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Original Article

Incidence and Their Associated Factors of Non-Communicable Diseases Among Khyber Pakhtunkhwa Population

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ABSTRACT

World Health Organization proposes implementing the WHO STEP smart strategy for tracking, to continuously monitoring noncommunicable diseases (NCDs) and associated risk factors (STEPS). **Objective:** To analyze the prevalence and contributing factors of NCD risk factors in Pakistan, a country with a low income where NCDs are responsible for 66 percent (or two-thirds) of fatalities annually. **Methods:** Total 675 eligible participants, ages 15 to 60, were selected by a multistage sampling approach from February 2020 and May 2021 for STEPS survey (version of instrument 3.2). Assessment of behavioral and physiological risk variables was part of the data collection process. SPSS version 25 was used for data analysis. **Results:** Intake of lesser than five portions of vegetables and fruits every day may be the greatest common risk factor. Of all participants, 341(50.51%) were smoking currently, 513(76%) were not physically active. A total of 251 (37.18%) individuals have elevated blood pressure whilst 245 (36.29%) individuals are affected by sugar. The cholesterol level is high in 215 (31.85%) participants out of 675. Each individual had an average of two risk factors for NCDs (2.04, 95percent [Confidence interval]: 2.02-2.08). **Conclusions**: Numerous risk factors for NCDs are present in a significant section of the Pakistani community. With the help of a multi-sectoral national coordination system, this observed data must be employed to promote and track specific NCD management and prevention programs for cities across Pakistan.

INTRODUCTION

The majority of diseases in the world are caused by NCDs (non-communicable diseases) [1]. NCDs account for 71 percent of all fatalities worldwide, estimated by World Health Organization (WHO) with low- and middle-income nations (LMICs) accounting for 85 percent of NCD-related premature deaths [2]. The primary root causes of NCDs have been recognized as behavioral risk aspects, which include smoking, alcohol consumption, lack of physical

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activity and unhealthy eating's well as biological risk factors, together with elevated blood glucose, blood pressure (BP)and cholesterol levels, like obesity and overweight [3]. Additionally, it has been shown that clustering, or the coexistence of several risk factors in one person, increases the likelihood of NCDs progressing [3-5]. The number of fatalities from NCDs increased by 8% between 2014 and 2016, according to figures from Pakistan, a country with a lower middle income. In 2017, 182,751 deaths, two third (66%) reported in Pakistan were attributable to NCDs [1]. The rising burden of non-communicable diseases, including the higher incidence of diabetes, COPD, coronary artery disease and chronic kidney disease is also shown in a 2019 in Pakistan based on population worldwide cross-sectional survey. This could present a significant challenge to the country's health systems in the upcoming years. In addition to these illnesses, it is known that a considerable number (8.5%) of Pakistani's elderly population suffers from diabetes mellitus [6]. In Pakistan, 2013 STEPS survey also confirmed significant incidence of a number of risk factors, like smoking (19%), low fruit and vegetable intake (99%), abnormal lipid levels (23%) and high blood pressure (26 %) [7]. Similarly, a high percentage of Pakistani people (19.9%) were discovered to have hypertension, and Twenty-one percent of them (21.4%) were obese or overweight [8]. The Pakistani government approved a Multisectoral Action Plan for the Prevention and Control of non-diseases in 2014 to fight NCDs at the statistical level [9]. A quarterly NCD STEPS study was one of the primary initiatives selected and featured in the Multisectoral action plan to monitor progress on NCD's prevention and management across the nation. Pakistan requires information on NCD's risk factors at the provincial state due to the recent change to a federal system in order to simplify decision-making in the medical sector. This research was aimed to evaluate the epidemiological spread and indicators of biological risk factors (raised blood sugar, raised BP, overweight/obesity and cholesterol levels) as well as behavioral risk factors (tobacco, salt consumption, physical activity and diet) linked with significant NCDs in Peshawar of Khyber Pakhtunkhwa, Pakistan.

