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Research Article

### SCREENING FOR DIABETES AND HYPERTENSION IN WORKPLACE ENVIRONMENTS

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**Abstract:**

**Background:** Non communicable diseases are major cause of morbidity and mortality worldwide. According to WHO, among NCDs, cardiovascular disease accounts for the highest number of deaths (17 million), followed by cancer (7.6 million), respiratory diseases (4.2 million), and diabetes (1.3 million). (1) These NCDs share common behavioral risk factors, namely, tobacco use, excessive use of alcohol, unhealthy diet, and physical inactivity, which, if eliminated, could prevent up to 80% of heart disease, stroke, and type 2 Diabetes, and more than one-third of cancers (2). Therefore, effective primary prevention methods are required for early detection and management of such cases.

**Objectives:** To screen general public for non-communicable diseases like diabetes and hypertension

To obtaining data regarding prevalence of NCDs in high risk groups (like the people working in Panorama Shopping Centre),

To assess the prevalence of factors like tobacco consumption and sedentary lifestyle in working class

To counsel general public on the pathology of diabetes and hypertension, and to reiterate the importance of healthy life style for prevention and control of NCDs.

**Study design:** Descriptive epidemiological study.

**Study Setting:** Panorama shopping centre, Lahore.

**Study Duration:** 1 month (April 2017 – May 2017).

**Respondents and Methods:** A screening form was devised using the screening guidelines for Hypertension and diabetes by American diabetes association (3) and U.S preventive task force. Blood Sugar random was used for diabetes and office blood pressure measuring method using manual sphygmomanometer was used for hypertension screening. Data was collected and then analyzed using SPSS software.

**Results:** A total of 270 people were screened for Hypertension and Diabetes, 5 of which were females. Approximately 82% of the participants were working at Panorama Center in various capacities. Participants were categorized into 4 age groups, with majority of them falling between 20-39 years of age. The ages ranged from 16-84 years with a mean age of 38.85. Participants less than 16 years of age were excluded as the guidelines by USPTF approve screening in age more than 18 years of age (4). 14 cases (5.2%) were screened positive for Diabetes and 27 (10%) were screened positive for hypertension.

**Conclusion:** The absence of population-wide screening in Pakistan leads to lack of awareness of general public about the importance of screening. There is a dire need to generate awareness regarding the various non-communicable diseases, which pose a significant burden on the health systems. Considering the significance of risk factors for development of diabetes and hypertension and the fact that control of risk factors supplemented with early diagnosis can significantly reduce the risk of disease development, it is recommended that special emphasis must be given to spread awareness about disease prevention and early screening.

**Keywords:** Screening, Diabetes, Hypertension, Non-communicable disease

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**INTRODUCTION:**

The World Health Organization (WHO) defines health as a "state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." Non-communicable diseases are major burden of health care delivery system in today world. In Pakistan, non-communicable diseases (NCD) are among the top ten causes of mortality and morbidity, contributing to about 46% of all deaths.

Pakistan ranks seventh among the global top ten countries with highest number of people with diabetes (IDF 2006). National Health Survey of Pakistan (NHSP) reported that 18% of adults >15 years and 33% of adults >45years of age suffered from hypertension (5). Similar results were also shown by other surveys which showed prevalence of hypertension to be around 25.6% in screened adult population (6). In Pakistan there is a lack of adequate data on the NCDs disease burden as well as the risk factors involved. The significant burden of non-communicable diseases has a profound effect on disability trends. Early screening for NCDs, control of risk factors and effective interventions can lead to prevention of NCDs.

**Objectives**

The key objectives for the camp were: generating awareness regarding prioritized NCD's (Hypertension, Diabetes) and Tobacco Cessation in public, an early detection and assessment of NCDs cases, obtaining data regarding prevalence of NCDs in high risk groups (like the people working in Panorama Shopping Centre), provision of free screening services to public and counselling them on the importance of healthy life style for prevention and control of NCDs.

**MATERIALS AND METHODOLOGY:-****Study Design:- Descriptive Epidemiological Study**

**Study Area:-** This research was conducted in Panorama shopping centre, Lahore, Pakistan.

**Clinical Criteria for Screening:**

- All participants with previous history of hypertension, diabetes were labelled as **Known Cases**.
- For screening, the following guidelines were followed:
  - i. **Every person with RBG > 140 mg/dl** – labelled as Screened Positive for Diabetes Mellitus.
  - ii. **Every Person with BP reading > 140/90** – labelled as Screened Positive for Hypertension.

All cases screened positive for one or more non-communicable disease/s were counselled and then referred to nearby health facilities for follow-up and further assessment. All known cases with poor control of disease were also counselled on the importance of controlling their disease/s to generate awareness regarding the control of Non-Communicable Diseases.

