보건학 석사 학위논문

Linking data from the Barbados Global Youth Tobacco Survey (1999, 2002, 2007 & 2013) to tobacco regulation policies.

바베이도스의 Global Youth Tobacco Survey (1999 년, 2002 년, 2007 년, 2013 년) 자료와 담배 규제 정책의 연계

2020 년 7 월

서울대학교 보건대학원

보건학과 역학 전공

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이 논문을 보건학 석사 학위논문으로 제출함

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보건학과 역학전공

Dorial Lauralyn Quintyne

Dorial Quintyne의 석사 학위논문을 인준함

2020 년 7월

위 원 장 조 영 태 (인)

부 위 원 장 유승현 (인)

위 원 조성일(인)

Abstract

Dorial Lauralyn Quintyne

Public Health, Epidemiology

Graduate School of Public Health

Seoul National University

Introduction

Tobacco use is a major risk factor in chronic disease and thus adolescent smoking is of public health significance because many adult smokers will first initiate smoking as adolescents. About 20.2% of the world's population aged less than 15 years were current smokers in 2015, therefore smoking in young adolescents is an important public health issue. Barbados was one of the first countries to implement the Global Youth Tobacco Survey (GYTS) and has implemented four GYTS cycles so far. As a result of these surveys and subsequent tobacco legislation, Barbados has seen decreases in youth smoking prevalence.

Objectives

The main objective of this research was to analyze the trends in tobacco use among adolescents in Barbados through four repeat national cross-sectional surveys (1999, 2002, 2007 & 2013). This research also explored the role the Global Youth Tobacco Survey played in implementing tobacco control legislature. Specific objectives included: determining which factors are significantly associated with the prevalence of youth cigarette smoking and investigating whether there is a gender difference in tobacco use in the 1999, 2002, 2007 and 2013 Barbados GYTS. Future intention to smoke was also analyzed to determine if current policies are effective at decreasing youth susceptibility to tobacco.

Methods

Data from the Global Youth Tobacco Surveys (1999, 2002, 2007 and 2013) with a total

sample of 4,786 students were analyzed. The dependent variables were current smoking status and intention to smoke. And the independent variables included: exposure to smoking in the home, exposure to smoking outside of the home, exposure to tobacco in TV, videos and movies, received tobacco education, ownership of an item with a tobacco product brand logo, exposure to anti-tobacco media messages, support for banning smoking in public places and implementation of the Health Services Regulations. Descriptive analysis and logistic analysis were carried out using SAS 9.4 and R version 3.5.2.

Results

Current cigarette use decreased overall (by 35%) but female current cigarette use decreased significantly more than males over the four surveyed years. Adolescents who had ever tried smoking a cigarette decreased significantly overall by 29% and males were more likely to have ever smoked cigarettes than females. Adolescents who reported ever using other smoked tobacco products increased overall, but females alone saw a decrease. These results all showed a significant gender gap in 2007. Based on logistic regression analysis, being male, older, exposure to second-hand smoke in outdoor places, the home, and ownership of a tobacco brand logo were associated with current smoking status. The 2010 Health Services Regulations were significantly associated with low current smoking status. In non-current smokers, being female, older, exposed to second-hand smoke in the home, outside the home and the media and owning a tobacco brand logo was significantly associated with intention to smoke. However, in the period of the 2010 Health Services Regulations, non-current smokers were more likely to want to smoke in the future. Females in both categories had higher odds of being exposed to second-hand smoke in the home and owning tobacco branded items.

Conclusion

The GYTS surveys played an important role in implementing tobacco legislature and some decreases in prevalence were seen after the laws were taken into effect. Nevertheless, Barbados must continuously monitor the prevalence of smoking among youth in order to further reduce tobacco use and to establish more positive policies such as placing more restrictions on tobacco advertising and

promotion to prevent students under the age of 18 from starting smoking and to protect them from the risk of second-hand smoking.

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Keywords: Youth smoking, legislation, tobacco use, Barbados

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Contents

List of Tables

List of Figures

Chapter 1. Introduction

1.1 Background

According to the World Health Organization (WHO) tobacco is the leading cause of poverty, disease and death, globally killing more than 8 million people a year. It is also estimated that 20.2% of the world's population aged less than 15 years were current smokers in 2015[1]. Smoking in young adolescents is an important health concern in public health because many adults become addicted to smoking at a young age and find it difficult to quit later and are more likely to relapse[2]. There is also evidence that there is a strong association between smoking and nicotine addiction, stunted lung growth, decreases lung function and early abdominal aortic atherosclerosis in adolescents. Additionally, early tobacco use has also been linked to other health risk behaviors, including risky sexual behaviour and drug use[3].

It is important to monitor youth tobacco use because if a young person has never smoked by age 18, they are less likely to start smoking as an adult. And nicotine exposure during adolescence can impair brain function and lead to addiction susceptibility[4]. Monitoring tobacco use in youth can be used to create tobacco control and prevention strategies which can therefore reduce smoking initiation[5].

In Barbados, tobacco use among youth is dynamic because of changing regulations and future provisions being considered to combat tobacco in Caribbean Community (CARICOM) countries.

1.2 Literature Review

WHO Framework Convention on Tobacco Control and Global Youth Tobacco Survey

The WHO Framework Convention on Tobacco Control (FCTC) is a treaty that was developed to combat the rapidly increasing prevalence of tobacco globally. This treaty targets both the demand and supply of tobacco using specific demand and supply reduction provisions. The WHO FCTC has also developed a package called "MPOWER" which seeks to: Monitor tobacco use and prevention policies; Protect people from tobacco smoke, Offering help to quit tobacco use, Warn about the dangers of tobacco, Enforcing bans on tobacco advertising, Promotion and sponsorship and Raise taxes on tobacco[6]. The WHO FCTC opened for signature on 16th June to 22nd June 2003 in Geneva and in the United Nations Headquarters, New York from 30th June 2003 to 29th June 2004. The Convention was subsequently ratified on 27th February 2005[7]. Barbados signed on 28th June 2004 and ratified on 3rd November 2005.

The Global Youth Tobacco Survey (GYTS) is a school-based survey intended to implement tobacco prevention strategies and monitor tobacco use among youth. The GYTS was first implemented in March 1999 in the following 11 countries: Barbados, Poland, China, Fiji, Jordan, Russian Federation, Sri Lanka, South Africa, Venezuela, Ukraine and Zimbabwe[7].

Tobacco use in Barbados

Barbados is an English-speaking island located in the Eastern Caribbean where the GYTS was carried out four times (2013, 2007, 2002, 1999), with the 2013 survey being the most recent. Therefore, the GYTS was carried out twice before, and after Barbados ratified the WHO FCTC.

A focus group study, conducted in Barbados by the United Nations International Drug Control Programme (UNDCP) Caribbean Regional Office, discovered that many young people do not consider tobacco, alcohol and prescription drugs to be real drugs. In this focus group, combinations of drugs were popular for example: mixtures such as cannabis and tobacco[8]. According to a drug

prevention agency official. This mixture is called "fanta" and is used to stretch spliffs by rolling marijuana with tobacco[9].

The overall prevalence of current cigarette smokers among Barbadian adolescents decreased from 10.8% in 1999 to 7% in 2002. The prevalence subsequently increased to 11.6% in 2007 but dropped back to 7% in 2013. In 1999, females (11.9%) had a higher smoking prevalence than males (10.8%) and this decreased to 6.4% and 7% for females and males respectively. In 2007, male current cigarette smokers increased to 14.3% and female current cigarette smokers also increased to 9.3%. In 2013, male and female current cigarette smokers decreased to 8.8% and 5% respectively (Figure 1).