METHODS

Attached to the boarder to China and India in Southern Asia is the Pakistan. Strategies for sampling and study development, implementing the WHO STEP wise strategy to surveillance (STEPS), a comprehensive surveillance method was used for information on NCDs. It was a cross sectional survey of NCD risk variables that was globally relevant. Between February and May 2019, information for the survey was obtained from the population of eligible adults (those individuals whose are older than 19 years according to WHO) who ranged in age from 15 to 60. In order for survey results to be generalized to the cities scale, sampling for the study considered Pakistan existing federal system. 675 suitable individuals from Peshawar of Pakistan were chosen using multistage cluster sampling technique. Compared to earlier STEPS studies, the sampling procedure was more thorough and associated with smoking, inadequate fruit/vegetable intake, and inappropriate physical exercise are all taken into account as behavioral factors in this research. Likewise, being overweight and having high blood pressure are considered physiological factors. Elevated blood cholesterol and blood sugar levels are regarded as one biological component. The study also inquired about programs and policies for cigarette use. Additionally, it queried on musculoskeletal discomfort, aggression, and injuries. Additionally, the amount of salt consumed was calculated in this round of the STEPs questionnaire through spot urine sampling, and the WHO recommended Cardio Check, PA was used to test sugar levels and cholesterol level concentrations. For nominal or ordinal data association chi square test was used whilst for continuous data pearson correlation was used. The method of incidence of the NCD is the point of care testing like for the cardiovascular disease is ECG and obesity is BMI. Statistically data was analyzed by IBM SPSS version 25. A p value less than 0.05 was considered statistically significant.

RESULTS

A total of 675 individuals were included in the survey, the included participants have some sort of diseases. Three hundred (44.4%) of the participants were female, whilst the 375 (55.6%) were male. Volunteers made up 164 (24.27%) of the population between the ages of 15 and 30, 256 (38.30%) between the ages of 31 and 45, and 250 (37.32%) between the ages of 46 and 60. About 169 (25%) worked as self-job, and about 313 (46.30%) had just finished their primary education. Approximately 425 (63%) of the participants were married as shown in the Table 1. Among all the 675 individuals, 341 (50.51%) were smokers. The majority of participants 83 (24.37%) reported currently smoking, with men 189 (55.48%) and those in their 45th to 60th year of life 127 (37.32%). Additionally, those who were less educated had a greater prevalence of current smoking (46 %). Among the least wealthy (poorest) quintiles 102 (30%) were smokers. Contrarily, persons who were employed 82 (24 %) and married 123 (36%) had increased tobacco consumption (Table 1).

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Participants Characteristics	Details	Total	Smoker (341, 50.51%)		Less intake of fruit/ vegetables (403, 59.70%)		Sugar (245, 36 .29%)		Exercise (513, 76%)		Blood Pressure (251, 37.18%)		Cholesterol (215, 31. 85%)	
Age Group	15-30	(24.31%)	(24.37%)	P=0.001	(26.37%)	P=0.739	(23.37%)	P=0.001	(22.37%)	P=0.001	(20.37%)	P=0.001	(20.37%)	P=0.001
	31-45	(38.26%)	(38.30%)		(36.30%)		(39.30%)		(36.30%)		(341.30%)		(35.30%)	
	46-60	2095 (37.45%)	(37.32%)		(37.32%)		(37.32%)		(41.32%)		(38.32%)		(44.32%)	
Gender	Female	(44.52%)	(42.12%)	P=0.001	(38.12%)	P=0.403	(41.12%)	P=0.219	(52.12%)	P=0.1	(41.12%)	P=0.001	(39.12%)	P=0.001
	Male	(55.48%)	57.78%		61.78%		58.78%		47.78%		58.78%		60.78%	
Education Level	Primary	(46.30%)	(46%)	P=0.001	(47%)	P=0.001	(43%)	P=0.469	(46%)	P=0.232	(44%)	P=0.001	(41%)	P=0.001
	Secondary	(24.61%)	(22.5%)		(21.5%)		(24.5%)		(22.5%)		(23.5%)		(24.5%)	
	Higher	(11.81%)	(10.25%)		(11.25%)		(11.25%)		(10.25%)		(10.25%)		(12.25%)	
	None	(21.25%)	(21.22%)		(20.22%)		(21.22%)		(21.22%)		(22.22%)		(22.22%)	
Financial Status	Richest	(28%)	(21%)		(19%)		(20%)		(21%)		(23%)		(22%)	
	Rich	(12%)	(19%)	P=0.001	(20%)	P=0.5	(19%)	P=0.001	(17%)	P=0.001	(15%)	P=0.02	(18%)	P=0.02
	Upper Middle Class	(18%)	(17%)		(16%)		(17%)		(18%)		(20%)		(17%)	
	Lower Middle Class	(19%)	(13%)		(15%)		(13%)		(14%)		(12%)		(14%)	
	Poor	(19%)	(30%)		(33%)		(31%)		(30%)		(30%)		(29%)	
Job Status	Student	(12%)	(15%)		(18%)		(17%)		(20%)		(20%)		(14%)	
	Employed	(31%)	(24%)	P=0.001	(22%)	P=0.03	(21%)	P=0.002	(20%)	P=0.001	(22%)	P=0.001	(21%)	P=0.001
	Unemployed	(17%)	(26%)		(28%)		(29%)		(25%)		(27%)		(27%)	
	Self-Job	(25%)	(23%)		(20%)		(21%)		(23%)		(20%)		(24%)	
	Other	(15%)	(12%)		(12%)		(12%)		(12%)		(11%)		(14%)	
Marital Status	Yes	(63%)	(36%)	P=0.001	(35%)	P=0.8	(31%)	P=0.001	(33%)	P=0.001	(30%)	P=0.001	(29%)	P=0.001
	No	(27%)	(24%)		(23%)		(28%)		(25%)		(25%)		(22%)	
	Divorced	(10%)	(40%)		(42%)		(41%)		(42%)		(45%)		(51%)	

