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ANALYSIS OF ESTABLISHED BEHAVIOURAL AND PHYSICAL RISK FACTORS ASSOCIATED WITH NON-COMMUNICABLE DISEASES AMONG RURAL AND URBAN WOMEN IN WEST BENGAL WITH A VIEW TO DEVELOP AN AWARENESS PROGRAMME RELATED TO THE MODIFICATION OF BEHAVIOURAL CHANGES TO PREVENT AND CONTROL NCDS.

Nursing

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ABSTRACT

Introduction: One of the most dangerous issues affecting women, both in rural and urban areas, is non-communicable disease. The study's goal was to look into the behavioral and physical risk factors for non-communicable diseases. in rural and urban women in order to establish a behavior-change awareness program in a particular Kol region. These risk factors included smoking, drinking alcohol, eating fewer fruits and vegetables, being obese, having a history of hypertension or diabetes, engaging in little physical activity, and having an increased BMI or blood pressure. **Methods:** In 210 rural and 210 urban women participated in this study who were accessible in certain rural and urban sub-centers during the study period were chosen using a multistage sampling strategy**.** The WHOSTEPS tool, which includes STEP-1 (the criteria of demographic characteristics and behavioral), was the instrument used to collect the data. STEP II - physical risk factors of NCDs. The tool was converted to local language and validated by language expert. An awareness programme was developed and validated by experts. **Results:** Women in remote areas had a higher likelihood of using smokeless tobacco. (55.7 % Vs 40.5%; p= 0.01*) than urban women. Opposite trend was seen with higher prevalence among urban women than rural women significantly for BMI (61.9% Vs 36.2%; p= <0.0001) with odd ratio 2.87(1.93, 4.26), diabetes (69.0%Vs 50.9%; p= <0.0001) with Odd ratio 0.08(0.05, 0.13), Blood Pressure (75.7% Vs 40.0%; p=<0.0001) with odd ratio 4.67(3.08, 7.11). Urban women had higher prevalence of sedentary activities (80.5% Vs 25.2%; p=<0.0001). BMI, Systolic, and Diastolic blood pressure mean values showed that urban women had higher values than rural women. **Discussion:** Several risk variables that researchers have already identified, although the studies were focused on various geographical locations. This study is based on females in Kolkata, West Bengal, both urban and rural. Thus, the risk variables identified through this study aided in the development of the awareness campaign for changing behavior. The study's conclusions have a number of consequences for nursing practice, instruction, management, and research. It can be applied to policy-making, early diagnosis, and referral in primary health centers. in the therapeutic setting to slow the spread of the illness.

KEYWORDS

NCDs, Behavioural and Physical Risk factors, Modification of Behavioural change, Awareness.

INTRODUCTION:

Cancer, diabetes, chronic respiratory conditions, and cardiovascular disease are in particular classified as non-communicable diseases. According to reports, around (68%) of all fatalities worldwide and close to (60%) in India are attributable to NCDs. The majority of deaths have taken place due to NCDs are detected mostly in low economic group of people. Rapid urbanization is one of the most important factors of an epidemiological move which produce a load on economic boost. (Chakma and Gupta, 2014). Since epidemiological shift is a significant component in the growth in the frequency of non-communicable illnesses, identifying the risk variables may be a crucial first step in prevention (WHO, 2014). The worrisome rise in NCDs may be because of a rise in behavioral and anthropometric risk factors. As the first steps in the control of chronic diseases, many experts advise documenting the incidence of disease, risk factors, and measures through monitoring. (Shah B 2010). India suggests that chronic diseases has accounted for about 53% of all deaths with chronic respiratory disease accounting for about 7% of deaths. Prevalence of men and women smokers aged between (15–49) years is 32.7% and 1.4% respectively according to the mentioned survey (NFHS-3).The relation of tobacco use in any form accounts a prevalence of 57 percent and 10.8 percent in males and females respectively. According to estimates, 8.5 million people pass away annually, with NCDs responsible for 62% of all fatalities in this region and for 48% of deaths in people under the age of 70. (Mozaffarian, 2014). The women comprise Sixty percent of the world's poor population suffering more from malnutrition, comprising two-thirds uneducated. The prime focus of controlling non-communicable disease burden is strengthening and preventing measure of the inter-sectorial collaboration. Non-communicable diseases (NCDs) covered in its full length in India too. Therefore, it is essential to monitor NCD risk variables as they may contribute to the development of policy and the implementation of preventative interventions.