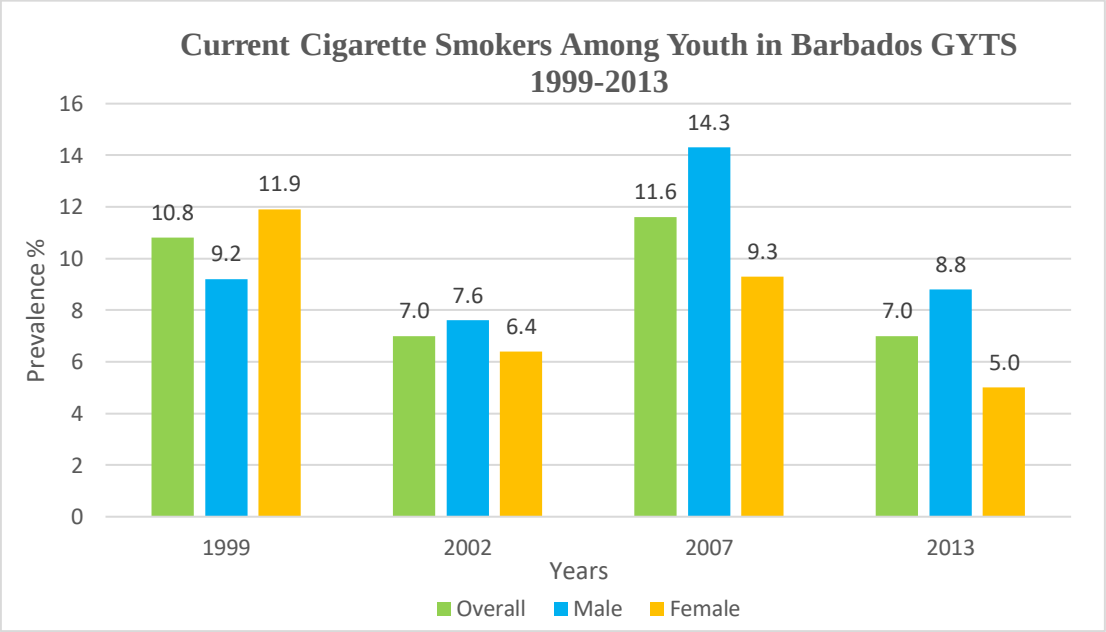

Figure 1: Current Cigarette Smokers Among Youth (Aged 13-15 years) in Barbados according to GYTS 1999-2013

To comply with the FCTC treaty, Barbados has instituted regulations such as the Health Services Regulations (Protection of Minors from Tobacco Products) in 2010. This prohibits the use of tobacco products by minors, the sale of tobacco products to minors, minors being employed in the tobacco industry, tobacco products being in self-service displays and the advertisement of tobacco products using minors. It also states that anyone who makes, sells or imports an item that imitates a cigarette, guilty of an offence[10].

The Health Services Regulations (Prohibition of Tobacco Smoking in Public Places) in 2010 prohibits smoking in public places and anyone who smokes in a public place where a sign is displayed is guilty of an offence and is liable on summary conviction to a fine of $5000.00 BBD (US $2500.00) or to imprisonment for 12 months or both[11].

In Barbados, the prices of cigarettes have increased from 2008 to 2016. However specific excise has decreased from 34.18% in 2008 to 25.07% in 2016. Specific excise tax is a monetary value per quantity of tobacco products. The Value Added Tax on cigarettes increased from 13.04% (2008-2010) to 14.89% and remained at this percentage until 2016. Figure 2 shows the price of the most popular brand of cigarettes in Barbados and the total tax (specific excise + value added tax) added on to this price. Studies have shown that cigarette price increases have a more immediate impact on teenagers in some cases but for may have a negligible effect on teens who only smoke a few cigarettes a week[12].

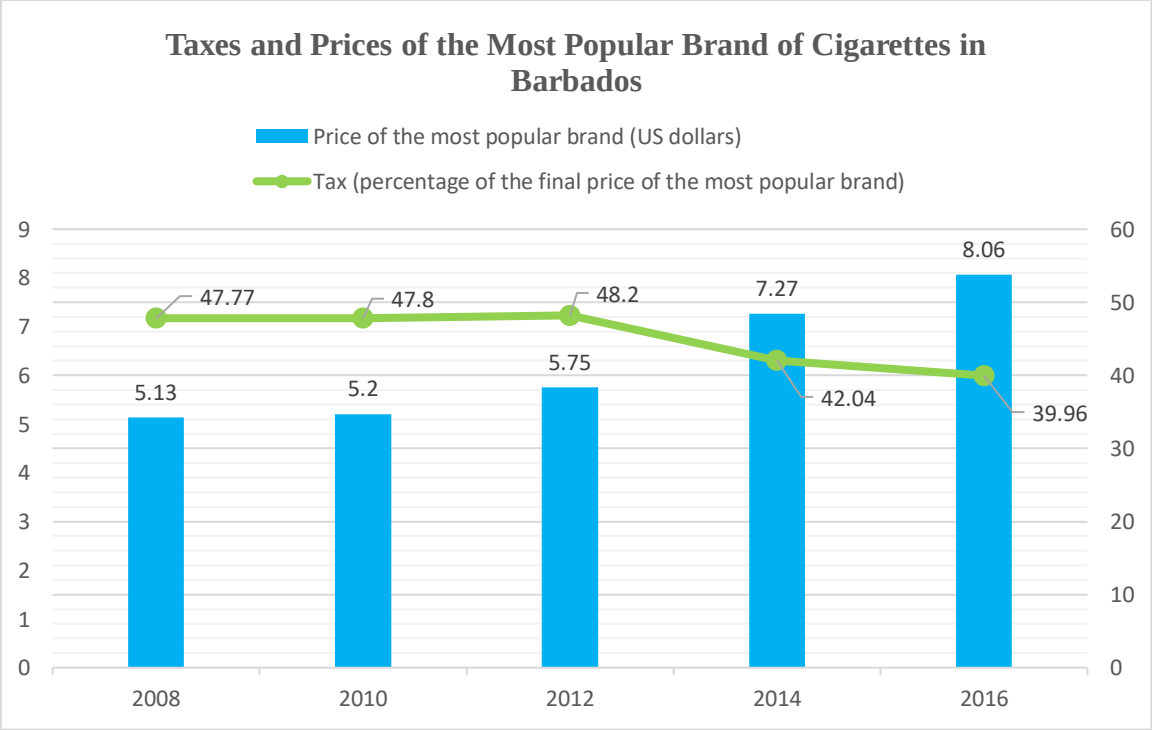

Figure 2: Taxes and Prices of the Most Popular Brand of Cigarettes in Barbados

Data source: World Health Organization. Global health observatory data repository.

GYTS data and implementation of tobacco regulations in previous studies

In Turkey, 21,011 students from GYTS 2003 and 2009 were analyzed but they found that current cigarette use did not change significantly among the genders. Current smoking was also higher in boys than girls and around 50% of students recalled being exposed to second-hand smoke at home, with 80% being exposed in public places. However, never smokers in 2009 were more likely to want to initiate smoking in the near future. Turkey passed its first anti-tobacco laws in 1996 to protect minors from tobacco, ban all forms of tobacco advertisement and promotion, implement warning labels on cigarette packages, ban smoking in public transportation and teach tobacco awareness in the public education system. These laws were further amended in 2008 to protect its citizens from second-hand smoke exposure in indoor and outdoor environments. Since no data was available regarding second-hand exposure in 2003, it was not possible for the researchers to evaluate if the recent amendment had any impact on this factor[14].