Table 1: Distribution of NCD risk factors among socio-demographic characteristics

The vegetable and fruit use are less. 403 (59.70%) out of all participants did not take the necessary fruit. Participants' sex and education's degree were significantly linked to smoking and high blood pressure. Patients between the ages of 30-44 and 45-60 shown to have an elevated chance of being overweight and having high blood cholesterol, blood sugar, and blood pressure. Participants in greatest wealth percentile also had increased risks of being overweight, insufficiently active, and having elevated blood cholesterol. Each individual had an average of two risk factors for NCDs (2.04, 95 percent [Confidence interval]: 2.02-2.08)(Table 2).

Participants Characteristics	Details	ARR with CI=95%	Mean of ERF with 95% CI
Age Group	15-30	Ref	1.7 (1.67-1.75)
	31-45	1.06 (1.03-1.10)	2.05 (1.90-2.20)
	46-60	11.205 (1.13-1.28)[1]	1.86 (1.81-1.92)
Gender	Female	Ref	1.85 (1.8-1.95)
	Male	1.15 (1.03-1.28)	1.87 (1.30-2.45)
Education Level	Primary	11.2 (0.90-1.5)	2.10 (2.00-2.20)
	Secondary	0.97 (0.92-1.05)	2.1(2.01-2.10)
	Higher	0.85 (0.7-1)[1]	1.97(1.80-2.07)
	None	Ref	2.11(2.01-2.22)
Financial Status	Richest	1.15 (1-1.30)	2.13(1.97-2.12)
	Rich	11.1 (1-1.2)	2.51(2.01-2.17)
	Upper Middle Class	11.03 (0.9-1.20)	2.03(1.93-2.11)
	Lower Middle Class	0.99 (0.96-1.09)	1.94(1.87-2.02)
	Poor	Ref	2.00(1.95-2.05)
Job Status	Student	0.8 (0.73-0.92)[1]	2.5(2.00-2.10)
	Employed	Ref	2.12(2.07-2.24)
	Unemployed	0.9 (0.78-1.03)	2.08(1.95-2.21)
	Self-Job	1.05 (1-1.10)	1.90(1.81-2.00)
	Other	1.03 (0.87-1.20)	2.36(2.10-2.63)
Marital Status	Yes	0.93 (0.84-1.03)	2.06(2.01-2.12)
	No	Ref	2.105(2.02-2.19)
	Divorced etc	0.99 (0.88-1.12)	2.23 (2.15-2.32)

AAR; Adjusted Relative Risk,
ERF; Existing Risk Factors
1; Significant with a p-value less than 0.05

