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An Analytical Survey on Cardiovascular Activity Among the Persons Living in a Passive Smoking Environment

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Abstract

Children could be particularly susceptible to the negative impacts of passive smoking on their cardiovascular health because of their underdeveloped physiological functions. Over 30% of coronary heart disease (CHD) mortality is attributable to either active smoking or exposure to passive smoke. While the specific causes of cardiovascular disease remain unknown, for a long time, people have understood that smoking has an impact that is harmful to the function of the endothelium. The purpose of this research was to report on the levels of knowledge among never-smokers about the dangers of secondhand smoke. A total of 50 participants were surveyed using a Likert scale and SPSS for this research. We used a standardized questionnaire to collect information on demographics, location, risk factors for cardiovascular disease (CVD), lifestyle, and physical activity levels among those exposed to secondhand smoke. Using the mentioned Scales and correlation analysis it was found that sleep quality is strongly positively associated with hypertension ($r = 0.90$ $p < 0.005$), and physical activity swimming is strongly positively associated with ($r = 0.87$, $p < 0.005$) is strongly positively associated. The author concluded that respondents were most knowledgeable about the risks of passive smoking to lung cancer, asthma attacks in adults and children, and preterm births in the obstetric population.

Keywords

Cardiovascular Disease, Diabetes, Likert Scale, Passive Smoking, SPSS

Imprint

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1. INTRODUCTION

Increases in both the prevalence and incidence of heart failure (HF) have been attributed to the significant global expansion in the number of elderly people. Heart failure is a disorder that develops with time and is chronic that is linked with high morbidity and death rates as well as significant medical expenses as a result of repeated readmission rates to the hospital [1]. Furthermore, HF is still linked to severe outcomes and poor prognosis, despite advances in medical and technology treatment. As a result, preventing HF in community populations is a major concern for public health on a local, national, and international scale. Successful prevention requires the early detection of relevant risk factors. Understanding the prevalence and potential risk factors for HF is crucial [2].

Cancer, "chronic obstructive pulmonary disease (COPD)", Diabetes, and cardiovascular disease (CVD), are the four main non-communicable diseases (NCDs) that affect people all over the globe. These illnesses were named by the World Health Organization (WHO). 15 million people between both the ages of 30 and 69 succumb each year to non-communicable illnesses. More than 80 percent of these "premature" deaths take place in middle- and low-income nations, illustrating a significant obstacle in the area of public health [3].

The four main changeable behavior risk factors for the start of NCDs are tobacco use, poor diet, inadequate activity, and hazardous alcohol use. Age, gender, smoking, obesity, dyslipidemia, lack of physical activity, high blood pressure, cardiovascular disease, risk factors include age, family history, and a history of high blood pressure or Type 2 Diabetes [4]. The research on the causes of coronary artery disease (CAD) has mostly come from European and North American studies, and there is currently a paucity of data on the perceived significance of these lifestyle factors in south Asian populations [5].

Smokeless tobacco and low-tar cigarettes have been associated with a higher chance of cardiovascular problems as well. The risk of developing atherosclerotic cardiovascular disease (ASCVD) is raised by 30% even among nonsmokers, which is only slightly less than the 80% increase seen in active smokers. Because of the Framingham study, epidemiologic research has sought to identify high-risk individuals for potential cardiovascular events to implement preventative measures [6]contributing to about 1 in 3 cancer deaths annually. Whereas detrimental effects of smoking are well recognized, the harms of continued smoking after a cancer diagnosis are undervalued (1. According to Figure 1, this statistic provides the proportion of risk variables for ischemic heart disease that was present in India in 2016, broken down by gender. Ischemic heart disease was shown to be the largest contributing risk factor of dietary hazards among both men and women over the studied period, with respective percentages of 71.5 and 68.9 for men and women accordingly.

Carbonyls and particulate particles are only two of the many components of passive smoking and have been shown to have significant harmful effects on the cardiovascular system. This is particularly true in the context of secondhand smoke. In addition, Frey *et al.* [7], demonstrated that even brief exposure to secondhand smoke, such as thirty minutes, in an environment where smoking is allowed can harm endothelial function causing an increase in the probability of experiencing a heart attack and needing hospitalization [8]. Inclusion criteria for this research were participants who were permitted to smoke in the study area. Twenty-plus studies on isolated subjects have linked passive smoking to adverse outcomes, and recent meta-analyses have demonstrated there is a dose-response relationship between aspirin and a 20%-30% increased risk of stroke [9].