MATERIALS AND METHODS

Participant Selection

In this study, 210 urban women who visited a particular Sub Center in West Bengal, India between April 2020 and June 2020 were included. The WHOSTEPS tool conducted direct interviews with each participant to learn more about their demographics. Following the appropriate calibration, a validated instrument was used to measure blood pressure, height, and weight. The usual formula for calculating BMI was used to determine the degree of obesity.

Statistical Analysis

Using Spss 25, the statistical analysis was finished. Both univariate and multivariate analyses were used to compute the odds ratio with a 95% confidence interval and the related p-values. In univariate analysis, bivariate frequency tables were used to compute the odds ratio and its 95% confidence interval; in multivariate analysis, multiple logistic regression was used to calculate the odds ratio and its 95% confidence interval after correcting for confounding variables. Descriptive statistical analysis was also performed to produce various frequency tables, determine means, and compute associated standard errors. The relationship measures were applied using the chi-square test.

RESULTS

The data presented in Table 1 depict that among 420 women majority of the participants 44.2% rural women and 41% urban women belonged to age between (40-49) years. Data indicates that majority of women both in rural women (46.2%) and urban women (40.0%) completed high school, followed by 33.8 percent rural women and 35.2 percent urban women completed primary school and only 7.1 percent and 12.5 percent rural and urban women respectively completed college level education. In relation to caste, maximum rural women (44.3%) and urban women (47.6%) belonged to kayasthya. Only 1.9 percent rural and urban women belonged to other caste. The data depicted from (Table1) that most of the rural women (75.2%) were married in comparison to urban women (44.8%) and divorced urban women (12.4%) which was more than rural women (5.7%).

Table1 ***Frequency, Percentage And Chi Square Of Sample Characteristics Among Rural And Urban Women. N = (210+210)***

Variabeles	*Rural frequency*	*(%)*	*Urban frequency*	*(%)*	*Total (%)*	*Chi-square*	*p-value*
Age (in years)							
40-49	93	44.2	86	41.0	0.48	0.79	
50-59	72	34.3	76	36.2			
60-69	45	21.4	48	22.9			
Caste							
Brahmin	40	19.0	48	22.9			
Kayasthya	93	44.3	100	47.6	15.51	0 .01*	

Scheduled caste	49	23.3	54	25.7		
Scheduled Tribe	24	11.4	4	1.9		
Others	4	1.9	4	1.9		
Level of education						
No formal education	7	3.3	4	1.9		
Less than primary school	20	9.5	22	10.5	4.00	0.41
Primary school completed	71	33.8	74	35.2		
High school completed	97	46.2	84	40.0		
College completed	15	7.1	26	12.5		
Marital status						
Never married	14	6.7	55	26.2		
Married	158	75.2	94	44.8	6.71	0.24
Separated	2	1.0	14	6.7		
Divorced	12	5.7	26	12.4		
Widowed	24	11.4	21	10.0		

*p< .05

The information in Table 2 shows how behavioral risk variables are distributed among women in rural and urban areas. Both urban (11.0%) and rural (6.7%) women were current smokers.. Most of the women of rural (50.0%) and urban (78.3%) among current smokers started smoking in between (18-30) years of age respectively. Majority of the current smokers, rural women (71.4%) and urban women (56.5%) used 5-10 cigarettes per day. Women in both cities and rural areas were found to use smokeless tobacco (55,7% and 40.5%, respectively). Both rural women (42.7%) and urban women (51.8%) used jarda pan as smokeless tobacco followed by sikhar 29.9 percent and 24.7 percent. Most of the rural women (53.0%) and urban women (60.0%) consumed smokeless tobacco <5 times daily. Only 1.7 percent rural women and 1.2 percent urban women used smokeless tobacco more than 10 times daily.

Table 2 ***Frequency, Percentage And Chi Square Of Behavioral Risk Factors Of NCDs Among Rural And Urban Women. N= (210+210)***

Behavioural risk factors	Rural (n=210)		Urban (n= 210)		Chi-square	p-value
	f	(%)	F	(%)		
Current smoking habit						
Yes	14	6.7	23	11.0	2.40	0.12
No	196	93.3	187	89.0		
Age at smoking started	n=14		n= 23			
<18 years	6	42.9	5	21.7		
18-30 years	7	50.0	18	78.3	6.14	0.10
>31 years	1	7.1	--	-		
Number of smoking/ day	n=14		n=23			
<5	–	—	3	13.0		
5-10	10	71.4	13	56.5	4.98	0.17
>10	4	28.6	7	30.4		
Current Smokeless Tobacco use						
Yes	117	55.7	85	40.5	9.77	0.01*
No	93	44.3	125	59.5		
Types of tobacco used	n=117		n= 85			
Gutkha	19	16.2	11	12.9		
Pan jarda	50	42.7	44	51.8 0.67 0.96		
Khaini	13	11.1	9	10.6		
Sikhar	35	29.9	21	24.7		
No of times using	n=117		n=85			
Smokeless tobacco <5 times	62	53.0	51	60.0 1.06 0.90		
5-10 times	53	45.3	33	38.8		
>10 times	2	1.7	1	1.2		

