Non-communicable diseases in women living in Swat Valley: A cross-sectional study

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ABSTRACT

Objective: With the rise of urbanization in Pakistan, non-communicable diseases (NCDs) have been shown to have an increasing impact on the healthcare system. NCDs are a leading cause of morbidity and mortality, especially in poverty stricken areas such as Swat Valley.

Methodology: A community-based health survey was conducted in nine villages in Swat Valley. Participants were selected using systematic sampling, in which women who fit the inclusion criteria from every 5th household were selected.

Results: 600 participants were included in the study. The prevalence of hypertension, diabetes mellitus and renal disease amongst the women of Swat was found to be 17.9%, 3%, and 1% respectively. Increased BMI was significantly correlated with increased incidence of hypertension (p=0.000, correlation coefficient=0.290) and diabetes mellitus (p=0.009, correlation coefficient= 0.119). Pearson correlation coefficients and two-tailed tests of significance were used for statistical analysis to test correlation between NCDs and risk factors.

Conclusion: Our study suggests the rates of NCDs amongst women in Swat are lower than the national prevalence (59%). Nonetheless, public health educational programs and greater accessibility to health resources are needed to decrease modifiable risk factors within the community.

Keywords: Non-communicable diseases (NCDs), diabetes mellitus, hypertension, Swat Valley, women

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INTRODUCTION

The global burden of non-communicable diseases (NCDs) presents with a demanding health challenge, particularly in poverty-stricken societies.[1] According to a systematic review done by Kankeu et al., which looked at the financial burden of NCDs in low and middle-income countries, NCDs significantly add to financial burdens directly and indirectly. This mainly includes cost of medicine and loss of income, time and productivity for the patient or caregivers. Majority of NCDs occur during the mid-life period and hence, negatively affect workforce productivity and socioeconomic development.[2,3]

As death and disability caused by NCDs are major obstacles for sustainable development, poverty reduction and progress, effective intervention is crucial.[4] World Health Organization (WHO) suggests preventive strategy implementation to control the risk factors contributing to NCDs. Attenuating the prevalence of hypertension, tobacco use, physical inactivity and other controllable risk factors is an essential step to improving health, especially in lower socioeconomic groups, that tend to have a greater prevalence of these risk factors.[3,5]

Approximately half of the population in South Asia lives below the poverty line, in conditions with inadequate healthcare and rising rates of NCDs.[2] According to WHO, by the year 2020 NCDs will account for 80% of the global burden of the disease and cause 7 out of every 10 deaths in the developing countries.[6]

In addition to battling diseases associated with underdevelopment, such as infections and malnutrition, Pakistani population currently suffers from high rates of diabetes mellitus, cardiovascular diseases and chronic pulmonary diseases.[7] According to Pakistan's NCDs policy brief of 2011, NCDs account for 59% of the total disease burden, while 41% is made up of communicable diseases,

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maternal and child health, and nutritional issues.[8] Furthermore, in Pakistan, every day approximately 100 people undergo amputations due to diabetes and trauma, and another 100 people begin dialysis daily.[5] Although new preventative programs are being introduced to the healthcare system, evidence shows that public institutions lack core elements to manage the additional integration and make appropriate use of population-based interventions.[5]

Furthermore, due to variation in development level and epidemiological transition, trends of prevalence of NCDs differ in urban and rural areas.[2] For example, according to a national health survey conducted in Pakistan in 1990, approximately 23% of adults in urban areas and 18% in rural areas live with hypertension.[9] Additionally, significant inequalities between urban and rural residents and economic status groups make it difficult to target the entire population with a unified health plan.[7] Thus, further population-based local research on NCDs is required in order to plan comprehensive interventional strategies.

Swat is a river valley in Khyber Pakhtunkhwa, with a predominately rural population of approximately 2.3 million and an average household size of 8.8 persons.[10] The armed conflict in Swat, spanning from 2007 to 2011, as well as continued military presence, adversely impacted regional economy, infrastructure and health services in the area.[10] It is estimated that 29% of health facilities in the province were damaged post conflict.[11]

Our study aims to investigate the incidence of certain non-communicable diseases faced by women in Swat, as well as factors of their diet and lifestyle that may increase the risk of these diseases.