1.1. The Link Between Smoking and the Heart Disease:

Epidemiologic research supports a connection between smoking and CVD, although the specific processes responsible for this relationship remain unclear. Numerous chemicals, some bound to aerosol particles and others floating freely in the gas phase, make up cigarette smoke, more so than any other risk factor for cardiovascular disease. At least 72 known carcinogens are among the more than 7,000 chemical compounds included in cigarette smoke. Chemical toxicity was investigated by Fowles *et al.* [10]; they discovered associations between exposure to 1, 3-butadiene, cyanide, arsenic, cresols, and many forms of cancer and cardiovascular disease. Smoking cigarettes has long been recognized as a major risk factor for cardiovascular disease. One's chance of developing cardiovascular disease is heightened by being around secondhand

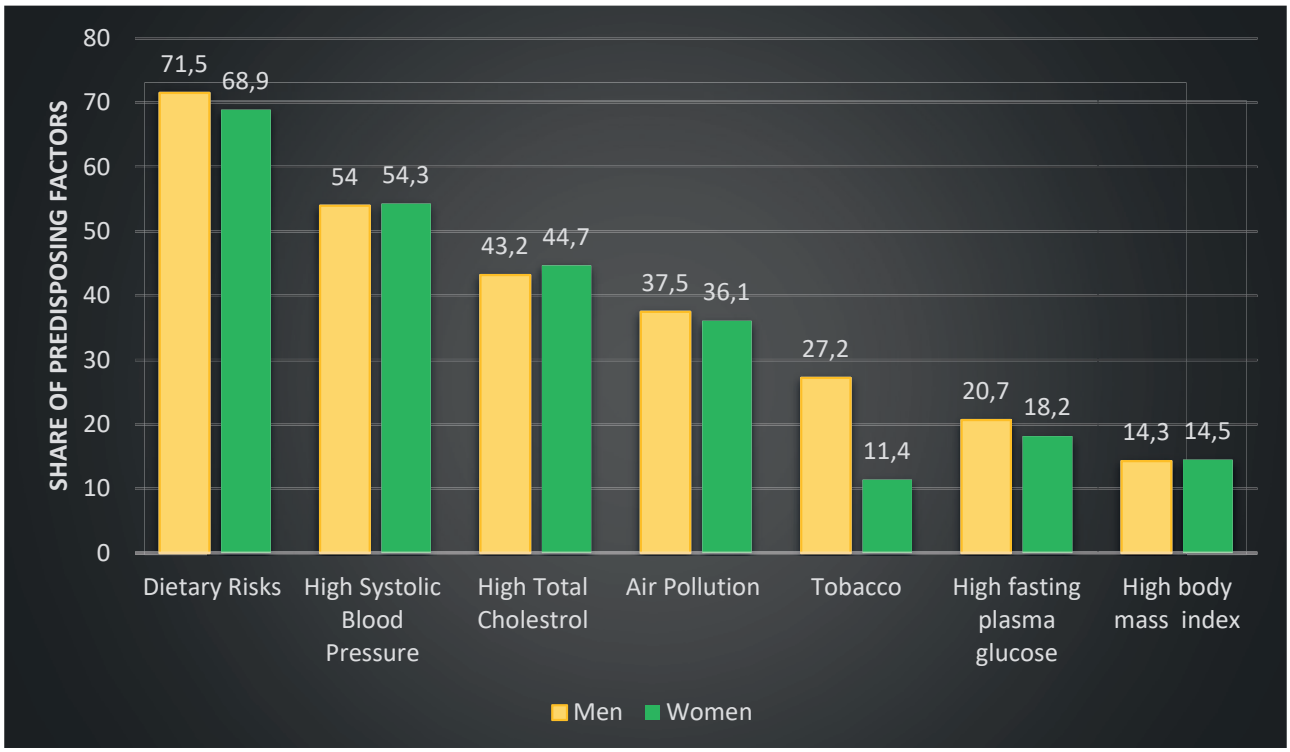

Figure 1: Displays the Ischemic Heart Disease Risk Factors in India in 2016 in Different Genders.

smoke, according to a variety of studies. The majority of these reports have emphasized the hazards of passive smoking on nonsmokers who live with smokers however, some have also taken into account secondhand smoke in the workplace. Meta-analyses of case-control and cohort studies investigating the influence of living with a smoker on risks amongst non-smokers have generally found an increased elevated risk of around one-fourth with minor hints of publishing bias.