A retrospective analysis was also carried out on three GYTS conducted in Qatar during 2004, 2007, and 2013. The prevalence of smoking, availability and accessibility of cigarettes increased and from 2002 to 2013 the percentage of participants who wanted to quit smoking decreased while in 2013 the highest percentage of students reported that they were exposed to tobacco free promotion. Qatar established tobacco legislation in 2002 and they control the promotion and use of tobacco, but the researchers still found that more control measures need to be put in place[15].

In the UK, smoking in public places was banned in Scotland in 2006 which was further implemented in the rest of the UK in 2007 and the legal age anyone could purchase cigarettes increased from 16 to 18 years. A total of 14,992 adolescents were surveyed between 1994 and 2016 and the researchers found that smoking initiation decreased following the implementation of those policies but quitting decreased and periodic smoking increased[16].

Tobacco regulations in CARICOM are varied and therefore efforts to combat smoking are slow and ineffective. There are fourteen member states that are a part of CARICOM and WHO/Pan American Health Organization (PAHO) , and these include: Antigua and Barbuda, Bahamas,

Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, St. Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, Suriname and Trinidad and Tobago[17]. Of these members, only two (Suriname and Guyana) have a comprehensive ban on tobacco advertising, promotion and sponsorship. Barbados, Jamaica, St. Lucia, Guyana and Trinidad and Tobago have health warnings on tobacco packaging. And the only members with the highest compliance of smoke free environments are Barbados, Suriname, Jamaica, Guyana and Trinidad and Tobago[18].

In the Caribbean there are few recent studies analyzing the prevalence of smoking using the GYTS. The Caribbean regional disparities in current and ever smoking prevalence were investigated in one such study. They discovered that ever smoking fell by 4.3% and current smoking fell by 0.4% overall. They saw a decrease in the between country disparity for the prevalence of ever smoking but not much change was seen for current smoking[19]. Monitoring smoking prevalence for the overall Caribbean and individual countries is needed to implement successful control programs and decrease youth smoking.

Two studies on individual countries using multiple years of GYTS data have been conducted in the Caribbean. In a study conducted using Jamaican GYTS data from 2000 and 2006, 1,752 and 1,864 students were surveyed, and the prevalence of smoking increased from 15.2% to 16.7% but this was not statistically significant. The perception that smoking was not harmful went up from 10.9% to 15.9% while parental smoking decreased from 39.4% to 35.5%. The rates of youths exposed to tobacco billboard advertisements and tobacco adverts in newspapers and magazines also decreased. The percentage of adolescents who reported having an item with a tobacco brand logo on it increased from 13.9% to 16.4%. Adolescents who possessed an item with a tobacco brand logo increased from 13.9% to 16.4%. Current smoking was associated with male gender, having smoking friends for most or all friends and having smoking parents[20]. However, in this study they were not able to detect the effect of Jamaica's ratification of the FCTC on youth smoking.

In Suriname, secondary analysis was conducted on GYTS 2000, 2004 and 2009 in order to inform tobacco control policy. They found that current cigarette use and use of other tobacco products increased in females. There was also high public and home exposure to second-hand smoking. Since

Suriname enacted comprehensive tobacco legislation in 2013, we cannot see the impact of this legislation on youth smoking prevalence[21].

Since the Caribbean does not have many studies conducted to analyze the impact of tobacco-related legislation, this research will serve to provide a Barbadian perspective which can fill this gap. There is a need to understand how unregulated tobacco advertisement and promotion affects Caribbean countries and their fight against adolescent tobacco use. As there is also a lack of gender-based research in the Caribbean region, in this study I will explore whether the association of current smoking and tobacco control law implementation differ by gender in Barbados. This will hopefully offer policy makers more information on how to counteract measures used by the tobacco industry in Barbados and the wider Caribbean.

1.3 Objectives

The main purpose of this research was to analyze the trends in tobacco use smoking among adolescents in Barbados through four repeat national cross-sectional surveys (1999, 2002, 2007 & 2013). This research also explored the role the Global Youth Tobacco Survey played in implementing tobacco control legislature.

Specific objectives included: determining which factors are significantly associated with the prevalence of youth cigarette smoking and investigating whether there is a gender difference in tobacco use in the 1999, 2002, 2007 and 2013 Barbados GYTS. Barbadian adolescents' future intention to smoke was analyzed to see whether current laws are enough to see a substantial decrease in smoking.

1.4 Hypotheses

In this research, the following hypotheses were investigated:

1. Tobacco control regulations are associated with lower current cigarette smoking and intention to smoke.
2. Associations between current smoking/intention to smoke and second-hand exposures to tobacco, media exposure and logo promotion will differ significantly by gender because tobacco advertisement is unregulated by the government.

Chapter 2 Methods

2.1 GYTS Questionnaire

The survey uses a standard core questionnaire with a set of optional questions that permits adaptation to meet the needs of the country on tobacco use and key tobacco control indicators. The questionnaire covers the following topics: tobacco use (smoking and smokeless), cessation, second-hand smoke exposure, pro- and anti-tobacco media and advertising, access to and availability of tobacco products, and knowledge and attitudes regarding tobacco use. The questionnaire is self-administered; using scannable paper-based bubble sheets, it is anonymous to ensure confidentiality. A comprehensive explanation of the methods used in the GYTS can be found elsewhere[22].

2.2 Study Population

In 1999, 1317 students participated in the survey and the student response rate was 94.7%, the school response rate was 96.2% and the overall response rate was 91.1%. In 2002, 1097 students participated, and the school response rate was 100%, the student response rate was 85.7%, the class response rate was 98.7% and the overall response rate was 84.6%. In 2007, 1066 students participated, and the school response rate was 95.5%, the student response rate was 95.5%, the class response rate was 100% and the overall response rate was 79.4%. In 2013, 1718 students participated, and the overall response rate was 74.9%. Students aged under 13 and over 15 years of age were excluded therefore, 4,786 students were analyzed in this study (Figure 3).