METHODOLOGY

A community-based health survey was carried out by Swat Relief Inititiative (SRI). SRI is a non-profit organization, currently covers 2, 2250 households in nine villages of Swat Valley through community health workers. SRI conducts door to door health check-ups of village households for women and children and regularly conducts preventive health seminars to improve nutrition, prevent major diseases, and educate the population on family planning. Their goal is to improve quality of life of women and children in Pakistan through healthcare, economic growth and a sustainable environment.

A community-based health survey was carried out in nine villages of Swat, covering two union councils, namely Saidu Sharif and Islampur. We conducted a quantitative research to find the prevalence of NCDs such as diabetes mellitus, kidney disease, hypertension and asthma amongst the women of Swat. In addition, questions were asked regarding the lifestyle, including dietary intake and physical activity, of the women in the study population.

The sample size consists of a total of 600 participants. The sample size was calculated using Cochrane's formula with confidence internal of four and confidence level of 95%. The exact sample size was calculated to be 584, however, 600 women were interviewed. Participants were randomly selected using a systematic sampling method in which women from every 5th household were included in the study. The participants were recipients of the community health worker program run by Swat Relief Initiative. The exclusion criteria included those who did not give consent, minors, and women who were mentally disabled or incapable of being interviewed due to lack of comprehension or ill health. Informed consent was taken from eligible participants.

The variables measured in the survey included diabetes, hypertension, renal disease, asthma, gestational diabetes and gestational hypertension. The rates of NCDs were determined based on self-reported diagnoses. We also analysed lifestyle by asking about dietary intake of fish, chicken, meat, eggs, fruits and vegetables on a weekly basis, and daily physical activity.

All questionnaires were filled by community health workers employed by SRI. The community health workers underwent a two days training during which they were taught how to fill questionnaires with the participants. Data was collected over the span of three months, from August to October 2015. Ethical approval was obtained by the President of Swat Relief Initiative. Statistical analysis was done using SPSS Version 25.0. Pearson correlation coefficients and two-tailed tests of significance analysis were used to find correlation between NCDs and lifestyle risk factors.

RESULTS

In total, there were 600 participants: 240 from Union Council (UC) Islampur and 360 from UC Saidu Sharif. The average BMI of the study population was 25.26 and the average parity was 3.28.

The prevalence of hypertension amongst the whole population investigated (N=590 due to missing data in 10 forms) was 17.9%. Notably, the prevalence of hypertension

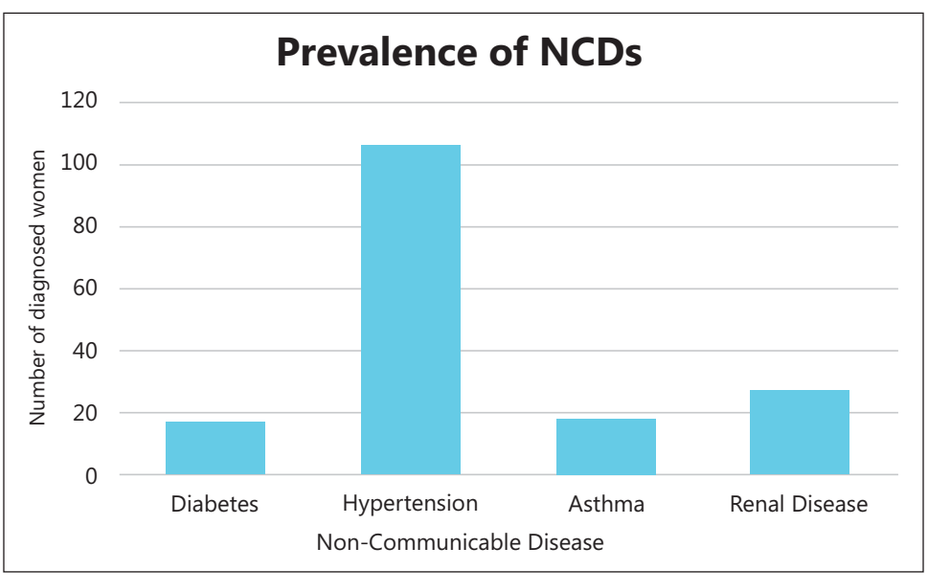
was highest in the sub-population of Kater of 53.8%. Other villages in UC Islampur with relatively high prevalence of hypertension include Kashar Khail (21.3%) and Sarkaricham (15.2%).

