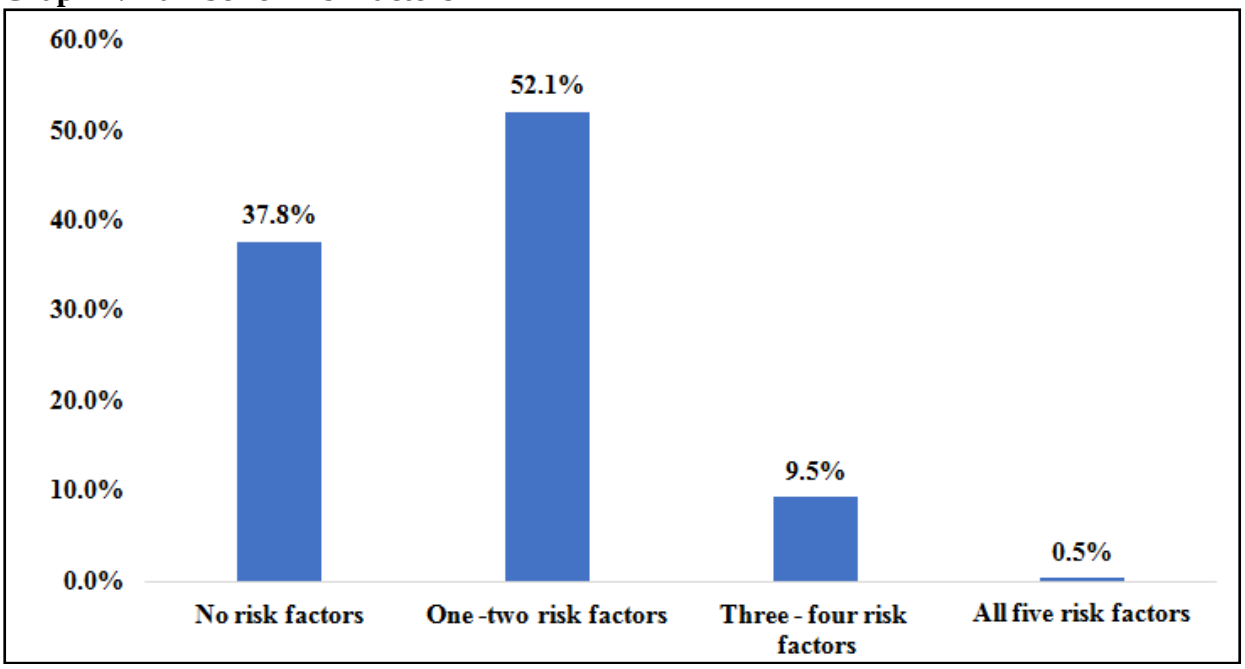


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Table 1: Operation definition

S no	Variable	Operational Definition
1	Tobacco consumption	Current smokers were defined as individuals who had smokedcigarettes, bidis, etc.
2	Alcohol Usage	Current alcohol users were those who consumed an alcoholic drinkwithin the past 1 year.
3	Obesity/ Overweight	BMI < 18.5 – UnderweightBMI 18.5- 22.9 – Normal BMI 23.0- 27.5 – OverweightBMI - >27.5 Obese
4	Hypertension	Hypertensive subjects were defined as those with systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥90 mmHg or thosebeing treated for hypertension.
5	Diabetes	Diabetes mellitus was defined as those having raised fasting bloodglucose levels of ≥126 mg/dL or those being treated for diabetes.
6	Socio Economic Scale	Modified Kuppuswamy Scale 2020