*p< .05

The data presented in Table 3 that rural women (74.8%) used to spend time for physical work ≥150 minutes/week whereas urban women only (19.5%). Urban women (80.5%) used to spent time for physical work <150 minutes per week in contrast to rural women (25.2%), chi square value 128.57; p< 0.0001*.

Urban women (75.7%) had BP more than equal to 140/90 mm of Hg, in contrast to rural women (40%), chi square value 54.92; p<0.0001*. On the other hand, in case of overweight, urban women (61.9%) had over weight in respect of rural women (36.2%), chi square value 27.78; p <0.0001*. Confirmed cases of diabetes were, among rural women (50.9%) and urban women (69.0%), chi square value 14.32, p p<0.0001* significant at .05 level of significance.

Table-3 ***Frequency, Percentage and Chi square of Physical Risk Factors among Rural and Urban Women. N=420(210+210)***

Physical risk factors	Rural		Urban		Chi-square	p value
	f	(%)	f	(%)		
Physical work <150 minutes/week	53	25.2	169	80.5	128.57	<0.0001*
≥150 minutes/week	157	74.8	41	19.5		
BP≥140/90 mmHg	84	40	159	75.7	54.92	<0.0001*
BMI group						
Normal ((18.5-24.9)	134	63.8	80	38.1	27.78	<0.0001*
Overweight and Obese (25- ≥30)	76	36.2	130	61.9		
Diabetes	107	50.9	145	69.0	14.32	<0.0001*

*p<.05

The information in Table 4 demonstrates the prevalence of both physical risk factors (overweight and obesity, elevated BP, increased BMI) and behavioral risk factors for NCDs (current nonsmokers and low physical activity). It is found that rural women (55%) and urban women (40.5%) use smokeless tobacco currently. Association of smokeless tobacco among rural and urban women is statistically significant (p=0.002), under univariate analysis, significant risk of non-communicable diseases for smokeless tobacco is found 1.85[OR-1.85(1.26, 2.72); p= (0.002] for rural women by many times.

Low amounts of exercise (weekly time spent moving less than 150 minutes) was prevalent among urban women (80.5%) compared to rural women (25.2%), **p**<0.0001*. It is found in table that a significant association (p<0.0001), between rural and urban women in the prevalence of physical activity.

Under univariate analysis significant risk of non-communicable diseases with physical activity (<150 minutes/week) is found 0.08 [OR-0.08 (0.05, 0.13); p<0.0001] times more for urban population. In relation to increased blood pressure it is depicted from data given in table-7 that a significant difference exists between rural and urban women. Above table shows that urban women had high prevalence of increased blood pressure (75.7%) than rural women (40.0%).p-value-<0.0001which is statistically significant. Under univariate analysis significant risk of non-communicable diseases with increased blood pressure is found 4.67[OR- 4.67(3.08, 7.11); p<0.0001] times more for urban women.

Considering 24.9 kg/m2 as cutoff value for describing overweight &obesity urban women (61.9%) had overweight and obesity p<0.0001,[OR2.87(1.93, 4.26) times more risk for urban women than rural women.

Data presented in table-4 also show that most of the urban women (69.0%) having history of diabetes which is significantly p<0.0001, [OR-0.08(0.05, 0.13)] high than rural women (50.9%).

Table-4 ***Multivariate Regression Of Behavioral And Physical Risk Factors For NCDs In Rural Versus Urban Women By Logistic Regression. N= (210+210)***

Behavioral& Physical risk factors	Rural (n=210) f	(%)	Urban (n=210) f	(%)	p- value	Adjusted Odd ratio
					Rural versus Urban	
Current smokeless Tobacco use	117	55.7	85	40.5	0.002*	1.85(1.26, 2.72)
Physical work Hours/week						
<150 minutes	53	25.2	169	80.5	<0.0001*	0.08(0.05, 0.13)
≥150 minutes	157	74.8	41	19.5		
BP mmHg						