An indirect biomarker of nicotine exposure, cotinine is a nicotine metabolite that may be measured in the blood. There is no evidence in the literature suggesting a link between the level of cotinine in the blood of nonsmokers and the chance of CHD or stroke. Contrary to popular belief, however, cotinine levels are associated with high CHD incidence. The author has investigated the links between smoking and the occurrence of CVD from two perspectives: the frequency with which people smoke and also the intensity with which they smoke.

2. LITERATURE REVIEW

Shiyi Cao *et al.* stated in their study that to synthesize existing epidemiological research to discover the health consequences of secondhand smoking up until January 2015, specifically, researchers searched PubMed", "Embase", "Web Science", and "Scopus" for meta-analyses. The author incorporates extensive studies that explored the link between secondhand smoking and many diseases. Summaries of quantitative research on the effects of secondhand smoking on health were compiled. There were 16 meta-analyses analyzed, which included 130 prospective studies, 159 medical studies, and 161 cross-sectional research. Passive smoking is not connected with 8 illnesses or health issues, but considerably raises the likelihood for 11, Streptococcus pneumonia carriage "(OR 1.66; 95% CI 1.33)", Neisseria meningitides carriage "(OR 1.68; 95% CI 1.19-2.36)", are all instances invasive meningococcal illness in children and "(OR 2.18; 95% CI 1.63-2.9)". The author concluded that descriptive epidemiological data implies passive smoking increases the risk of numerous illnesses, including childhood disorders and malignancies [11].

Onoja Matthew Akpa *et al.* stated in their study that cardiovascular disease prevalence shows hypertension's public health importance. It's unclear whether passive smoking exposure (PSE) causes hypertension. Their study examined if PSE was linked to hypertension in U.S. adults over 18. Results of the association between PSE and hypertension were investigated in a sample of 3067 participants from the "National Health and Nutrition Examination Survey" (adjusted for covariates). Respondents averaged 46.5 17.9 years. 23.7% of respondents had PSE and 32.6% were hypertensive (14.3%). PSE participants had a modified probability of hypertension of 1.038 (1.037, 1.040), $P < 0.0001$. In conclusion among women, younger people, and the elderly, PSE was shown to increase the risk of hypertension independently. An ethnically diverse longitudinal cohort might shed light on the question of causation and bolster the case for effective treatments [12].

Lucy E. Stirland *et al.* stated in a study that dementia risk increases with smoking, however, the consequences of passive smoking are less certain. The study's authors were curious about any possible association between secondhand smoke and cognitive decline. The author searched for relevant articles in many electronic databases, including MEDLINE, Scopus, CINAHL Plus, Web of Science, Cochrane, EMBASE, and PsycINFO. Researchers looked at the link between secondhand smoke and memory loss and dementia. After filtering the 1,425 results identified, only nine studies using a variety of methods matched the inclusion criterion. From a total of eight studies, only minor correlations were found a correlation between secondhand smoke and cognitive decline. Carotid artery stenosis was linked to this condition in just one study. The quality of the articles ranged from poor to excellent, with just two exceptions. Passive smoking has been linked to a higher risk of cognitive impairment and dementia, but the data connecting the two is scant and anecdotal at best. However, the studies used a wide variety of methodologies, and their quality varied widely [13].

