

# The Prevalence of Smoking in Caribbean Towns and Correlation with Disease States: A Survey

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## Abstract

**Background:** Smoking continues to be one of the most popular recreational practices despite its known harmful effects. **Aim:** The purpose of this survey was to assess the prevalence of smoking in the Caribbean and the correlation of smoking with the disease states of high blood pressure, diabetes and high cholesterol whose risk is known to be higher among smokers. **Findings:** Our study found a smoking prevalence of 22% in the population, similar to that reported by the World Health Organization (20%) and a positive correlation between smoking and diabetes. **Conclusion:** The survey shows that smoking numbers within the population are still high and that smoking increases the risk of certain disease states within smokers. Aggressive global efforts to reduce smoking should continue so as to minimize the negative impact of smoking on health.

## Keywords

Smoking, Tobacco, Prevalence, High Blood Pressure, High Cholesterol, Diabetes

## 1. Introduction

Nicotine is a highly addictive substance found in tobacco products [1]. Tobacco products contain nicotine and many other chemicals that are harmful to health [2]. These harmful health effects include Type 2 diabetes, high blood pressure, high cholesterol, gingival and periodontal disease among others [3]-[5].

Tsai *et al.* conducted a study to assess the changes in blood pressure among smokers following cessation and found that individuals with high blood pressure saw both their systolic and diastolic blood pressure decrease significantly after

successful smoking cessation [6].

Smoking is known to increase the risk of Type 2 diabetes [7] and has been connected to an increase in insulin resistance [8]. Smoking also increases the risk of high cholesterol which can subsequently contribute to endothelial dysfunction [9].

While the World Health Organization indicates that tobacco use has decreased since 2000 there are still 1.25 billion adult smokers worldwide and around 20% of the adult world population uses tobacco (down from 33%) [10].

Per the CDC, the United States of America has 28.3 million smokers above the age of 18 or 11.5% [11]. According to the Tobacco Atlas, a partnership that includes Tobacco nomists at Johns Hopkins University, the United States of America has an adult (>age 15) tobacco usage of 45 million adults (18%) [12].

As shown, smoking poses a global challenge and the Caribbean region is no exception. The small Caribbean island of St. Lucia has an adult (>age 15) tobacco usage percentage of 12% with 17,500 adults using tobacco [13]. Trinidad and Tobago have an adult (>age 15) tobacco usage percentage of 18% and a total of around 191,900 adults using tobacco.

For the purpose of advancing knowledge on something as harmful and widely used as tobacco but with a focus on small town Caribbean locations, we conducted a survey on the prevalence of smoking and medical health problems linked to smoking, specifically high blood pressure, diabetes and high cholesterol.

## 2. Materials and Methods

### Sample Selection

The Study was carried out in Tunapuna, Trinidad; Vieux Fort, St. Lucia; and Castries, St. Lucia in June and July 2024.

#### Selection Criteria:

All individuals eighteen years or older at the three locations of Tunapuna, Trinidad; Vieux Fort, St. Lucia; and Castries, St. Lucia in June and July 2024 were eligible for the study. A total of 50 participants agreed to participate in the survey. No individuals who were approached for the study declined to participate.

The study qualified for exempt status. As defined in the federal regulations: minimal risk standard was applied: the probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests. Per electronic code of Federal Regulations in effect August, 2018, Research activities involving human subjects that are exempt from IRB review are identified in 45CFR46.104 d1 –8. The Office of Human Research Protections (U. S. Department of Health and Human Services) does not specify who at an institution may determine that research is exempt but recommends that, because of the potential for conflict of interest, investigators not be given the authority to make an independent determination that human subject research is exempt. Per this recommendation by OHRP, this survey was reviewed

by an independent reviewer who had sufficient information to make a decision and deemed the study exempt, as identified in 45CFR46.104 d2. Belmont principle of Respect for Persons generally requires that subjects be given the opportunity to choose whether or not to participate in research. In line with this principle, Voluntary informed consent was obtained from participants for this exempt survey. Also per recommendation by OPHS (Office of Public Health and Science) the participants were provided with the following minimum consent information: 1) The identity and affiliation of the researcher. 2) A clear description of the study procedures and how data will be used in the future. 3) A statement that participation in the research is voluntary. 4) Contact information for questions about the research.

#### Survey Design and Administration:

All participants provided their age and gender and were asked to answer the following questions:

- 1) Do you currently smoke;
- 2) Has your doctor ever told you that you have high blood pressure;
- 3) Has your doctor ever told you that you have diabetes;
- 4) Has your doctor ever told you that you have high cholesterol.