≥140/90	84	40	159	75.7	<0.0001*	4.67(3.08, 7.11)
	134	63.8	80	38.1	<0.0001*	2.87(1.93, 4.26)
	76	36.2	130	61.9		
	107	50.9	145	69.0	<0.0001*	0.08(0.05, 0.13)
BMI						
Normal ((18.5-24.9)						
Overweight and Obese (25-≥30)						
Diabetes						

***** Blood pressure, or BP, and body mass index, or BMI, *p<.05

The value of BMI among rural and urban women is statistically significant (p<0.0004). Again data showed in the Table 5 depicts that among rural women, the mean systolic blood pressure (mean± SD.) is 127.8(±14.4). In other hand, the mean systolic blood pressure (mean± SD.) among urban women is found high 145.9(±13.7). The data in the table above demonstrate statistically significant number difference in mean (±SD) women in rural and urban areas, with a p-value of (p<0.0001). It is also seen in (Table-5) that the mean diastolic pressure (mean with ± SD.) of rural women 83.5(±10.4) and in case of urban women it is found 91.2(±9.5). Difference of mean Diastolic pressure is statistically important (p<0.0001).

Table 5 ***Mean, & Standard Deviations of Physical Risk Factors among Rural and Urban Women. N= 420(210+210)***

Physical risk factors	Rural (n=210) Mean ±SD	Urban n= (210) Mean ± SD	p- value Rural versus Urban
BMI (kg/M^2)	23.9 ±3.2	26.1±3.1	<0.0004*
Systolic blood pressure (In mm of Hg)	127.8±14.4	145.9±13.7	<0.0001*
Diastolic blood pressure (In mm of Hg)	83.5±10.4	91.2±9.5	<0.0001*

BMI—body mass index. Independent "t" test to compare means. *p<.05

DISCUSSION:

The WHO-STEPS questionnaire was used in this cross-sectional study in West Bengal to gather information on the psychological and physical NCD risk factors among rural and urban women. Compared to rural women (39.5%) and urban women (40.5%) to use smokeless tobacco at a rate of 55.7%.

According to a similar study by Vivek Gupta et al., The use of smokeless tobacco was more common in urban than in rural areas. Overall, rural areas have a higher rate of tobacco use than cities do, including both smoking and using smokeless tobacco. In both rural and urban situations, consumption of fruits and vegetables was equally low (27.6% vs. 33.3%), at less than five servings per day.

The Areas Of Behavioural And Physical Risks

This cross-sectional survey in West Bengal used the WHO-STEPS I and WHO-STEPS II techniques to Determine the psychological and physical NCD risk factors in rural and urban women. In contrast to somewhat higher smoking rates (11.0%) in urban women, the prevalence of current smoking was 6.7% in rural women. The consumption of smokeless tobacco was observed among rural women (55.7%) which seemed to be higher than urban women (40.5%). In terms of the distribution of alcohol consumption among rural (19.0%) and urban women (22.4%) respectively. The majority of women in urban areas (42.6%) and rural areas (40.0%) used to drink five days per week. Only 7.5% of rural women and 1.2% of urban women reported daily alcohol consumption (Table 2). Both rural women (27.6%) and urban women (33.3%) consumed fewer than five daily portions of fruits and vegetables.

In relation to physical activity, it was seen that (80.5%) of the urban and (25.2%) rural women had low physical activity. Most of the physical activity is related with house hold work among rural women (59.5%) and among urban women is (39.0%), and on the other hand majority of urban women (41.9%) related with sedentary work in contrast to rural women. It was also seen that (80.5%) urban women had physical activity <150 minutes/week which was evidenced as significant risks for NCDs in contrast to rural women (p<0.0001). Under univariate analysis significant risk of non-communicable diseases with physical activity <150 minutes/week was found<0.0001 [OR-0.08(0.05, 0.13);] times more for urban women.

Women from rural and urban areas were found to have significantly different blood pressure levels. The data represented that urban women had high prevalence of increased blood pressure (75.7%) than rural women (40.0%); p-value-<0.0001 which was statistically significant. Under univariate analysis significant risk of non-communicable diseases with increased blood pressure was found 4.67[OR-4.67(3.08, 7.11); p<0.0001] times more for urban women.

Considering 24.9 kg/m^2 as cutoff value for describing overweight & obesity, urban women (61.9%) had over weight and obesity which is significant p<0.0001,and risk [OR 2.87(1.93, 4.26) times more than rural women.

Again, it was discovered that most urban women (69.0%) had a history of diabetes, which was substantially greater than rural women (50.9%) [OR-0.08(0.05, 0.13)].