Tahira Zubair *et al.* stated in their study that to ascertain whether or not secondhand smoke exposure contributes to the development of COPD stands for chronic bronchitis and emphysema. The data for this research was gathered from October 2015 to March 2016, making it a cross-sectional study at Dow University Hospital, Karachi. Participants denied history or smoking habits and contact with bio-mass fuel. The participants were 15-64-year-old hospital employees, professors, and medical students. Each patient had pulmonary function testing by spirometer after filling out a questionnaire form assessing COPD symptoms and second-hand smoke exposure. The data were an-

alyzed by using SPSS 20. 63.84% of 307 individuals were addicted to passive smoking at home, at work, or even both, and 12.24% had COPD, identified by pulmonary function. Stage I was found in 5 individuals (20.8%), Stage II in 9 patients (37.5%), Stage III in 8 patients (33.3%), and Stage IV in 2 patients (8.3%). Passive smoke density over duration was associated with COPD (p0.05). The author concludes that nonsmokers are susceptible to COPD [14].

Research by Marek Milcarz *et al.* aimed to determine how well socially disadvantaged Poles understand the risks of passive and active smoking, as well as the impacts of secondhand smoke (ETS). Participants ranged in age from 18 to 59 and were all regular users of Piotrkowski district's social care organizations. The vast majority of the sample (92%), knew that smoking may increase one's risk of developing lung cancer and other severe illnesses. In contrast, only 69.4 percent were aware of the link between ETS and health risks, and only 57.1 percent were aware of the link the cardiovascular disease and stroke hazards in connection to smoking and ETS, respectively. In conclusion, the risks of both active and passive smoking need to be better communicated to economically disadvantaged communities [15]who used aid services from local social care institutions in Piotrkowski district. Majority of the participants were aware of the fact that smoking may cause serious diseases and lung cancer (92%.

3. METHODOLOGY

3.1. Design

The current study employed quantitative approaches to explore the connection between smoking and elevated heart rate and blood pressure, in addition to determining the contributing components and their interrelationships. Numerous primary data sources were used throughout this investigation. Figure 2 shows that questionnaires and the Likert scale were used as the major data collecting tool in this study. Each research variable was given a descriptive statistic. Participant socio-demographics were added as a variable.

3.2. Sample and Instruments:

In this study, a sample size of 50 people would be used. The researchers interacted with the participants in this study in different ways to get the necessary information. Each respondent was given a link to a comprehensive, well-structured survey. Survey responses were ranked using a Likert scale, and then the raw data were analyzed in Excel before being sent to SPSS for further analysis. We calculated the mean, standard deviation, and other central tendency indicators for each of the variables using descriptive statistics. Bivariate analysis was performed to examine the associations between age, gender, education, marital status, occupation, and weight. To determine statistical significance, we utilized a value of $P < 0.05$.

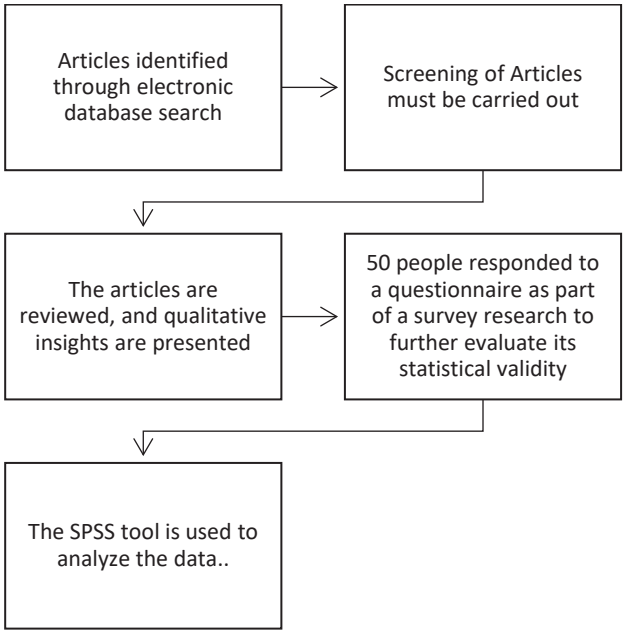

Figure 2: Demonstrates the Flow Diagram of the Participants and Also the Criteria for Exclusion.