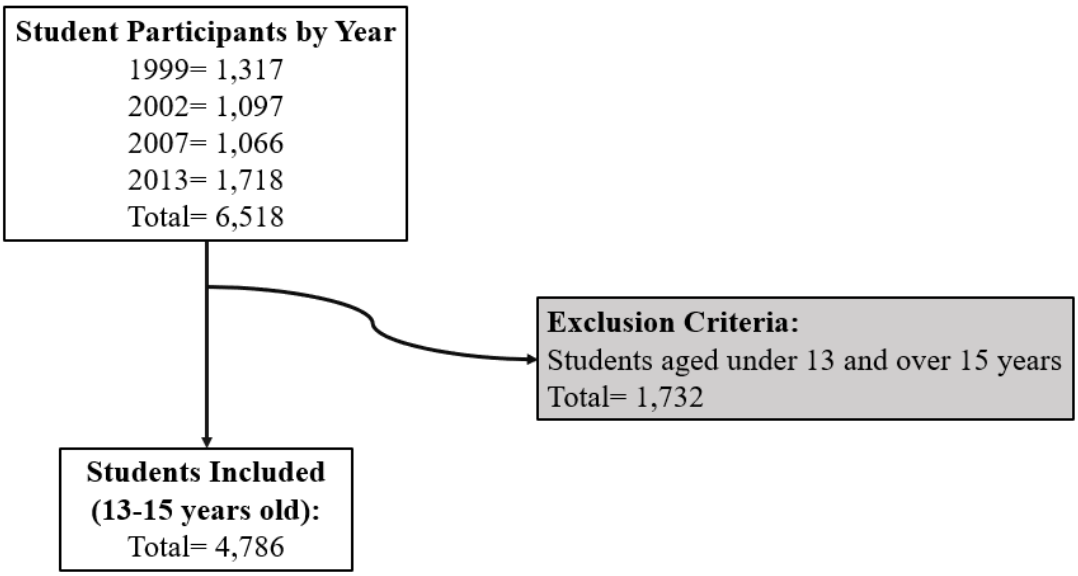

Figure 3: Showing the inclusion and exclusion criteria of this study

2.3 Analysis of Variables

The question, “During the past 30 days, on how many days did you smoke cigarettes?” was selected as one of the dependent factors, which represented the individuals current smoking status. If the respondent stated that they smoked on 1 or more days during the past 30 days, they were considered current cigarette smokers. The other dependent factor was youth intention to smoke, which showed whether students would want to smoke cigarettes in the next 12 months.

The independent factors, which many influence smoking status will be selected as, (1) exposure to smoking in home, (2) exposure to smoking in outdoor spaces, (3) exposure to tobacco in TV, videos and movies, (4) received tobacco education, (5) ownership of an item with a tobacco product brand logo, (6) exposure to anti-tobacco media messages, (7) support for banning smoking in public places. These variables were adapted from previous validated studies[23,24] and they were only used if all the four surveys asked the same question. Table 1 shows the selected dependent and independent variables chosen in this study.

2.3.1 Recoding of Selected Variables

Table 1: Showing how study measures and responses were recoded into dichotomized measures

Study Measure	Survey Items	Item Response	Dichotomized Measure
Dependent Variables			
Current Smoking Status	During the past 30 days, on how many days did you smoke cigarettes?	0 days 1 or 2 days 0 to 5 days 6 to 9 days 10 to 19 days 20 to 29 days All 30 days	No= 0 days Yes ≥ 1 day
Intention to smoke	At anytime during the next 12 months do you think you will use any form of tobacco?	Definitely not Probably not Probably yes Definitely yes	No= Definitely not and Probably not Yes= Probably yes and Definitely yes
Independent variables			
Ever used any form of smoked tobacco besides cigarettes	Have you ever tried or experimented with any form smoked tobacco products other than cigarettes (such as pipes, cigars, fanta)?	Yes No	Yes No
Exposure to smoking in home	During the past 7 days, on how many days has anyone smoked inside your home, in your presence?	0 days 1 to 2 days 3 to 4 days 5 to 6 days 7 days	No= 0 days Yes ≥ 1 day
Outdoor exposure to smoking	During the past 7 days, on how many days has anyone smoked in your presence, at any outdoor public place (such as playgrounds, sidewalks, entrances to buildings, parks, beaches)?	0 days 1 to 2 days 3 to 4 days 5 to 6 days 7 days	No= 0 days Yes ≥ 1 day
Media exposure to smoking	During the past 30 days, did you see any people using tobacco when you watched TV, videos, or movies?	I did not watch TV, videos or movies in the past 30 days Yes No	No=didn't watch & wasn't exposed Yes
Seen anti-tobacco media	During the past 30 days, did you see or hear any anti-tobacco media messages on television,	Yes No	Yes No

	radio, internet, billboards, posters, newspapers, magazines, or movies?		
Learned about the dangers of smoking in school	During the past 12 months, were you taught in any of your classes about the dangers of tobacco use?	Yes No I don't know	Yes=Yes No= No & I don't know
Tobacco Promotion	Do you have something (for example, t-shirt, pen, backpack) with a tobacco product brand logo on it?	Yes No	Yes No
Support smoke-free policies	Are you in favour of banning smoking at outdoor public places (such as playgrounds, sidewalks, entrances to buildings, parks, beaches)?	Yes No	Yes= Yes No= No
Attempt at Cessation	Have you ever received help or advice to help you stop smoking?	Yes, from a program or professional Yes, from a friend Yes, from a family member Yes, from both programs or professionals and from friends or family members No	Yes= Answer yes to individual and combined sources No=No
Health Services Regulations Implementation	NA	Years (1999, 2002, 2007) Year (2013)	No Yes

2.4 Descriptive Analysis

The data from the Global Youth Tobacco Surveys (1999, 2002, 2007, 2013) was analyzed using descriptive statistics to present the frequency of each variable in a tabulated form. Descriptive analyses were carried out using SAS V.9.4 of the SAS System for Windows © 2016 SAS Institute Inc. Cary, NC, USA.2.4 Statistical Analysis.

2.5 Statistical Analysis

Statistical analysis and logistic regression were conducted using SAS 9.4 and R version 3.5.2. The weights, primary sampling and stratification units was used to accommodate the complex survey design. The $p \leq 0.05$ significance level was used to compare data by gender and year.

Chapter 3. Results

3.1 Descriptive analysis of the study population

Table 2: General Characteristics of the population (N= 4,786)

Variables	Categories	1999		2002		2007		2013	
		Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Age	13	40	67	52	73	200	250	270	238
	14	213	294	197	261	208	184	264	303
	15	276	416	211	298	132	81	118	110
Total		529	777	460	632	540	515	652	651
(%)		(40.4)	(59.6)	(48.1)	(51.9)	(47.2)	(52.8)	(51.7)	(48.3)

*There are differences in the sample sizes because of non-answered (missing) values

Table 2 shows the general characteristics of the Global Youth Tobacco Survey participants in Barbados from 1999 to 2013. From this table we can see that more female students participated in this survey from 1999 to 2007 but in 2013 more males (51.7%) participated than females (48.3%).

3.2 Prevalence of tobacco use and associated factors

Table 3: Prevalence of tobacco use among Barbadian adolescents (13 to 15 years old) by survey year and sex