High BMI was calculated to be the greatest risk factor for presence of NCDs. There was a significant positive correlation between increased BMI and incidence of diabetes mellitus (p=0.009, correlation coefficient= 0.119). Higher BMI was also significantly associated with increased incidence of hypertension (p=0.000, correlation coefficient=0.290). Furthermore, we found that low rates of daily exercise, that were measured by the presence of moderate to vigorous activity for at least 150 minutes weekly, did not have a significant correlation with presence of NCDs (p=0.499, correlation coefficient= 0.28).

Table 1 - Body Mass Index (BMI) averages of Swat women divided by age and village

Village	Age division (years)				Total
	16-25	26-35	36-45	46+	
Akhoon Baba	24.00	22.70	26.50		23.96
Barkalay	26.79	24.52	24.59	24.73	25.12
Chail Shagai	24.30	26.78	27.74	28.05	26
Kashar Khail	27.04	24.98	20.65		25.66
Kater	29.72	23.88	20.15		24.66
MGC	25.43	24.58	25.40	27.90	25.14
Sarkaricham	24.02	25.02	26.28	34.30	24.97
Shaheen Abad	24.66	26.94	28.90	30.30	26.58

Figure 1 - Asthma and renal disease amongst Swat women



DISCUSSION

According to a meta-analysis done by Shah et al., the overall prevalence of hypertension in Pakistan in 2018 was estimated to be 26.34%.[12] Thus, compared to the national prevalence, rates of hypertension amongst the women of Swat are relatively lower (17.9%). Additionally, according to a study done by Naseem et al. on the prevalence of NCDs, the prevalence of hypertension in the semi-urban city of Islamabad was 38.7%, higher than the overall national prevalence.[13] This suggests that urbanization may be correlated with higher prevalence of hypertension. Similarly, the same trend was found in several other studies done in various countries such as Mali, China and Turkey.[14,15,16] The difference between prevalence of hypertension in rural and urban areas can be explained by the higher BMI averages, increased salt intake from greater consumption of processed foods, and a more sedentary lifestyle in urbanized regions.[12] Increasing BMI is known to have an independent correlation with risk of hypertension, as further supported by our findings. Another study conducted on the distribution of hypertension in Pakistan found that a one kg/cm increment in BMI was associated with a 0.56-0.74 mmHg increase in systolic blood pressure.[17] Additionally, hypertension is highlighted as the most prevalent NCD when compared to diabetes mellitus, stroke, dental problems and physical disabilities.[13]

In addition to hypertension, diabetes mellitus also heavily burdens Pakistan's healthcare facilities. According to the World Health Organization Diabetes country profile (2016), the total prevalence of diabetes in Pakistan is 9.8%, with men and women at 10.0% and 9.7% respectively.[18] This is a significant increase when compared to Shera's study in 2006, in which the prevalence of diabetes in urban versus rural areas was found to be 6.0% in men and 3.5% in women against 6.9% in men and 2.5% in women, respectively.[19] We found the prevalence of diabetes mellitus in Swat women to be approximately 3%, falling slightly above the prevalence of women in rural areas from Shera's study, but less than that of Pakistani women in 2016. Similarly, when compared to the global prevalence of diabetes which, according to a meta-analysis cited by the World Health Organization, was 8.5% in 2014,[20] the women of Swat have a lower occurrence. Several studies have shown a positive correlation between the prevalence of diabetes and urbanization due to increased family income, which leads to significant changes in food habits and physical activity.[21,22] In our study however, lack of physical activity was not seen to be a significant risk factor for diabetes mellitus. This may be because, although a large percentage of the participants reported no daily physical exercise, often the Pakistani village lifestyle incorporates strenuous physical activities into everyday life, and thus the villagers do not regard that separately as physical exercise. Additionally, however, it was found that in urbanized regions, improved education and a greater accessibility to medical care led to more diagnoses of diabetes, which may further contribute to the difference of prevalence of diabetes between rural and urban communities.[21] Thus, although our study found the prevalence rate of diabetes in Swat to be lower than the national prevalence, this may be because of various undiagnosed cases. This difference in prevalence requires further exploration.