Respondents to a survey or poll may express their opinions on a topic by selecting the response that most closely reflects their own. One's level of agreement or disagreement with a given topic or statement may be used as a proxy for their overall disposition. One of the most common ways to gauge public opinion is via the use of Likert scale questions, which are a kind of closed inquiry. To gauge one's thoughts, feelings, and opinions, gauge a person's personality, they conduct psychometric testing. Each question has a series of statements, and answers are asked to indicate how strongly they agree or disagree with the statements. With Likert Scale questions, a scale of 0-10 is typical, however shorter scales are conceivable. Likert Scale inquiries employ an easy-to-understand global style of data collection. Conclusions, analyses, results, and graphs may be easily derived from quantitative data. Because Likert Scale inquiries utilize a scale, individuals may be neutral if they wish. After receiving all comments, analyzing them is straightforward.

IBM offers a statistical analysis application called SPSS (Statistical Product for the Social Sciences). SPSS is a visualization tool that allows for quick model development of varied complexity. SPSS is becoming more and more popular for modeling in the fields of computing and AI. As a tool in the social sciences, it is used by those in the fields of market research, medicine, surveys, marketing, and education. Methods of statistical analysis that do not rely on normal distributions include: non-parametric tests; descriptive statistics; tests of scale reliability; tests of mean and variance; tests of differences, and even drawing are just some of the analyses that may be carried out using SPSS. Data analysts can benefit from SPSS Support by using the software to examine and compare multiple data sets, as well as to test hypotheses about the relationship between independent and dependent variables using tests like the analysis of variance (ANOVA), t-test (T-test), and multivariate analysis of variance (MANOVA) and regression analysis.

3.3. Data Collection

Some of the questions in the questionnaire probed respondents' familiarity with the general and particular health consequences of passive smoke from cigarettes on adults, children, and also the entire population, while others probed respondents' familiarity with sociodemographic characteristics. It was made up of yes/no questions designed to elicit quick responses from the respondents. It has been stated that questionnaires, data coding, documentation, and just a procedure manual were used in the data collecting process. The study findings were included in the research data. All sorts of demographic information are displayed in Table 1, including the proportion of the population, tested, participants' gender, location, and many more factors were gathered for this research. Respondents were interviewed using physical activity (cycling, swimming, and gym) in, Body mass index, Blood Pressure (High, Normal, and Low), Lifestyle Factors (smoking, alcohol consumption, and sleep quality), and some risk factors which increase the chances of cardiovascular disease (Diabetes, Hypertension, and Hyperlipidemia).

3.4. Data Analysis:

The program known as International Business Machines Corporation's IBM's Social Science Analysis Software (SPSS) Version 21 was used to process the data. To analyze the impact of passive smoking on people's cardiovascular activity, we may look at Pearson's Correlation Coefficient (r), which is shown in Table 2. Alternative measures of central tendency were used in the study of the data. Sleep quality is strongly positively associated with hypertension, and there is a statistically significant positive relationship between physical activity swimming variables, and the cycling variable. However, the other factors were not significantly associated.

Table 1

Displaying the Percentage of Demographic Details and Diseases Reported in Respondents.

Variable		Percent	Frequency
Gender	Women	42	21
	Men	58	29
Location	Urban	42	21
	Rural	58	21
Blood Pressure	Normal	38	10
	High	40	20
	Low	22	11
Body Mass Index	46	23	46
	40	20	40
	14	7	14
Swimming	Yes	30	60
	No	20	40
Cycling	Yes	60	30
	No	50	20
Gym	Yes	58	29
	No	42	21
Sleep Quality	Yes	54	54
	No	46	46
Alcohol	Yes	56	28
	No	44	22
Smoking	Yes	56	28
	No	44	22
Diabetes	Yes	56	28
	No	44	22
Hypertension	Yes	54	27
	No	46	23
Hyperlipidaemia	Yes	54	27
	No	46	23

Table 2

Displays the Correlation Analysis of Cardiovascular Activity among the persons living in a Passive Smoking Environment.