BMI, systolic blood pressure, and diastolic pressure were all considerably greater in urban women than in rural women. (Table 5)

According to a related study, urban areas had a higher prevalence of smokeless tobacco usage than rural ones. Overall, tobacco usage, including smoking and using smokeless tobacco, is higher in rural regions than in cities. In both rural and urban areas, consumption of fruits and vegetables was low—27.6% vs. 33.3%, respectively. (Vivek, et al.).

a research conducted to gauge the distribution of NCD risk factors at Budh Nagar district. The study reported that 4.6% women were smokers, consumption of smokeless tobacco was observed in 15.4 percent women, none of the female was consuming alcohol. 90.0 percent of females reported eating few fruits and vegetables.. Majority of women had normal BMI (53.1%). More women were overweight (30.8%), and (14.6%) women were hypertensive. Overall prevalence of diabetes was found 7.8% in women. (Shalini, Harsh, Sonia, & Siddarth, 2016).

A similar study was conducted in Kerala where the rate of hypertension was high. One more study was done in Kerala where it was seen that Both rural and urban residents shared a similar prevalence of adult hypertension. (Thankappan, et al, 2010).

Support for the study came from a investigation of the frequency of risk factors for non-communicable illnesses in Tamil Nadu's rural and urban areas. According to Anu, Mary, and Vinod et al. (2018), Those who lived in cities had a BMI of 61% (CI: 56.9 to 65.1), whereas women in rural areas had a BMI of 34.6% (95% CI: 27.4 to 41.7).

For Asians, 85% of rural females and Urban women were overweight in 94.1% of cases. when using 23kg/m2 as the definition of overweight (WHO, 2014).

In 2003, the WHO and Indian Council of Medical Research carried out a similar study utilizing a WHO survey instrument that had been approved. Both urban and rural women showed a similar positive correlation between behavioral and physical risk variables (WHO, 2003).

CONCLUSION:

Both rural and urban areas were found to be widely prevalent of the risk variables. In comparison to rural women, urban women had much higher rates of diabetes, hypertension, obesity, and physical inactivity. Multiple strategies should be implanted to reduce the prevalence of diseases and prevent NCDs by lifestyle change. An urgent need prevails for addressing different risk behaviours for the occurrence of NCDs. Awareness programme was accepted by rural and urban people. Rural and urban women were able to be aware of their health risks and the management of NCDs.

REFERENCES:

1. Adeyi, O., Smith, O., & Robles, S. (2007). Public policy and the challenge of chronic Non- communicable diseases. WorldBank, Washington DC.
2. Aroor, B., Trivedi, A., & Jain, S. (2013). *Health Popul Nutr,* 31(1), 78-85.doi: 10.3329/jhpn.v31i1.14752.
3. Agarwal, D., Ahmad ,S., Singh , J., Shukla , M., Kori , B., & Garg,A.(July,2018). Prevalence of Risk Factors of Non-Communicable Diseases in a Rural Population of Eastern Uttar Pradesh. *International journal of Medical and Dental Sciences,* 7(2). doi.org:10.18311/ijmds/2018/20122.
4. Anand, K., Shah, B., &Yadav, K., et al. (2007). Are the urban poor vulnerable to non-communicable diseases? A survey of risk factors for non-communicable diseases in urban slums of Faridabad. *National Medical Journal of India*, 20(3), 115–120.
5. Alwan, A., Maclean, D.R., Riley, L.M., Espaignet, E.T., Mathers, C.D., Stevens, G.A., et