		Currently Smoke Cigarettes		
Prevalence	**Total**	**Male**	**Female**	**Male-Female p value**
1999	10.8 (± 0.9)	9.2 (± 1.3)	11.9 (± 1.3)	0.1353
2002	7.0 (± 0.8)	7.6 (± 1.3)	6.4 (± 1.0)	0.4817
2007	11.6 (± 1.1)	14.3 (±1.6)	9.3 (± 1.4)	0.0175
2013	7.0 (± 0.7)	8.8 (± 1.2)	5.0 (± 0.9)	0.0084
Percent change	-35%	-4%	-58%	
p value	0.0234	0.0109	<.0001	
		Ever Smoked Cigarettes		
Prevalence	**Total**	**Male**	**Female**	**Male-Female p value**
1999	34.7 (± 1.4)	33.5 (± 2.2)	35.5 (± 1.8)	0.4651
2002	29.1 (± 1.4)	32.3 (± 2.3)	26.2 (± 1.8)	0.0365
2007	32.3 (± 1.5)	40.2 (± 2.2)	25.3 (± 2.0)	<.0001
2013	24.8 (± 1.3)	28.3 (± 1.8)	21.1 (± 1.7)	0.0043
Percent change	-29%	-16%	-41%	
p value	<.0001	0.0006	<.0001	
		Currently Use Other Smoked Tobacco Products		
Prevalence	**Total**	**Male**	**Female**	**Male-Female p value**
1999	9.1 (± 0.8)	10.1 (± 1.3)	8.4 (± 1.0)	0.3069
2002	10.2 (± 1.0)	11. 9 (± 1.6)	8.7 (± 1.2)	0.1057
2007	20.4 (± 1.3)	25.2 (± 1.9)	16.1 (± 1.7)	0.005
2013	9.4 (± 0.8)	10.8 (± 1.3)	7.9 (± 1.1)	0.0781
Percent change	3%	7%	-6%	
p value	<.0001	<.0001	0.0004	
		Have intentions to smoke in next 12 months		
Prevalence	**Total**	**Male**	**Female**	**Male-Female p value**
1999	5.8 (± 0.7)	4.6 (± 1.0)	6.6 (± 1.0)	0.1445
2002	4.5 (± 0.7)	3.9 (± 1.0)	5.2 (± 1.0)	0.3440
2007	5.3 (± 0.8)	5.4 (± 1.1)	5.3 (± 1.0)	0.9165
2013	9.7 (± 0.9)	8.7 (± 1.2)	10.6 (± 1.3)	0.2855
Percent change	67%	89%	61%	

P value	0.7077	0.0083	0.0565	
	Have intentions to smoke in next 12 months (never smokers)			
Prevalence	**Total**	**Male**	**Female**	**Male-Female p value**
1999	2.3 (± 0.5)	2.1 (± 0.8)	2.5 (± 0.7)	0.6738
2002	1.8 (± 0.5)	1.6 (± 0.7)	2.0 (± 0.6)	0.6348
2007	2.6 (± 0.6)	2.4 (± 0.9)	2.8 (± 0.8)	0.7615
2013	7.3 (± 0.9)	6.1 (± 1.2)	8.4 (± 1.3)	0.1828
Percent change	217%	190%	236%	
P value	0.1784	0.0504	0.1182	

Table 3 illustrates the prevalence of tobacco use between 1999 and 2013. Current cigarette use decreased overall (by 35%) but female current cigarette use decreased significantly more than males over the four surveyed years. There was no significant gender gap between male and female prevalence in 1999 and 2002 but a significant gap appeared from 2007 and 2013.

Adolescents who had ever tried smoking a cigarette decreased significantly overall by 29% and males were more likely to have ever smoked cigarettes than females. Gender gaps were seen in the years 2002, 2007 and 2013, with 2007's gender gap being the most significant.

The prevalence of adolescents who currently use other smoked tobacco products besides cigarettes increased overall, but it decreased for females from 1999 to 2013. The gender gap in 2007 was more significant than any of the other surveyed years.

The prevalence of adolescents who didn't smoke in the last month but intended to smoke in the near future, increased overall by 67% and males were more likely to want to smoke than females. However, no significant gender gaps were seen among the survey years.

The prevalence of adolescents who never smoked but intend to smoke in the future increased overall by 217% with males who never smoked being less likely to want to smoke in the future than females. There were also no significant gender gaps seen among the four survey years.

Table 4: Factors influencing tobacco use among adolescents (13-15 years) in Barbados by age and sex

		Year					
Factor	**Sex**	**1999**	**2002**	**2007**	**2013**	**%Change 1999-2013**	**p value**
Outdoor exposure to second-hand smoke in the past seven days	*Total*	51.0 (± 1.4)	52.0 (± 1.6)	59.6 (± 1.6)	46.0 (± 1.4)	-10	0.3039
	Male	52.2 (± 2.3)	50.2 (± 2.4)	59.7 (± 2.2)	43.8 (± 2.0)	-16	<.0001
	Female	50.2 (± 1.8)	53.7 (± 2.1)	59.6 (± 2.2)	48.4 (± 2.1)	-4	0.0012
	Male-Female p value	0.5018	0.2697	0.9948	0.1081		
Home exposure to second-hand smoke in the past seven days	*Total*	22.4 (± 1.2)	22.4 (± 1.3)	25.9 (± 1.4)	19.1 (± 1.1)	-15	0.0562
	Male	20.9 (± 1.9)	19.4 (± 1.9)	25.9 (± 1.9)	17.3 (± 1.5)	-17	0.0054
	Female	23.5 (± 1.6)	25.2 (± 1.8)	26.0 (± 2.0)	21.1 (± 1.6)	-10	0.2075
	Male-Female p value	0.2822	0.0248	0.9648	0.0847		
Media exposure to tobacco use in the past 30 days	*Total*	84.8 (± 1.0)	93.3 (± 0.8)	51.9 (± 1.6)	62.8 (± 1.4)	-26	0.0006
	Male	88.1 (± 1.4)	89.9 (± 1.5)	52.3 (± 2.2)	60.5 (± 2.0)	-31	<.0001
	Female	82.5 (± 1.4)	96.5 (± 0.7)	51.4 (± 2.3)	65.2 (± 2.0)	-21	<.0001
	Male-Female p value	0.0049	<.0001	0.7768	0.0927		
Learned about the dangers of tobacco use in school	*Total*	32.1 (± 1.4)	41.4 (± 1.5)	33.2 (± 1.5)	32.0 (± 1.4)	-0.3	0.6583
	Male	30.3 (± 2.1)	40.7 (± 2.4)	37.7 (± 2.2)	32.0 (± 1.9)	6	0.0022
	Female	33.2 (± 1.8)	42.0 (± 2.0)	29.3 (± 2.0)	32.1 (± 2.0)	-3	<.0001
	Male-Female p value	0.2775	0.6936	0.0049	0.9838		
Saw any anti-tobacco media messages in the past 30 days	*Total*	77.1 (± 1.3)	77.6 (± 1.3)	53.9 (± 1.6)	49.9 (± 1.5)	-35	0.0005
	Male	75.6 (± 2.1)	76.3 (± 2.0)	53.3 (± 2.2)	47.6 (± 2.1)	-37	<.0001
	Female	78.1 (± 1.5)	78.8 (± 1.7)	54.5 (± 2.3)	52.5 (± 2.1)	-33	<.0001
	Male-Female p value	0.3405	0.3449	0.7084	0.0940		
Support banning smoking at outdoor public places	*Total*	79.4 (± 1.2)	77.4 (± 1.3)	74.8 (± 1.4)	58.4 (± 1.4)	-26	<.0001
	Male	80.6 (± 1.9)	73.2 (± 2.1)	68.7 (± 2.0)	56.0 (± 2.0)	-29	<.0001
	Female	78.6 (± 1.6)	81.2 (± 1.6)	80.4 (± 1.9)	60.9 (± 2.0)	-23	<.0001
	Male-Female p value	0.4086	0.0027	<.0001	0.0853		

Own anything with a tobacco brand logo	*Total*	14.5 (± 1.0)	15.6 (± 1.2)	15.6 (± 1.2)	18.7 (± 1.1)	31	0.0001
	Male	13.4 (± 1.6)	20.3 (± 1.9)	19.4 (± 1.7)	19.7 (± 1.6)	48	0.0093
	Female	15.3 (± 1.4)	11.2 (± 1.3)	12.3 (± 1.5)	17.6 (± 1.5)	17	0.0076
	Male-Female p value	0.3637	0.0001	0.0022	0.3433		
Current smokers who have received help from a professional and/or family	*Total*	53.0 (± 4.6)	51.5 (± 6.1)	59.2 (± 4.7)	51.9 (± 5.6)	-2	0.0248
	Male	63.3 (± 7.1)	57.7 (± 9.0)	58.7 (± 6.0)	60.4 (± 6.9)	-5	0.9550
	Female	47.3 (± 5.9)	44.9 (± 7.9)	59.7 (± 7.5)	36.9 (± 8.8)	-22	0.2677
	Male-Female p value	0.0868	0.2943	0.9066	0.0430		

Table 4 shows that exposure to outdoor second-hand smoke decreased from 51% in 1999 to 46.0% in 2013. When comparing 1999 and 2013, females' exposure outside of the home decreased less than males. Even though an overall decrease of 10% is seen, the prevalence is still a high percentage.