Table 1: Binary Logistic regression for determinants for NCD Risk factors

Variable		NCD Risk Present n (%)	NCD Risk Absent n (%)	B	SE	Wald	df	Sig	Exp(B)	95% CI for Exp(B) Lower	Upper
Age	<=39	79(13.9)	64(18.6)	0.36	0.19	3.41	1	0.064	1.445	0.9	2.1
	40	489(86.1)	281(81.4)								
Gender	Male	362(63.7)	104(30.1)	1.4	0.149	93.3	1	0.0001	4.2	3.1	5.6
	Female	206(36.3)	241(69.9)								
Religion	Hindu	441(77.6)	263(76.2)	0.02	0.173	0.014	1	0.9	1.0	0.72	1.4
	Non-Hindu	127(22.4)	82(23.8)	0							
Caste	General	220(38.7)	115(33.3)	0.21	0.153	1.95	1	0.16	1.2	0.9	1.6
	Non-General	348(61.3)	230(66.7)								
SES	Lower Middle or Above	207(36.4)	90(26.1)	0.58	0.16	13.1	1	0.002	1.7	1.3	2.4
	Below Lower Middle	361(63.6)	255(73.9)								

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Table 2: Socioeconomic Grade and NCD risk factors

Variable	NCD Risk Present n (%)	NCD Risk Absent n (%)	df/ Chi Square	p Value
Upper (I)	4(0.7)	2(0.6)		
Upper Middle (II)	29(5.1)	4(1.2)		
Lower Middle (III)	174(30.6)	84(24.3)	4 /17.8	0.001
Upper Lower (IV)	262(46.1)	198(57.4)		
Lower (V)	99(15.4)	57(16.5)		
Total	568(100)	345(100)		

Discussion

The study conducted by us in our field practice area showed that NCD risk factors were present in 63.2% of the study population, which is relatively high compared to other similar studies(9)(16)(17) (18) in rural India. This high prevalence would be because we used a stringent Asian guideline(12) for evaluation of Obesity and overweight while most of the studies have used the WHO criteria. This point is further validated by the fact that we found 35.4% of the study subjects were obese/overweight, which is high compared to other similar studies(18). The prevalence of other risk factors is similar to our research. Our study has challenged the notion that NCD is the disease of affluence, which has been questioned by numerous studies(19)(20)(21)(22), finding which is similarto our research.

Limitation of the Study

The present study is carried out in one rural field practice area of a medical college. The external validity of the study can be questioned. The sampling technique used by us was simple random sampling; another researcher may argue a stratified sampling method would be more appropriate. We did not carry out daily sodium consumption, diet survey, or other estimation of biochemical marker for cholesterol due to financial constrain. We did estimate the risk factor for the NCD, but the study did not ascertain the impact it had on the overall health of the study population. We did provide IEC material and tried to educate the participant regarding the benefit of adaptation of healthy lifestyle and vital signs and symptoms of the disease like diabetes and hypertension and use of early screening, prompt treatment, and regular follow up.

Conclusion

The high prevalence of NCD risk factors among those who are from low socioeconomic status is of grave concernas it may not only increase their OOP and push them back into poverty but will significantly increase the financialconstraints on the public health system.

Recommendation

It is vital that increased focus be directed in primordial, primary, and secondary prevention strategies for cost- effective management of NCD risk factors and be specially directed through front-line workers to those belongingto lower socioeconomic status.