Diabetes has a high economic burden at personal, societal and national levels. In low-income countries like Pakistan, 73% deaths due to complications arising from diabetes are under the age of 60.[23] This high mortality rate of working-age people has a substantial hindrance for economic development. Thus, despite the relatively low prevalence of diabetes in Swat, programs to increase daily exercise and educate the population on regular diagnostic testing are of utmost importance due to the high risk of complications.

We found the prevalence of kidney disease amongst the women of Swat to be 1%. It is difficult to compare our results with prevalence of kidney disease in the rest of Pakistan because the data is not available. However, due to high rates of poor socioeconomic factors, such as lack of dialysis units, restriction of existing units to urban centres, and low government funding of health insurance coverage, the incidence of end stage renal disease is likely to be greater in low-income countries.[24] Additionally, low-income countries tend to have problems with undernutrition and overnutrition, both of which are significant risk factors for kidney disease. Malnutrition predisposes young children to infection, leads to underweight mothers and low birth weight offsprings, which are all associated with an increased lifetime risk of chronic kidney disease, in mothers and in children. Meanwhile, overnutrition can lead to obesity and diabetes, and adverse outcomes in pregnancy, that may also increase the risk of chronic kidney disease.[25] In our findings, the prevalence of kidney disease significantly correlated with the presence of gestational diabetes ($p=0.000$, correlation coefficient= 0.175).

A major limitation of our study however was use of self-reported diagnoses. These may have introduced bias and resulted in systematic under- or over- reporting within the villages. Data shows that people with low levels of education tend to under-report symptoms.[26] Thus, our data

may have underestimated the true NCDs' rates amongst women in Swat, as a majority of them do not receive higher education. Another limitation was that we did not analyse the significance of predisposing risk factors of the NCDs due to time restraints.

CONCLUSION

Over the past decade the rising burden of NCDs has created major obstacles for development and growth because of poverty, economic instability and health inequity. Additionally, with increasing urbanization, it is expected that the prevalence of NCDs will rise in Swat Valley over the next several years. Thus, it is crucial that public health actions are taken to improve national education and access to disease management. Further investigations on the risk factors and prognostic factors are needed to devise sustainable interventions in order to reduce morbidity and mortality rates from NCDs.