Table 2: Clustering of NCD risk factors and its multivariable analysis

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DISCUSSION

The rate of prevalence of the current smoking (24%) has remained mostly unchanged from the STEPS study's previous poll (19%), and these results are comparable to those of GATS 2017study of Bangladesh [9-11]. The total tobacco control law that was adopted in 2011 may have contributed to the comparatively consistent smoking level that has been seen since 2013 [12]. In addition, rising literacy rates, greater public awareness of the negative health effects of smoking, effective application and surveillance and supervision of tobacco control law provisions like visual health warnings, and tobacco company's litigation could have all been significant factors in maintaining the status quo or reversing the upward pattern in cigarette consumption. Research has shown that a number of variables, such as tobacco industry it's possible that the problem stems from marketing campaigns that portray smoking as more manly and from cultural acceptability of male smoking more than female smoking [13, 14]. According to the findings of the vegetable and fruit consumption, there has been a little increase intake since the STEPS survey's first round. No considerable correlation between consuming the required amounts of fruit and vegetables was discovered by multivariable analysis. Comparison to the observations of an earlier study, this survey indicated that individuals with higher literacy rates (greater than higher education level) were very much able to intake necessary quantities of vegetable and fruits when comparing to lesser groups which are educated [15]. The overall prevalence of an inadequate vegetables and fruits intake in the population in Pakistani's might be due to a number of reasons, including restricted availability, accessibility, and price of fruits and veggies as well as societal attitudes on their use. Additionally, people might not be adequately informed about the requirement of eating enough vegetables and fruit and the negative effects on health if they don't. Qualitative research might be used to better investigate this problem and offer more understanding into the Pakistanis population's inadequate consumption of fruits and vegetables. The results of this research may also be helpful in developing contextualized interventions meant to encourage appropriate consumption of fruits and vegetables. Physical inactivity is reported to be uncommon in the present study, which is consistent with findings from earlier national and international surveys [16, 17]. Lack of physical activity has increased since the 2013 STEPS study, but the highest prevalence of inactivity was observed to be among those in the top quintile of income. This could be because of the inactive lifestyles adopted by this class of individuals as a result of their professions and easier accessibility to transportation, which reduces the amount of time, spent walking each day. More than one-fourth of Pakistani people involved in the current analysis had increased blood pressure, which is comparable to results from the findings from the last survey of STEPS but a little more than results from NDHS survey conducted in 2016 i.e., 19.9 % [18]. So, this discrepancy might be the result of difference in methodology, or different sampling designs. The results of combined surveys show that high blood pressure is becoming more prevalent in Pakistan and suggest for adequate measures to avoid and manage this issue. Comparable to the 2016 Pakistan Demographic and Health Survey (PDHS) and prior STEPS poll, we observed that perhaps the prevalence of elevated blood pressure increased with age. Gender disparity was also observed when we talk about the prevalence of raised/elevated blood pressure. It was also discovered that a sex difference is also plays role in the prevalence of elevated blood pressure, in accordance to the results of earlier surveys. Raised blood pressure between the sexes may result from combined behavioral and biological causes [19]. Like sexual hormones, genetics, as well as other biological aspects of sex that are thought to prevent from elevated BP in females [19, 20]. However, a correlation between education level and elevated blood pressure was discovered, with a decreased prevalence within people who had higher education. This conclusion is in line with earlier STEPS and NDHS results. People with higher levels of education are more able to have access to data about the severe Hypertension and its effects, which may eventually encourage them to take precautionary steps [21]. According to WHO worldwide findings, 8 % of South Asians had elevated blood glucose levels, which are comparable to the figures from this study (6 %). The frequency of elevated blood glucose has increased from 3% to 6%, that should also be evaluated in light of the various methods used to assess blood sugar levels. The dry technique was applied through this stage of the study as compared to previous stages, which employed the wet approach to assess blood sugar levels. Similar to earlier studies conducted the prevalence of increased blood sugar levels increases as age increases. Age-related variations in obesity, physical inactivity, medication, comorbid illnesses, and insulin secretion abnormalities all have an impact on blood glucose levels [22]. In comparison to earlier surveys, when the rate of increased cholesterol level was determined to be 22.7%, the present study's finding of 11% is comparatively lower. This could be because the assessment methods were different. Just like 2013 report, we noticed that the prevalence of high cholesterol increased with age group, just as it did with high blood pressure. An age-dependent increase in level of blood cholesterol could be caused by a causative element related

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to the decrease in growth hormone synthesis with advancing age [23]. According to this, our findings that females are more likely to have elevated blood cholesterol levels might be explained by ageing and variations in the female sex hormone, estrogen. According to present research, average of two risk variables for NCDs have been observed in people of Pakistan. Along with highest wealth quintile, older individuals, and men having a higher average number of NCD risk variables. Indicating that as people grow older, risk variables tend to cluster more together, same conclusion that has been confirmed by different studies. It is anticipated that these issues will get worse in the upcoming years because Pakistan has had a substantial decrease in average lifespan and mean age population. Males tend to gather risk variables more than females, which might be a result of their risk-taking tendencies and unproductive lifestyles, including smoking, drinking, and lack of exercise. We also observed in a similar survey conducted in Bhutan clustering of NCD risk variable's prevalence was greater between wealthiest people. The clumping of NCD risk markers in the wealthiest group might be connected to adopting an unhealthy lifestyle, identical to particular risk variables like obesity/overweight and high blood pressure [23].

CONLCUSIONS

The significant majority of Pakistanis people had two or more NCD possible risks according to the results of this study. Prevalence of majority of the risk factors has grown since the 2013 STEPS study, which highlights a demand for efficient strategies to address this. Preventing or reducing the impact of controllable risk factors must be one of the main ways to lessen an impact of risk factors for NCD. This approach should also be more economical than treating NCD patients with curative therapies. Therefore, in order to establish a supportive environment for change in behavior, interventions targeting changeable risk factors need combined effort from several domains. The present Pakistani federal structure, where municipality is in charge of the healthcare system as well as other areas like education, infrastructure development, and the environment, can allow for coordinated efforts from various fields, that may be successful in lowering a workload of non-communicable diseases risk variables in state.

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