### 3. Results

#### 3.1. Total Survey Population Results

The Study included 50 participants, 25 female and 25 male. The ages ranged from 18 - 68 with the average age being 36.2 (see **Table 1**).

**Table 1.** Demographics.

	Male	Female	Total
Smokers	6	5	11
Non Smokers	19	20	39
Average Age	32.76	39.64	36.2
Age Range	19 - 49	18 - 68	18 - 68
Diabetes	1	2	3
High Cholesterol	0	2	2
High Blood Pressure	3	5	8

#### *Survey Question 1: Do you currently smoke?*

In total 11 out of 50, or 22%, of the participants currently smoke. Six are male and five are female.

#### *Survey Question 2: Has your doctor ever told you that you have high blood pressure?*

In total 8 out of 50, or 16%, of the participants have been medically diagnosed with blood pressure. Three are male and five are female.

#### *Survey Question 3: Has your doctor ever told you that you have diabetes?*

In total 3 out of 50, or 6%, of the participants have been medically diagnosed with diabetes. One is male and two are female.

*Survey Question 4: Has your doctor ever told you that you have high cholesterol?*

In total 2 out of 50, or 4%, of the participants have been medically diagnosed with high cholesterol. Both Participants were females.

#### **Correlations:**

Out of the eleven smokers included in this study 18.18% had diabetes, 9.09% had high blood pressure, and none had high cholesterol.

Out of the 39 non-smokers included in this study, 2.56% had diabetes, 17.95% had high blood pressure, and 5.13% had high cholesterol.

### **3.2. Castries Results**

**Table 2.** Castries, St. Lucia.

Participant	Gender	Age	Weight	Currently Smokes	High Blood Pressure	High Cholesterol	Diabetes
Participant #1	Male	24	65 kg	No	No	No	No
Participant #2	Female	30	83 kg	Yes	No	No	No
Participant #3	Female	36	59 kg	No	No	No	No
Participant #4	Male	25	58 kg	No	No	No	No
Participant #5	Male	20	70 kg	No	No	No	No
Participant #6	Male	24	72 kg	Yes	No	No	No

*Survey Question 1: Do you currently smoke?*

Of the Participants from Castries 2 out of 6, or 33%, currently smoke. One is male and one is female (see **Table 2**).

*Survey Question 2: Has your doctor ever told you that you have high blood pressure?*

None of the participants from Castries had high blood pressure.

*Survey Question 3: Has your doctor ever told you that you have diabetes?*

None of the participants from Castries had diabetes.

*Survey Question 4: Has your doctor ever told you that you have high cholesterol?*

Of the Participants from Castries none had high cholesterol.

### **3.3. Tunapuna Results**

*Survey Question 1: Do you currently smoke?*

Of the Participants from Tunapuna 1 out of 7, or 14.29%, currently smokes with the participant being a female (see **Table 3**).

*Survey Question 2: Has your doctor ever told you that you have high blood pressure?*

Of the Participants from Tunapuna 1 out of 7, or 14.29%, of the participants have been medically diagnosed with blood pressure with the participant being a

male.

*Survey Question 3: Has your doctor ever told you that you have diabetes?*

None of the participants from Tunapuna have diabetes.

*Survey Question 4: Has your doctor ever told you that you have high cholesterol?*

None of the participants from Tunapuna have high cholesterol.

**Table 3.** Tunapuna, Trinidad

Participant	Gender	Age	Weight	Currently Smokes	High Blood Pressure	High Cholesterol	Diabetes
Participant #1	Male	32	74 kg	No	No	No	No
Participant #2	Female	42	67 kg	No	No	No	No
Participant #3	Female	45	65 kg	No	No	No	No
Participant #4	Male	46	65 kg	No	No	No	No
Participant #5	Male	47	74 kg	No	Yes	No	No
Participant #6	Female	37	64 kg	No	No	No	No
Participant #7	Female	21	66 kg	Yes	No	No	No

### 3.4. Vieux Fort Results

**Table 4.** Vieux Fort, St. Lucia.

Participant	Gender	Age	Currently Smokes	High Blood Pressure	High Cholesterol	Diabetes
Participant #1	Female	29	Yes	No	No	No
Participant #2	Female	25	No	No	No	No
Participant #3	Male	24	No	Yes	No	No
Participant #4	Male	49	Yes	No	No	Yes
Participant #5	Female	32	Yes	No	No	Yes
Participant #6	Female	29	No	No	No	No
Participant #7	Male	42	Yes	Yes	No	No
Participant #8	Male	26	No	No	No	No
Participant #9	Male	26	Yes	No	No	No
Participant #10	Female	68	No	Yes	Yes	No
Participant #11	Female	18	No	No	No	No
Participant #12	Male	19	No	No	No	No
Participant #13	Male	43	No	No	No	No
Participant #14	Female	27	No	No	No	No
Participant #15	Female	50	No	Yes	No	No
Participant #16	Female	53	No	Yes	No	No
Participant #17	Female	42	No	No	No	No
Participant #18	Female	44	No	No	No	No
Participant #19	Male	33	No	No	No	No
Participant #20	Male	37	No	No	No	No