REFERENCES

1. Daar AS, Singer PA, Persad DL, Pramming SK, Matthews DR, Beaglehole R, et al. Grand challenges in chronic non-communicable diseases. Nature. 2007.
2. Ghaffar A, Reddy KS, Singhi M. Burden of non-communicable diseases in South Asia: Authors' reply. BMJ. 2004.
3. Kankeu HT, Saksena P, Xu K, Evans DB. The financial burden from non-communicable diseases in low- and middle-income countries: A literature review. Health Research Policy and Systems. 2013.
4. Beaglehole R, Bonita R, Horton R, Adams C, Alleyne G, Asaria P, et al. Priority actions for the non-communicable disease crisis. Lancet. 2011;
5. Wasay M, Zaidi S, Khan M, Jooma R. Non communicable diseases in pakistan: Burden, Challenges and way forward for health care authorities. Journal of the Pakistan Medical Association. 2014;
6. Boutayeb A. The double burden of communicable and non-communicable diseases in developing countries. Transactions of the Royal Society of Tropical Medicine and Hygiene. 2006.
7. Pappas G, Akhtar T, Gergen PJ, Hadden WC, Khan AQ. Health status of the Pakistani population: A health profile and comparison with the United States. Am J Public Health. 2001;
8. Bank TW, Asia S, Development, Human, Health N, Population. NCDs Policy Brief - Pakistan. 2011;(February):1–5.
9. Nishtar S, Bile KM, Ahmed A, Amjad S, Iqbal A. Integrated population-based surveillance of noncommunicable diseases: The Pakistan model. Am J Prev Med. 2005;
10. Khan MN, Chiumento A, Dherani M, Bristow K, Sikander S, Rahman A. Psychological distress and its associations with past events in pregnant women affected by armed conflict in Swat, Pakistan: A cross sectional study. Confl Health. 2015;
11. Ud Din I, Mumtaz Z, Ataullahjan A. How the Taliban undermined community healthcare in Swat, Pakistan. BMJ. 2012;
12. Shah N, Shah Q, Shah AJ. The burden and high prevalence of hypertension in Pakistani adolescents: A meta-analysis of the published studies. Archives of Public Health. 2018.
13. Naseem S, Khattak UK, Ghazanfar H, Irfan A. Prevalence of non-communicable diseases and their risk factors at a semi-urban community, Pakistan. Pan Afr Med J. 2016;
14. Bâ HO, Camara Y, Menta I, Sangaré I, Sidibé N, Diall IB, et al. Hypertension and Associated Factors in Rural and Urban Areas Mali: Data from the STEP 2013 Survey. Int J Hypertens. 2018;
15. Wang J, Sun W, Wells GA, Li Z, Li T, Wu J, et al. Differences in prevalence of hypertension and associated risk factors in urban and rural residents of the Northeastern region of the people's republic of China: A cross-sectional study. PLoS One. 2018;
16. Daştan İ. Urban and rural differences in hypertension risk factors in Turkey. Anatol J Cardiol. 2017;
17. Aziz KU, Faruqui AMA, Manolio T, Davis CE, Abenathy J. Blood pressure and hypertension distribution in a lower middle class urban community in Pakistan. J Pak Med Assoc. 2005;
18. WHO. Pakistan - Diabetes. 2016;2016. Available from: http://www.who.int/diabetes/country-profiles/pak_en.pdf?ua=1
19. Shera AS, Jawad F, Maqsood A. Prevalence of diabetes in Pakistan. Diabetes Res Clin Pract. 2007;
20. Sarwar N, Gao P, Kondapally Seshasai SR, Gobin R, Kaptoge S, Di Angelantonio E, et al. Diabetes mellitus, fasting blood glucose concentration, and risk of

vascular disease: A collaborative meta-analysis of 102 prospective studies. Lancet. 2010;

21. Ramachandran A, Snehalatha C, Baskar ADS, Mary S, Sathish Kumar CK, Selvam S, et al. Temporal changes in prevalence of diabetes and impaired glucose tolerance associated with lifestyle transition occurring in the rural population in India. Diabetologia. 2004;
22. Cheema A, Adeloye D, Sidhu S, Sridhar D, Chan KY. Urbanization and prevalence of type 2 diabetes in Southern Asia: A systematic analysis. J Glob Health. 2014;
23. Ogurtsova K, da Rocha Fernandes JD, Huang Y, Linnenkamp U, Guariguata L, Cho NH, et al. IDF Diabetes Atlas: Global estimates for the prevalence of diabetes for 2015 and 2040. Diabetes Res Clin Pract. 2017;
24. Schieppati A, Remuzzi G. Chronic renal diseases as a public health problem: Epidemiology, social, and economic implications. Kidney Int Suppl. 2005;
25. Luyckx VA, Tonelli M, Stanifer JW. The global burden of kidney disease and the sustainable development goals. Bull World Health Organ. 2018;
26. Mackenbach JP, Looman CWN, Van Der Meer JBW. Differences in the misreporting of chronic conditions, by level of education: The effect on inequalities in prevalence rates. Am J Public Health. 1996;