**Ethical Clearance:-**

All the subjects were explained the purpose and process of the study. They were explained the benefits of study assurance were given to protect life, health, privacy and dignity of human study subject.

**Data Collection Methods:**

Questionnaire method

**Instruments:-**

Data was collected through a structured questionnaire.

**Sample size:** 270 participants completed the questionnaire which was designed to assess their lifestyle, tobacco consumption and physical activity. Participants were also screened for diabetes and hypertension. The questionnaire comprised of close and open ended questions.

**Data Management and Analysis Plan:-**

Epi info and SPSS computer software was used for entry, compilation and analysis of data.

**DISCUSSION:**

This study provides preliminary but significant information about screening for diabetes and hypertension in workplace environments and is the first study of this kind to be undertaken in Panorama center, Lahore. Panorama Centre is a congested mall where shops have a small area and no proper system for ventilation or natural light for the shops is there. Around 1500 to 2000 people work in the mall in different capacities ranging from shop owners, salesmen, street vendors, security staff and genital staff. The work hours of these people are usually quite long. Also, the people belonging to this community have a minimal education and they have a sedentary life style. The nature and environment of work, lifestyle and lack of education expose this community to NCDs and make them a high-risk group. Keeping in view these factors, Panorama Centre was considered to be a suitable spot for this study. The relatively small sample size (270) is a limitation to generalize our results to the community, but nevertheless we feel that important information is gathered from this subset, which is fairly typical

regarding the type of patients we come across.

Tables 1 and 2 below shows a brief overview of the characteristics of the sample.

**Table 1**

N= 270		
<b>Age Group</b>	<b>Frequency</b>	<b>Percentage</b>
NA	6	2.2%
<20	9	3.3%
20-39	142	52.6%
40-59	90	33.3%
>60	23	8.5%
Total	270	100%
<b>Occupation</b>	<b>Frequency</b>	<b>Percentage</b>
Shopkeeper	101	37.4
Salesman	121	44.8
Govt. Employee	5	1.9
Unemployed	11	4.1
Other	32	11.9
Total	270	100.0
<b>Gender</b>	<b>Frequency</b>	<b>Percentage</b>
Males	265	98.1
Females	5	1.9
Total	270	100.0
<b>Random Blood Sugar Level</b>	<b>Frequency</b>	<b>Percentage</b>
<140 Normal	219	81.1
140-199 Pre-Diabetes	19	7.0
>200 Diabetes	32	11.9
Total	270	100.0
<b>Blood Pressure Range</b>	<b>Frequency</b>	<b>Percentage</b>
< 140/90 Normal	206	76.3
140-149/90-99 Mild Hypertension	37	13.7
150-159/100-109 Moderate Hypertension	10	3.7
> 160/100 Severe Hypertension	17	6.3
Total	270	100.0
<b>Smoking Status</b>	<b>Frequency</b>	<b>Percent</b>
Smokers	93	34.4
Non-smokers	177	65.6
Total	270	100.0
<b>Tobacco consumption (Naswaar, Paan etc.)</b>	<b>Frequency</b>	<b>Percent</b>
Tobacco consumers	37	13.7
Non-consumers	233	86.3
Total	270	100.0

Table 2: Mean Values of BP, RBG, BMI in participants

No. of Participants	270
Mean Age	38.85
Mean Height	5'7"
Mean Weight (kg)	74.9
Mean BMI	25.9
Mean Random Blood Glucose	134 mg/dl
Mean Blood Pressure	128/86 mm Hg

Table 3: Number of cases screened for Diabetes, Hypertension and Asthma &amp; COPD

N = 270	Known Cases		Screened positive cases	
	Frequency	Percentage	Frequency	Percentage
Diabetes	50	18.5	14	5.2
Hypertension	70	25.9	27	10

According to our screening report, 25.9% of total screened population showed co morbid hypertension. This is in accordance with other surveys which showed prevalence of hypertension to be around 25.6% in screened adult population (6).

Table 4: Blood Pressure Levels in Known Hypertensive Patients

		BP range					Total
		< 140/90 Normal	140-149/90-99 Hypertension	Mild	150-159/100-109 Moderate Hypertension	>160/100 Severe Hypertension	
HTN	Y	33	17		9	11	70

Of the 70 participants with co-morbid hypertension, 33 (47%) had BP <140/90. 37 (52.8%) of them had un-controlled hypertension with 11 participants suffering from severe hypertension. Non-compliance to drugs was noted as a major factor impairing the control of disease. This raises an alarm for the health policies as Hypertension is considered a major risk factor for development of heart failure, kidney failure, and stroke and Vascular diseases. The predictors of hypertension include increasing age, ethnicity, female gender, uncontrolled diabetes mellitus, obesity, sedentary life style, smoking, and excessive salt and alcohol intake. (7). Although Asians have high blood pressure values compared to Hispanics and females show high values compared to men (8), in our study ethnicity and gender are almost a constant factor as screening participants belonged to a fixed ethnic group.