al. (2010). Monitoring and surveillance of chronic non-communicable diseases: Progress and capacity in high-burden countries. *Lancet,* 376, 1861-8.
6. Anu Mary Oommen, Vinod Joseph Abraham, Kuryan George, and V. Jacob Jose. *Prevalence of risk factors for non-communicable diseases in rural & urban Tamil Nadu.* Indian J Med Res. 2016 Sep; 144(3): 460–471.
7. Banerjee, A. (2018). Non-communicable diseases in India: Challenges and the way forward, 7(2), 60-64.
8. Bhar, D., Bhattacherjee, S., & Das, D., (2019). Behavioral and biological risk factors of non-communicable diseases among tribal adults of rural siliguri in Darjeeling District, A cross sectional study. Indian Journal of Public Health, 63(2), 119-127. https://doi.org/10.4103/ijph.IJPH_326Z_18.
9. Beaglehole, R., Bonita, R., & Horton, R., et al. (2011). Priority actions for the non-communicable disease crisis. *Lancet,* 377, 1438-1447.
10. Bhattacharjee, S., Datta, S., Roy, J.K., & Chakraborty, M. (December, 2015). A cross sectional assessment of risk factors non-communicable diseases in Sub-Himlayan Region of West Bengal. *Journal of The association of Physicians of India*, 63.
11. Chakma, J.K., Gupta, S. (2014). Lifestyle and non-communicable disease: A double edged sword for future India. *Indian J Community Health*, 26, 325-32.
12. Deepa, M., Pradeepa, R., Anjana, R.M. & Mohan, V. (2019). Noncommunicable Diseases Risk Factor Surveillance. *Experience and Challenge from India,* 65(1), 5-6.
13. Fuster, V., Kelly, B.B., & Vedanthan, R. (2011).Promoting Global Cardiovascular Health Moving Forward. *Circulation*, 123 (15), 1671-1678.
14. Global Health Risks. (2009). Mortality and Burden of Disease Attributable to Selected Major Risks. Geneva: Switzerland, World Health Organization. [Google Scholar].
15. Gupta, V., Yadav, K., &Anand, K. (2010). Patterns of tobacco use across rural, urban, and urban-slum populations in a north Indian community. *Indian J Community Med,* 35, 245–51. [PubMed], [Google Scholar].
16. Hancock, C., Kingo, L., Raynaud, O. (2011). The private sector, international development and NCDs. *Glob Health,* 7 (1), 1-11. doi:10.1186/1744-8603.
17. Ishikawa, K. (1996). *Guide to Quality Control.* Asian Productivity Organization. ISBN 92- 833-1036-5.
18. Indian council of medical research report (ICMR, & WHO 2006)). *Study on assessment of burden of non-communicable diseases.* New Delhi Indian Council of Medical Research, New Delhi, India. [Google Scholar].
19. Joshi, R., Alim, M., Kengue, A.P., Jan, S., Maulik, P.K., &Peiris, D., et al. (2014). Task shifting for non-communicable disease management in low and middle income countries- a systematic review. *PLoS One*, 9(8), 1-9.
20. J, Glob Health.(2018, December). A systematic review of associations between non-communicable diseases and socioeconomic status within low- and lower-middle-income countries. 8(2), 020409. doi: 10.7189/jogh.08.020409.
21. Krishnan, A., Shah, B., Lal, V. (2018).Prevalence of Risk factors for Non-Communicable disease in a rural area of Faridabad district of Haryana. *Ind J Pub Health*, 52(3), 117- 125.
22. Kappod, R.S., & Girish, H.O. (2014, February). A community based study on the prevalence of behavioral risk factors of non-communicable diseases in davangere city, Karnataka. *Journal of Evolution of Medical and Dental Sciences*, 3(8), 1841-1849.
23. Kassa, M., D., (2018). A mixed method study of quality, availability and timeliness of Non- communicable disease (NCD) related data and link to NCD prevention: Perceptions of health workers in Ethiopia. *Health Information Management Journal*, 47(4), 21-34.
24. Kelly, T., Yang, W., Chen, C.S., Reynolds, K. (2008). Global burden of obesity in 2005 and projections to 2030. *Int J Obes*, 32, 1431.
25. Kundu, M., Hazra, **S.,** Pal, **D.,** Bhattacharya, M. (2018). A review on Noncommunicable Diseases (NCDs) burden, its socio-economic impact and the strategies for prevention and control of NCDs in India. *Indian journal of public health,* 62(4), 302-304.
26. Lopez, D., Christopher, J.,& Murray, L. (2006).The Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries, and Risk Factors in 1990 and Projected to 2020.Harvard School of Public Health.
27. Little , M., Humphries ,S., Patel , K., & Dewey,C. (2010). Factors Associated With BMI, Underweight, Overweight, and Obesity among Adults in a Population of Rural South India: A Cross-Sectional Study. DOI: 10.1186/s40608-016-0091-7.