Correlations														
		Swimming	Cycling	Sleep Quality	Hypertension	Gender	Location	Blood Pressure	Body Mass Index	Gyming	Alcohol	Smoking	Diabetes	Hyperlipidemia
Swimming	r	1												
	P													
Cycling	r	0.89**	1											
	P	0.000												
Sleep Quality	r	0.066	0.066	1										
	P	0.651	0.651											
Hypertension	r	0.066	0.066	1.000**	1									
	P	0.651	0.651	0.000										
Gender	r	0.132	0.132	-0.216	-0.216	1								
	P	0.360	0.360	0.131	0.131									
Location	r	0.050	0.050	0.190	0.190	0.015	1							
	P	0.732	0.732	0.186	0.186	0.919								
Blood Pressure	r	-0.021	-0.021	-0.045	-0.045	0.041	0.147	1						
	P	0.883	0.883	0.756	0.756	0.776	0.308							
Body Mass Index	r	0.081	0.081	-0.036	-0.036	0.099	0.041	-0.107	1					
	P	0.576	0.576	0.802	0.802	0.495	0.776	0.462						
Gyming	r	0.132	0.132	-0.216	-0.216	1.000**	0.015	0.041	0.099	1				
	P	0.360	0.360	0.131	0.131	0.000	0.919	0.776	0.495					
Alcohol	r	0.510**	0.510**	0.071	0.071	0.307*	-0.020	0.103	0.402**	0.307*	1			
	P	0.000	0.000	0.623	0.623	0.030	0.893	0.477	0.004	0.030				
Smoking	r	-0.066	-0.066	0.395**	0.395**	-0.183	0.225	0.208	-0.112	-0.183	-0.055	1		
	P	0.650	0.650	0.005	0.005	0.204	0.116	0.147	0.439	0.204	0.703			
Diabetes	r	0.099	0.099	-0.171	-0.171	0.470**	0.062	0.050	-0.226	0.470**	-0.055	0.107	1	
	P	0.495	0.495	0.234	0.234	0.001	0.669	0.728	0.114	0.001	0.703	0.459		
Hyperlipidemia	r	0.066	0.066	0.034	0.034	-0.135	0.353*	0.321*	0.077	-0.135	-0.171	0.314*	0.071	1
	P	0.651	0.651	0.816	0.816	0.350	0.012	0.023	0.593	0.350	0.234	0.027	0.623	
**. Correlation is significant at the 0.01 level (2-tailed).														
*. Correlation is significant at the 0.05 level (2-tailed).														

4. RESULTS AND DISCUSSION

The statistical link between adults' knowledge of the overall health impacts of secondhand smoke exposure and their exposure status was statistically significant on bivariate analysis. Sociodemographic variables, including gender (male and female) and geographic region (urban and rural), were correlated using the Pearson product-moment correlation. Sporting Events (cycling, swimming, and Gyming). Smoking, poor diet quality, and excessive alcohol use are only a few of the lifestyle variables linked to an elevated risk of cardiovascular disease, along with high blood pressure, normal blood pressure, a normal or "low body mass index", as well as a body mass index of 30 or more (Diabetes, Hypertension, and Hyperlipidemia). Pearson's Correlation Coefficient (r) is shown in Table 2 to analyze the connections between the factors. The quality of sleep and its association with risk factors was large and statistically significant (Hypertension), which are responsible for raising the risk of CVD. ($r = 0.90$, $p < 0.005$), however other variables such as Physical Activities (cycling, swimming, Gyming), Lifestyle factors (Smoking, Alcohol intake,) Blood pressure, and Body mass index were not significantly related. Swimming and Gyming had a substantial, statistically significant link ($r = 0.87$, $p < 0.005$), although other characteristics such as gender, lifestyle factors (smoking, use of alcohol,) blood pressure, and body mass index were not significantly associated.

5. CONCLUSION

The results of this study show that being exposed to secondhand smoke considerably increases one's chance of developing several illnesses and health issues, including disorders in youngsters. As smoking has negative effects on both the smoker and their immediate surroundings, stricter anti-smoking laws need to be drafted and put into place. The majority of these reports have emphasized the hazards of passive smoking. The number of Pack-years a person has logged is a major factor in determining their risk of getting cardiovascular disease as a result of smoking. To add insult to injury, studies have shown that the health risks associated with smoking one less cigarette per day over a longer period are equivalent to those associated with smoking one more cigarette per day over a shorter period. All of these results highlight the need to reduce smoking rates by encouraging people to stop. Smoking negatively impacts glucose tolerance and HDL cholesterol levels, which raises the risk of developing chronic heart illnesses and acute atherothrombotic events including stroke and myocardial infarction.

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