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Conflict of Interest
None

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References

1. NCDs | Major NCDs and their risk factors [Internet]. WHO. World Health Organization; [cited 2021 Jan 17]. Available from: http://www.who.int/ncds/introduction/en/
2. WHO | disability, noncommunicable disease and health information [Internet]. WHO. World Health Organization; [cited 2021 Jan 17]. Available from: http://www.who.int/bulletin/volumes/94/3/15- 156869/en/
3. Arora M, Mathur C, Rawal T, Bassi S, Lakshmy R, Nazar GP, et al. Socioeconomic differences in the prevalence of biochemical, physiological, and metabolic risk factors for noncommunicable diseases among urban youth in Delhi, India. Prev Med Rep. 2018 Dec;12:33–9.
4. Allen L, Williams J, Townsend N, Mikkelsen B, Roberts N, Foster C, et al. Socioeconomic status and noncommunicable disease behavioral risk factors in low-income and lower-middle-income countries: a systematic review. Lancet Glob Health. 2017 Mar;5(3):e277–89.
5. Bihar.pdf [Internet]. [cited 2021 Jan 17]. Available from: http://rchiips.org/nfhs/NFHS-4Reports/Bihar.pdf
6. Census of India Website : Office of the Registrar General & Census Commissioner, India [Internet]. [cited 2021 Jan 17]. Available from: https://censusindia.gov.in/2011census/dchb/Bihar.html
7. Bihar [Internet]. [cited 2021 Jan 17]. Available from: https://poshan.ifpri.info/2019/04/26/bihar/
8. International Institute for Population Sciences. National Family Health Survey - 5 2019-20 [Internet]. New Delhi: International Institute for Population Sciences; Available from http://rchiips.org/nfhs/NFHS-5_FCTS/FactSheet_BR.pdf
9. Bhagyalaxmi A, Atul T, Shikha J. Prevalence of Risk Factors of Noncommunicable Diseases in a District of Gujarat, India. J Health Popul Nutr [Internet]. 2013 Apr 25 [cited 2021 Jan 17];31(1). Available from: http://banglajol.info/index.php/JHPN/article/view/14752
10. Global tobacco report 2019 [Internet]. [cited 2021 Jan 24]. Available from: https://www.who.int/teams/maternal-newborn-child-adolescent-health-and-ageing/maternal- health/about/health-promotion
11. WHO | Alcohol [Internet]. WHO. World Health Organization; [cited 2021 Jan 24]. Available from:http://www.who.int/substance_abuse/publications/alcohol/en/
12. Lim JU, Lee JH, Kim JS, Hwang YI, Kim T-H, Lim SY, et al. Comparison of World Health Organization and Asia-Pacific body mass index classifications in COPD patients. Int J Chron Obstruct Pulmon Dis. 2017 Aug 21;12:2465–75.
13. STEPS_Manual.pdf [Internet]. [cited 2021 Jan 24]. Available from: https://www.who.int/ncds/surveillance/steps/STEPS_Manual.pdf
14. Standards of Medical Care in Diabetes—2013 | Diabetes Care [Internet]. [cited 2021 Jan 24]. Available from: https://care.diabetesjournals.org/content/36/Supplement_1/S11
15. Mohd Saleem S, Community Medicine. Modified Kuppuswamy socioeconomic scale updated for the year2019. Indian J Forensic Community Med. 2019 Apr 28;6(1):1–3.
16. Srivastav S, Mahajan H, Goel S, Mukherjee S. Prevalence of risk factors of

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noncommunicable diseases in a rural population of district Gautam-Budh Nagar, Uttar Pradesh using the World Health Organization STEPS approach. J Fam Med Prim Care. 2017;6(3):491.

17. Phaswana-Mafuya N, Peltzer K, Chirinda W, Musekiwa A, Kose Z. Sociodemographic predictors of multiple noncommunicable disease risk factors among older adults in South Africa. Glob Health Action.2013 Dec;6(1):20680.
18. Keetile M, Navaneetham K, Letamo G, Rakgoasi SD. Socioeconomic inequalities in noncommunicable disease risk factors in Botswana: a cross-sectional study. BMC Public Health [Internet]. 2019 Dec [cited 2021 Jan 17];19(1). Available from: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-019-7405-x
19. Novotny TE. Why We Need to Rethink the Diseases of Affluence. PLoS Med [Internet]. 2005 May [cited 2021 Jan 18];2(5). Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1088286/
20. Noncommunicable Diseases, Affluence, and Gender | Economic and Political Weekly [Internet]. [cited 2021 Jan 18]. Available from: https://www.epw.in/journal/2019/46/special-articles/non-communicable- diseases-affluence-and-gender.html
21. Kulkarni VS, Kulkarni VS, Gaiha R. Persistence of Noncommunicable Diseases, Affluence and Inequality in India. :39.
22. Stringhini S. Association of Socioeconomic Position With Health Behaviors and Mortality. JAMA. 2010Mar 24;303(12):1159.