28. Mahal, A., Karan, A., &Engelgau, M. (2010).The Economic Implications of Non-Communicable Diseases for India. *Health, Nutrition and Population (HNP) Discussion Paper*, the World Bank, Washington, DC.
29. Mozaffarian, D.,Fahimi, S., Singh, M., Micha, R., et, al. (2014).Global sodium consumpti and death from cardiovascular causes. *New England Journal of Medicine,* 371(7), 624-634.
30. Mohan, V., Deepa, R. (2004). Risk factors for coronary artery disease in Indians. J Assoc Physicians India, 52, 95–7. [PubMed] [Google Scholar
31. Manjrekar, S.S., Sherkhane, M.S., &Chowti, J.V. (July-September, 2014).Behvioral risk factors for non-communicable diseases in working and nonworking women of urban slums. *J Middle Health*, 5(3), 143-149. doi: 10.4103/0976-7800.141220. PMCID: PMC4195188, PMID: 25317001.
32. Mahajan, M., Naik, N., Jain, K., Patira, N., Prasad, S., & Mogri, S.Study of Knowledge, Attitudes, and Practices toward Risk Factors and Early Detection of Non-communicable Diseases among Rural Women in India. *Journal of Global Oncology*, *5.*
33. Nethan, S., Sinha, D., & Mehrotra, R. (2017). Non Communicable Disease Risk Factors and their Trends in India. *Asian Pac J Cancer Prev*, 18(7), 2005–2010. doi: 10.22034/APJCP.2017.18.7.2005. PMCID: PMC5648412. PMID: 28749643.
34. National Family Health Survey-32005-06, International Institute of Population Sciences. Mumbai, IIPS, 2007. Google Scholar.
35. Oommen, A.M., Joseph, V., Kuryan, A., George, & Jose, V. J. (2016).Prevalence of risk factors for non-communicable diseases in rural & urban Tamil Nadu. *Indian J Med Res,* 144(3), 460–471.
36. Pangtey, R., Basu, S., Meena, G.S., & Banerjee, B. (2018). Status of Non-communicable disease screening in an urban resettlement colony in Delhi, India. *Journal of MAMC Medical Sciences,* 4(3), 133-136. Doi: 10.4103/mamcjms.mamcjms_42_18.
37. Polit, D. F., & Beck, C. T. (2012). Nursing research: generating and assessing evidence for nursing practice. Ninth Edition. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins.
38. Phelps, Richard P. (2018). *To save the research literature, get rid of the literature review,* LSE impact Blog, London School of Economics.
39. Reddy, K.S., Shah, B., Varghese, C., &Ramadoss, A. (2005).Responding to the threat of chronic diseases in India. *The Lancet,* 366, 1746–51.Google Scholar
40. Sarma, P.S., Sadanandan, R., Thulaseedharan, J.V., Soman, B., Srinivasan, K., Varma, R.P., Nair, M. R., Pradeepkumar, A.S.,Jeemon, P., Thankappan, K.R., &Kutty, R.V. (2018). Prevalence of risk factors of non-communicable diseases in Kerala, India: results of a cross-sectional study. *BMJ,*9 (11),http://dx.doi.org/10.1136/bmjopen-2018-027880.
41. Sugathan, T. N., Soman, C. R., &Sankaranarayanan, K. (2008, June). *Indian Journal of Medical Research*, 127(6), 555-563.
42. Srivastav, S., Mahajan, H., Goel, S., & Mukherjee, S (July-September, 2017). Prevalence of risk factors of non-communicable diseases in a rural population of district Gautam – Budh Nagar. *Journal of Family Medicine and Primary Care*, 6(3), 491-497. Doi: 10.4103/2249-4863.222027.
43. The National Academies Press, (ICMR-MRC Workshop). Building Indo-Uk collaboration in chronic diseases, 16.
44. Thankappan, K. R., Shah, B., Mathur, P., Sarma, P.S., Srinivas, G., &Mini, G.K., et al. (2010).
45. Risk factor profile for chronic non-communicable diseases: results of a community-based study in Kerala, India. *Indian J Med Res,* 131, 53–63. [PubMed] [Google Scholar].
46. Tabák, A.G., Herder, C., Rathmann, W., Brunner, E.J., &Kivimäki, M (2012, June). Prediabetes: A highrisk state for developing diabetes. *Lancet*, 16,379(9833), 2279–90.
47. Tripathy, J. P. (2018, June) *Health Action*, Published online 21. doi: 10.5588/pha.18.0023, 8(2), 98–99.
48. Thakur, J.S.,Jeet, G., Pal, A., Singh,S., Singh, A., Deepti,S., Lal, M.,Gupta, S., Prasad, R., Jain, R.,& Saran, R.(2016).Profile of Risk Factors for Non-Communicable Diseases in Punjab, Northern India: Results of a State-Wide STEPS Survey. *PLoS One*, 11(7), e0157705.
49. Terzic, A., &Waldman, S. (2011). Chronic diseases, the emerging pandemic. *Clinical and translational science,* 4 (3), 225-226.
50. Taylor, D.W. (2010). The Burden of Non-Communicable Diseases in India. Hamilton. *ON*, *The Cameron Institute*, 13. [Google Scholar]).