**Continued**

Participant #21	Male	41	No	No	No	No
Participant #22	Male	35	No	No	No	No
Participant #23	Male	37	No	No	No	No
Participant #24	Male	32	No	No	No	No
Participant #25	Female	42	No	No	No	No
Participant #26	Female	49	No	No	No	No
Participant #27	Male	32	No	No	No	No
Participant #28	Male	32	No	No	No	No
Participant #29	Male	28	No	No	No	No
Participant #30	Female	55	No	No	No	No
Participant #31	Female	62	No	Yes	No	No
Participant #32	Male	39	Yes	No	No	No
Participant #33	Female	27	No	No	No	No
Participant #34	Female	40	No	No	No	No
Participant #35	Male	26	Yes	No	No	No
Participant #36	Female	54	No	Yes	Yes	Yes
Participant #37	Female	34	Yes	No	No	No

*Survey Question 1: Do you currently smoke?*

Of the Participants from Vieux Fort 8 out of 37, or 21.62%, currently smoke, 5 being male and 3 female (see **Table 4**).

*Survey Question 2: Has your doctor ever told you that you have high blood pressure?*

Of the Participants from Vieux Fort 7 out of 37, or 18.92%, of the participants have been medically diagnosed with blood pressure with five being female and two being male.

*Survey Question 3: Has your doctor ever told you that you have diabetes?*

Of the Participants from Vieux Fort 3 out of 37, or 8.11%, of the participants have been medically diagnosed with diabetes with two being female and one being male.

*Survey Question 4: Has your doctor ever told you that you have high cholesterol?*

Of the Participants from Vieux Fort 2 out of 37, or 5.41%, of the participants have been medically diagnosed with high cholesterol with both being female.

**4. Discussion**

Tobacco use continues to be one of the most widespread recreational practices despite its known harmful effects [10]. This widespread use of tobacco can particularly affect areas that are not developed in efforts to control the prevalence of smoking globally and where information on cessation may not be as readily

accessible [14] [15].

As shown in our Introduction, smoking is extremely harmful and can lead to type 2 diabetes, high blood pressure, high cholesterol, and other health challenges [3]. We carried out this study to assess the prevalence of smoking in the Caribbean towns and to assess any correlation with the disease states that are associated with smoking.

Our study showed a prevalence of 22% of smokers among the study population. This number is similar to the prevalence reported by the WHO which reports that 20% of the adult world population uses tobacco [10].

Our study then tried to identify the correlation between smoking and the disease states of high blood pressure, diabetes and high cholesterol. Out of the eleven smokers included in this study 18.18% had diabetes, 9.09% had high blood pressure, and none had high cholesterol.

Out of the 39 non-smokers included in this study, 2.56% had diabetes, 17.95% had high blood pressure, and 5.13% had high cholesterol.

While we found a higher rate of diabetes among smokers, there were lower rates of high blood pressure and cholesterol among smokers. The average age of the patients with diabetes in our study was 45. The average age of our study population was 36. This may indicate that older patients have a higher incidence of diabetes which is consistent with current knowledge [16]. There are limitations to the study that could affect the findings. The study had a small sample size and was not able to detect these correlations. We did not collect information on how long participants had been smoking and there was also a lack of official medical records. Due to the answers being solely based on the individual filling out the survey, there is room for the said individual to not answer the questions correctly for reasons such as forgetting information needed to answer or simply not wanting to reveal their medical information that they may not be proud of.

## 5. Conclusions

Our study found a prevalence of smoking similar to that reported by the World Health Organization.

Our study found a positive correlation between diabetes and smoking which is consistent with previous findings in research [2]. However the rate of high blood pressure and cholesterol among smokers did not have a positive correlation with smoking in our study. While we did not find a positive correlation between smoking and high blood pressure and cholesterol, smoking has been shown to increase the chances of having these disease states [17] [18].

This study confirmed the known global prevalence of smoking and showed a higher rate of diabetes among smokers.

Additional studies need to be done to further assess the correlation between smoking and the disease states that are related to tobacco. There also needs to be ongoing measures to continue to reduce smoking numbers, given the well-documented and known negative health outcomes.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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