Exposure to second-hand smoke in the home decreased overall also by 15%, with males showing a significant decrease of 17%. In 2002 there was a significant difference between male and female exposure.

Media exposure to tobacco use also decreased significantly overall by 26% within the surveyed years, with gender gaps seen in 1999 and 2002. In 2002, media exposure rose to 93.3% with females being more exposed to tobacco use then their male counterparts. Comparing 1999 and 2013, female exposure decreased by 21% while male exposure decreased by 31%.

Education about the dangers of tobacco use decreased slightly overall by 0.3%, with females reporting a significant decrease of 3%, while males' tobacco awareness increased by 6%. In 2007, a significant gender gap in education was seen with 37.7% of males reporting learning about tobacco use, compared to 29.3% of females.

Between 1999 and 2013, the prevalence of adolescents seeing anti-tobacco media messages decreased significantly by 35%. Males and females reported a 37% and 33% decrease respectively. No significant gender gaps were seen between the four surveyed years.

Between 1999 and 2013, there was a reported significant overall decrease of adolescents who supported smoke-free policies in public places by 26%. There were significant gender gaps seen in 2002 and 2007, where females were more supportive of banning smoking in public places than males. Overall, males' support for smoke-free policies decreased by 29% while females reported a 23% decrease.

Between 1999 and 2013, ownership of a product with a tobacco brand logo increased significantly overall by 31%. Significant gender gaps were seen in 2002 and 2007. In 2002, 20.3% of males reported owning such product, compared to 11.2% of females. And in 2007, 19.4% of males, compared to 12.3% of females reported owning an item with a tobacco brand.

Current smokers who have received help from a professional, program and or friends decreased by 2%. It can be seen that females (22% decrease) received less help than males (5% decrease), with a significant gender gap recorded in 2013.

3.2 Regression analysis of factors associated with current smoking

Table 5: Regression analysis of factors associated with current smoking status among youth, GYTS, 1999-2013

Characteristics	Category	OR (95% CI)	AOR (95% CI)
Sex	Female	REF	REF
	Male	1.21*** (± 0.04)	1.24*** (± 0.04)
Age	13 years	REF	REF
	14 years	1.17** (± 0.05)	1.19** (± 0.06)
	15 years	1.34 *** (± 0.05)	1.33** (± 0.06)
Outdoor exposure to second-hand smoke	No	REF	REF
	Yes	2.64*** (± 0.04)	1.98*** (± 0.05)
Home exposure to second-hand smoke	No	REF	REF
	Yes	4.09*** (± 0.04)	3.22*** (± 0.04)
Media exposure to tobacco use	No	REF	REF
	Yes	1.11* (± 0.04)	1.01 (± 0.05)
Own anything with a tobacco brand logo	No	REF	REF
	Yes	2.81*** (± 0.04)	2.15*** (± 0.05)
Implementation of Health Services Regulations	No	REF	REF
	Yes	0.69*** (± 0.05)	0.70*** (± 0.06)

REF- reference value, OR- odds ratio, AOR-adjusted odds ratio, 95% CI- 95% Confidence Intervals

*β p< 0.05, * p<0.01, ** p<0.001 *** p<0.000*

Table 5 shows the results of logistic regression as odds ratio values. Using adjusted odds ratio, males (AOR 1.25, 95% CI ± 0.04), adolescents aged 14 (AOR 1.26, 95% CI ± 0.06) and 15 (AOR 1.33, 95% CI ± 0.06), those exposed to second-hand smoke in outdoor places (AOR 1.90, 95% CI ± 0.05) and in the home (AOR 3.21, 95% CI ± 0.04) and those who owned any item with a tobacco brand logo (AOR 2.14, 95% CI ± 0.05) were significantly associated with being current cigarette

smokers. Media exposure to tobacco use was not statistically associated with current smoking status using the adjusted odds ratio but it was significant in the unadjusted model.

Table 6: Regression analysis of factors associated with current cigarette smoking status among youth and stratified by gender GYTS, 1999-2013

		Male		Female	
Characteristics	**Category**	**OR (95% CI)**	**AOR (95% CI)**	**OR (95% CI)**	**AOR (95% CI)**
Age	13 years	REF	REF	REF	REF
	14 years	0.94 (± 0.07)	0.98 (± 0.08)	1.54*** (± 0.08)	1.48*** (± 0.08)
	15 years	1.20* (± 0.07)	1.07 (± 0.08)	1.59*** (± 0.08)	1.37*** (± 0.09)
Outdoor exposure to second-hand smoke	No	REF	REF	REF	REF
	Yes	3.37*** (± 0.06)	2.69*** (± 0.07)	2.07*** (± 0.07)	1.51*** (± 0.06)
Home exposure to second-hand smoke	No	REF	REF	REF	REF
	Yes	4.23*** (± 0.06)	3.01*** (± 0.06)	4.03*** (± 0.06)	3.36*** (± 0.06)
Media exposure to tobacco use	No	REF	REF	REF	REF
	Yes	1.00 (± 0.06)	1.02 (± 0.07)	1.25*** (± 0.07)	0.99 (± 0.07)
Own anything with a tobacco brand logo	No	REF	REF	REF	REF
	Yes	2.35*** (± 0.06)	1.91*** (± 0.07)	3.27*** (± 0.06)	2.53*** (± 0.07)
Implementation of Health Services Regulations	No	REF	REF	REF	REF
	Yes	0.84** (± 0.06)	0.91 (± 0.07)	0.51*** (± 0.08)	0.49*** (± 0.09)

REF- reference value, OR- odds ratio, AOR-adjusted odds ratio, 95% CI- 95% Confidence Intervals

*β p< 0.05, * p<0.01, ** p<0.001 *** p<0.000*

Age was more significantly associated with current smoking status in females than in males, with 14 and 15-year olds having higher odds of smoking than 13-year olds (AOR 1.48, 95% CI ± 0.08 and AOR 1.37, 95% CI ± 0.09 respectively).

Current smokers in both genders were more likely to have been exposed to smoking in the home and outdoor. However, males (AOR 2.69, 95% CI ± 0.07) who were exposed to outdoor

secondhand smoke had higher odds of being current smokers, while females (AOR 3.36, 95% CI ± 0.06) who were exposed in the home were more likely to be current smokers.

The association between media exposure to tobacco use and current cigarette use was not statistically significant in males or females in the adjusted model. But in the unadjusted model, females who exposed to smoking in the media were more likely to be current smokers (OR 1.25, 95% CI ± 0.07).