51. Thirunavukkarasu, S., Srinivasan, K., Sankara, P. S., Oliver, R., Odile, S., & Kavampurathu,
52. R.T. (August, 2017). Seven-year longitudinal change in risk factors in rural kerala, India: the WHO steps approach. *PLOS ONE,* 12(8): e0183379.
53. Tushi**,** A**.,** Rao**,** S. R**.,** Pattabi**,** K**.,** Kaur, P. (2018). Prevalence of risk factors for non-communicable diseases in a rural tribal population of Mokokchung, Nagaland, India. *The national Medical Journal of India,* 31(1), 11-14. doi: 10.4103/0970-258X.243405.
54. UNDP (2011). Political declaration of the high-level meeting of the general assembly on the prevention and control of non-communicable diseases. vol. A/66/L.1: UN. 2011.
55. Upadhay, R. P. (March, 2012). An overview of the burden of non-communicable diseases in India. *Iranian Journal of Public Health*, 41(3), 1-8. PMCID: PMC3481705, PMID: 23113144.
56. Vijayakarthikeyan, M., Krishnakumar, J., &Umadevi, R. (2017).Cross-sectional study on the prevalence of risk factors for non-communicable disease in a rural area of Kancheepuram, Tamil Nadu. *International Journal of Community Medicine and Public Health*, 4(12), doi**:** http://dx.doi.org/10.18203/2394-6040.ijcmph, 20175337.
57. Vaidyanath, A., & Thapa, G. (2013). Behavioural risk factors of non-communicable diseases among Nepalese urban poor. *Epidemiology Research International*, 2013, 329156. https://doi.org/10.1155/2013/329156.
58. Wang, H., Nagvi, M., & Allen, C., et al. (2015). Golbal, regional, and national life expectancy, all cause mortality, and cause specific mortality for 249 causes of death, 1980-2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet*, 388, 1459- 1544.
59. WHO. (2002). Reducing risks, promoting healthy life, Geneva. *Prevention of cardiovascular disease- Guidelines for assessment and management of cardiovascular risk*, Geneva.
60. World Health Organization (2002). *WHO STEPS Instrument. The WHO Stepwise Approach to Chronic Disease Risk Factor Surveillance (STEPS)* Geneva: WHO; 2002. [Google Scholar]
61. World Health Organization. (2005). WHO STEPS Surveillence manual: the WHO STEP wise approach to chronic disease risk factor surveillance. Geneva.
62. World Health Organization (WHO) *Global Recommendations on Physical Activity for Health.* Geneva: WHO; 2010. [Google Scholar]
63. World Health Organization. (2010).The WHO Global Status Report on Non-communicable Diseases 2010.NCDs and its Development. Geneva: WHO.
64. World Health Organization. (2011). Non-communicable Diseases in the South-East Region. Situation and Response*,* New Delhi.
65. World Health Organization. (2013). Global action plan for the prevention and control of non - communicable disease 2013-2020. In. Edited by WHO. Geneva, Switzerland: WHO, 2013, 55.
66. WHO. (2014). Global Status Report on Non- communicable Diseases. Attaining the Nine Global Non-communicable Disease Targets; A Shared Responsibility. World Health Organization. 1211 Geneva27, Switzerland.
67. World Health Organization. (2015). World report on ageing and health. Geneva, WHO.
68. World Health Organization. (2016). Non Communicable Diseases Country Profile*. 2014.* Accessed on October 24*,* Available from: http://www.who.int/nmh/publications/ncd- profiles-2014/en/.
69. World Economic Forum. (2011).The Global Economic Burden of Non-Communicable Diseases.Harvard School of Public Health. Geneva: World Economic Forum.
70. Williams,J., Allen, L., Wickramasinghe, K., Mikkelsen, B., Roberts, N., &Townsend, N. (2018, June). *Public Health Action***,** 8(2), 98–99. doi: 10.5588/pha.18.0023.
71. WHO. (2017). Non-communicable Diseases Progress Monitor. Vol, 46, World Health Organization, Geneva. [Google Scholar].
72. WHO. (2018). WHO Methods and Data Sources for Country- Level Causes of Death 2000- 2016. *Global Health Estimates*, WHO/HIS/IE.
73. WHO. (2018). Non-communicable Diseases Country Profiles. [Google Scholer].
74. WHO. (2018). Non-communicable Diseases Key Facts.Who is at Risk of such diseases?
75. Modifiable Behvioral Risk Factors. [Google Scholer].
76. WHO. (2018). Time to Deliver. Third UN High- level Meeting on Non-communicable
77. Diseases. World Health Organization. [Google Scholer].
78. Yach, D., Kellog, M., Voute, J. (2005). Chronic diseases: an increasing challenge in developing countries. *Trans R Soc Trop Med Hyg*, 99, 321–24. [Google Scholar].