- BMI is an important risk for development of diabetes and hypertension. Participants were grouped according to standardized BMI Ranges (9) with most of the participants falling in the overweight zone. This is consistent with cross sectional study by Ahmad et al (10) in Multan. Considering the fact that participants belonged to variety of social and economic back grounds along with the other small scale studies, we can assume that majority of Pakistani population falls in overweight class. But considering the limitations of such study designs, a more randomized large scale study is needed to confirm this finding.
- Sedentary life style is associated with development of insulin resistance, atherosclerosis and thickening of arteries so it contributes as risk factor for both diabetes and hypertension. Aziz KU (11) reported that physical inactivity is an important risk

factor in Pakistani population and it is an undervalued factor for the prevention of non-communicable diseases.

- Ninety-six participants (35.5%) engaged in some sort of physical activity whereas 174 (64.4%) had completely sedentary lifestyle. Sedentary life style is associated with development of insulin resistance, atherosclerosis and thickening of arteries so it contributes as risk factor for both diabetes and hypertension. Aziz KU (11) reported that physical inactivity is an important risk factor in Pakistani population and it is an undervalued factor for the prevention of non-communicable diseases.

- It appears that the lack of physical activity was not restricted to a particular educational background but participants from diverse educational backgrounds reported lack of adequate physical activities in their lives. The long and odd working hours seem to be an important contributing factor disabling the workers at Panorama Center from engaging in healthy physical activities.

But when Level of physical activity is correlated with qualification under the null hypothesis that these two are not related in our study, the p value of ( $>0.05$ ) is obtained using a chi square and thus we are unable to show that these two factors are not significantly associated. Further studies are needed to work on this factor to establish a statistically significant relation or lack of relation between these two factors.

**Table 5: Cross-Tabulation of Qualification with Physical Activity**

		Physical Activity				Total
		Active	Mildly Active	Moderately Active	Inactive	
Qualification	Illiterate	4	2	4	13	23
	Under Matric	13	3	13	52	81
	Matric	4	5	28	67	104
	Intermediate	2	3	4	15	24
	Graduation	3	1	4	21	29
	Masters	1	1	1	6	9
Total		27	15	54	174	270

- Participants were inquired about their consumption of cigarettes. Ex-smokers and Passive smoking status was not considered even when it is a important factor in causing smoking related diseases especially lung cancers.

- 34.4% of participants were Cigarette smokers, as mentioned in Table 1 This is consistent with results shown by Rashid A (12) which stated that 36% of young adult Pakistani population is involved in cigarette smoking. Whereas these results are higher than cross sectional survey done by Sara et al (6) which showed 26.6% of screened hypertensive people to have positive smoking status. As smoking is a significant cause of NCDs and prevention of smoking removes a high risk of their occurrence, health care policies should be devised to manage this factor.

As both smoking and impaired glucose control are important risk factors for alteration in development of hypertension, so keeping smoking constant, we

analyzed the correlation of impaired blood glucose with range of blood pressure values.

Sixty-nine out of 93 (74%) Smokers had normal RBG and Blood Pressure values. Fourteen (15%) had isolated deranged values of blood pressure and 14 had deranged values of Random Blood Glucose. Four (4%) out of 93 had abnormally elevated Blood Glucose levels and Blood pressure readings. Our findings are somehow different from the study done by Almas et al (14) which showed that only 20.6% of people with hypertension has smoking status positive and 38% people had co-existent diabetes. This difference can be most probably ascribed to difference in the target population as majority of our screening population fall in the young age window. So if standardized for the age window addressed, it is expected that our results will fall in correlation with that of other studies.

- . So with the smoking factor present, people are prone to develop altered control of blood sugar and blood pressure and this is a statistically significant association with p value  $<0.05$ .

**Table 8: Blood Pressure and Random Blood Glucose Levels in Smokers**

N=93		RBG Range			Total
		<140 Normal	140-199	>200	
BP Range	< 140/90 Normal	69	7	3	79
	140-149/90-99 Mild Hypertension	7	0	2	9
	>160/100 Severe Hypertension	3	0	2	5
Total		79	7	7	93

**CONCLUSION:**

Considering the significance of risk factors for development of diabetes and hypertension and the fact that control of risk factors supplemented with early diagnosis can significantly reduce the risk of disease development, it is recommended that special emphasis must be given to spread awareness about disease prevention and early screening.

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