Owning any item with a tobacco brand logo was significantly associated with current cigarette smoking in both genders but females (AOR 2.53, 95% CI ± 0.07) once again had higher odds than males (AOR 1.91, 95% CI ± 0.07)

In the adjusted model, the Health Regulations were associated with lower odds of current cigarette smoking in females and males, but it was only significant in females (AOR 0.49, 95% CI ± 0.09) (Table 6).

3.3 Regression analysis of factors associated with intention to smoke among non-current smokers

Table 7: Regression analysis of factors associated with non-current smokers' intentions to smoke in the next year among youth, GYTS, 1999-2013 (n= 4786)

Characteristics	Category	OR (95% CI)	AOR (95% CI)
Sex	Female	REF	REF
	Male	0.86*** (± 0.05)	0.73*** (± 0.05)
Age	13 years	REF	REF
	14 years	1.19** (± 0.06)	1.39*** (± 0.07)
	15 years	0.94 (± 0.07)	1.20* (± 0.07)
Saw any anti-tobacco media messages	No	REF	REF
	Yes	0.76*** (± 0.05)	0.79*** (± 0.06)
Outdoor exposure to second-hand smoke	No	REF	REF
	Yes	1.66 *** (± 0.05)	1.45*** (± 0.06)
Home exposure to second-hand smoke	No	REF	REF
	Yes	2.10*** (± 0.05)	1.66*** (± 0.06)
Media exposure to tobacco use	No	REF	REF
	Yes	1.13*** (± 0.05)	1.36*** (± 0.06)
Own anything with a tobacco brand logo	No	REF	REF
	Yes	2.67*** (± 0.06)	2.18*** (± 0.06)
Support smoke free policies	No	REF	REF
	Yes	0.31*** (± 0.05)	0.40*** (± 0.06)
Implementation of Health Regulations Services	No	REF	REF
	Yes	1.95*** (± 0.05)	1.64*** (± 0.06)

REF- reference level, OR- odds ratio, AOR-adjusted odds ratio, 95% CI- 95% Confidence Intervals

*β p< 0.05, * p<0.01, ** p<0.001 *** p<0.000*

Table 7 presents the results of logistic regression of factors associated with non-current smokers' intentions to smoke as odds ratio values. Using adjusted odds ratio, males (AOR 0.73, 95% CI ± 0.05), those who viewed anti-tobacco media messages (AOR 0.79, 95% CI ± 0.06), those who received education about the dangers of tobacco use (AOR 0.83, 95% CI ± 0.06) and those who support smoke free policies (AOR 0.40, 95% CI ± 0.06) were less likely to want to smoke in the future. On the other hand, adolescents who were 14 years old (AOR 1.39 95% CI ± 0.07), 15 years old (AOR 1.20, 95% CI ± 0.07) exposed to secondhand smoke in the home (AOR 1.66, 95% CI ± 0.06), outside of the home (AOR 1.45 95% CI ± 0.06) and in the media (AOR 1.36, 95% CI ± 0.06), those who owned an item with a tobacco brand logo (AOR 2.18, 95% CI ± 0.06) and the Health Regulations (AOR 1.64, 95% CI ± 0.06) were associated with wanting to smoke cigarettes in the next twelve months.

Table 8: Regression analysis of factors associated with non-current smokers' intentions to smoke in the next year among youth and stratified by gender GYTS, 1999-2013

		Male		Female	
Characteristics	**Category**	**OR (95% CI)**	**AOR (95% CI)**	**OR (95% CI)**	**AOR (95% CI)**
Age	13 years	REF	REF	REF	REF
	14 years	1.08 (± 0.10)	1.24* (± 0.10)	1.28** (± 0.08)	1.55*** (± 0.09)
	15 years	0.94 (± 0.10)	1.21 $^{\beta}$ (± 0.11)	0.95 (± 0.09)	1.22* (± 0.10)
Outdoor exposure to second-hand smoke	No	REF	REF	REF	REF
	Yes	1.13 (± 0.08)	1.08 (± 0.08)	2.22*** (± 0.07)	1.79*** (± 0.07)
Home exposure to second-hand smoke	No	REF	REF	REF	REF
	Yes	1.36*** (± 0.09)	1.24* (± 0.10)	2.66*** (± 0.07)	1.93*** (± 0.07)
Media exposure to tobacco use	No	REF	REF	REF	REF
	Yes	0.77** (± 0.08)	0.92 (± 0.09)	1.56*** (± 0.08)	1.85*** (± 0.09)
Saw any anti-tobacco media messages	No	REF	REF	REF	REF
	Yes	0.80** (± 0.08)	0.88 (± 0.08)	0.72*** (± 0.07)	0.68*** (± 0.07)
Own anything with a tobacco brand logo	No	REF	REF	REF	REF
	Yes	1.95*** (± 0.09)	1.78*** (± 0.09)	3.53*** (± 0.07)	2.46*** (± 0.08)
Support smoke free policies	No	REF	REF	REF	REF
	Yes	0.41*** (± 0.08)	0.53*** (± 0.08)	0.24*** (± 0.07)	0.30*** (± 0.07)
Implementation of Health Services Regulations	No	REF	REF	REF	REF
	Yes	1.98*** (± 0.08)	1.77*** (± 0.09)	1.95*** (± 0.07)	1.38*** (± 0.08)

REF- reference level, OR- odds ratio, AOR-adjusted odds ratio, 95% CI- 95% Confidence Intervals

*β p< 0.05, * p<0.01, ** p<0.001 *** p<0.000*

Gender stratification was used again to determine whether the above factors were confounded by the gender of the participants. Age was significantly associated with future intention to smoke in

both genders however, age was more significantly associated with female non-smokers. Fourteen-year-old girls (AOR 1.55, 95% CI ± 0.09) were more likely to intend on smoking than thirteen and fifteen-year olds.

Females who wanted to smoke in the future were also more likely to be exposed to outdoor (AOR 1.79, 95% CI ± 0.07) and home (AOR 1.93, 95% CI ± 0.07) secondhand smoke and tobacco use in the media (AOR 1.85, 95% CI ± 0.09) than their male counterparts.

Females (AOR 0.68, 95% CI ± 0.07) and males (AOR 0.88, 95% CI ± 0.08) who saw anti-tobacco messages in the media were less likely to intend to smoke but this was only significant in females.

Those who owned a tobacco logo branded item were more likely to have intentions to smoke. Females who possessed such items (AOR 2.46, 95% CI ± 0.08) had a higher likelihood of intending to smoke than males (AOR 1.78, 95% CI ± 0.09).

Both males (AOR 0.53, 95% CI ± 0.08) and female (AOR 0.30, 95% CI ± 0.07) nonsmokers who supported smoke-free bans were significantly less likely to have intentions to smoke. Meanwhile, the Health Services Regulations were associated with both males (AOR 1.77, 95% CI ± 0.09) and females (AOR 1.38, 95% CI ± 0.08) intending to smoke in the future (Table 8).

Chapter 4. Discussion

4.1 Discussion of Results

The objectives of this research were to analyze the trends in cigarette smoking among adolescents in Barbados and to explore the contribution the Global Youth Tobacco Survey played in implementing tobacco control legislation. Data from 4,786 students was analyzed from four years (1999, 2002, 2007, 2013) of the Global Youth Tobacco Survey conducted in Barbados.

From 1999 to 2002 the Overall prevalence of current cigarette use decreased but subsequently increased in 2007. This increase could be a result of tobacco companies and distributors increasing their advertising campaigns and distributing tobacco branded items, which could affect minors[25]. Prevalence rates increased after the ratification of the FCTC in 3rd November 2005 but decreased in 2013. This decrease could be due to the Barbadian government passing the Health Services Regulations (Protection of Minors from Tobacco Products) in 2010. Prevalence of current cigarette use in females (11.9%) was only higher than males (9.2%) in 1999. Comparing 1999 and 2013, current cigarette use in females (-58%) decreased at a faster rate than in males (-4%). Significant gender gaps in current cigarette use were seen in 2007 and 2013.

From 1999 to 2002 the overall prevalence of ever cigarette smokers decreased from 34.7% to 29.1% but increased to 32.3% in 2007. In 2013, the prevalence decreased again to 24.8%. In 2007 male prevalence was at its highest (40.2%) but female prevalence decreased continuously from 1999 to 2013, with the highest rate in 1999 (35.5%). There were gender gaps in 2002, 2007 and 2013, with the most significant gap being in 2007. Contrary to this, a survey conducted by the WHO showed that boys and girls had similar smoking rates in half of the 151 countries studied[26].

Current use of other smoked tobacco products showed an overall increase of 3%, when 1999 and 2013 data were compared. In 2007, it reached its highest rate of 20.4% and decreased to 9.4% in 2013. Males reported an increase of 7% overall however females reported a 6% decrease. A significant gender gap was seen in 2007.

Teens who don't currently smoke and those who have never smoked reported an increase in wanting to smoke in the next 12 months. Although these results were not statistically significant overall, non-smoking males reported a significant increase in future intentions to smoke. No significant gender gaps were observed in this category.

Outdoor exposure to second-hand smoke generally decreased by 10% from 1999 to 2013 but a spike was seen in 2007. Females reported being more exposed to second-hand smoke than males. These results are similar to a Korean study carried out on GYTS 2013 data where females were more likely to be exposed than males[27].

Exposure to second-hand smoke in the home also decreased from 1999 to 2013 with males reporting a more significant decrease than females. Similar results were observed in studies conducted in Gambia and Greece, where females were more likely to be exposed to second-hand smoke in the home than males[28,29]. Young girls are more likely to be affected by decreased lung function than boys when exposed to high amounts of second-hand smoke inside and outside of the home[30].

Media exposure to tobacco use decreased overall, with significant gender gaps in 1999 and 2002. Males reported a greater decrease than females. Exposure to tobacco use and tobacco advertisements is still a serious public health issue even though Barbados ratified the WHO FCTC in 2005 and the rate is still high among adolescents. From the WHO report on the Global Tobacco Epidemic conducted in Barbados in 2017 and 2019, we can see that there were no bans on direct tobacco advertising, whether that be on national or international television[31,32].

Students who reported seeing anti-tobacco media messages decreased significantly from 1999 to 2013. The WHO reports also noted that there were no anti-tobacco mass media campaigns between 1st July 2014 and 30th June 2018 in Barbados[31,32]. There is strong evidence that anti-smoking campaigns decrease tobacco use and increase the number of attempts to stop smoking among adolescents and adults[33-36]. There was a significant decline in students who supported "smoke-free

policies" such as banning smoking in public places, from 1999 to 2013. This could be the result of their parents' attitude towards smoking and anti-tobacco campaigns being less frequent and effective[37-39].

There was an increase in students owning an item with a tobacco brand logo. In 2002 and 2007 there were significant gender gaps where males reported possessing more items with a tobacco brand logo than females. Promotion of tobacco falls under "TAP" which is tobacco advertising and promotion and it is defined by the WHO FCTS as "any form of commercial communication, recommendation or action with the aim, effect or likely effect of promoting a tobacco product or tobacco use either directly or indirectly"[40]. Using marketing strategies such as specialty items with tobacco brand logos on them, can normalize tobacco use and make it seem desirable to youth[41]. One study conducted in the Czech Republic showed that children as young as eight years old were aware of tobacco brands and 59% of the children surveyed could name at least two cigarette brands[42].

According to the first stage of regression results, being male, older than 13, exposed to second-hand smoke in the home and outdoors, and owning a product with a tobacco brand logo were significantly associated with current cigarette smoking in adolescents. (p value <0.05). As expected, the implementation of the Health Service Regulations was associated with lower odds of current smoking. However, being exposed to tobacco use in the media was not significantly associated with current cigarette use.

The regression was then stratified by gender and older females were more likely to be current smokers than males but once again media exposure to tobacco did not have a significant effect on boys or girls' current smoking status. Females who owned an item with a tobacco brand logo had higher odds of being current smokers than males. The Health Services Regulations was significantly associated with lower odds of current smoking in females, but this was not significant in males. It is well known that the tobacco industry has been utilizing gendered tactics in marketing for decades and

because Barbados does not have a comprehensive ban on tobacco advertising and promotion, many fluctuations in tobacco use can be seen. Up to 2007, there were no prohibitions on distribution on free tobacco products to the public including minors, but this was updated in 2008 to exclude minors[43]. Still, free distribution to adults can serve as indirect promotion to adolescents who observe the marketing. Tobacco companies are still able to use their brand names on non-tobacco goods and services to indirectly promote.

Being female, older than 13 years old, exposed to second-hand smoke outside the home, inside the home and in the media and owning a product with a tobacco brand logo were more likely to intend to smoke in the next 12 months. Those who viewed anti-tobacco media messages and who supported banning smoking in outdoor public places were less likely to want to smoke in the future. Surprisingly, during the period of the Health Regulations, non-current smokers were more likely to have intentions to smoke in the future.

In a previous GYTS study conducted in Thailand, males were more likely to intend to smoke in the future instead of females. This difference could have arisen because they used the survey question, "Do you think you will be smoking cigarettes 5 years from now?" as a determination of youths' intention to smoke[44]. This question was not available in all the Barbadian surveys, so it wasn't used for this analysis. Fourteen-year olds had 1.39 higher odds of having intentions to smoke in the next 12 months and fifteen-year olds had 1.20 higher odds, but this was not statistically significant. Students who supported smoke free policies were less likely to have intentions to smoke. This result coincides with a previous study that investigated susceptibility of never smoking youth worldwide. In their study they found that support for smoke-free policies had an inverse association with susceptibility[45].

Barbadian females who were non-current smokers had higher odds than males of being exposed to tobacco promotion in the form of tobacco brand logos and via the media. Recognizing why these gender differences exist can help the government effectively counter such approaches. One

theory is that the tobacco industry has identified the psychosocial needs of women in different age groups and living situations. Before, the allusion of independence or weight loss have been advertised to young women but now tobacco distributors are emphasizing self-confidence and female solidarity without even referring to cigarettes[46]. These subtle tactics could be indirectly steering Barbadian youths especially females, into a direction of future cigarette use.

In the Caribbean, many youth smoking prevention programmes have been created to discourage youth smoking, but these are usually not very effective. One might hypothesize that these programmes help the industry more by marketing themselves as responsible companies that want to make a positive impact which might in turn reverse any negative connotations. In Barbados, a major distributor called Bryden Stokes Limited, launched their Youth Smoking Prevention Programme in 2011 but ever cigarette smokers are still high and current cigarette use has barely decreased[47].

4.1.2 GYTS and its Impact on Tobacco Control Regulations

By observing prevalence rates from 1999 to 2013, current cigarette use, ever cigarette use, current smoked tobacco use was the highest in 2007. Even though the WHO FCTC was ratified in 2005 the rates only decreased slightly in 2013 after comprehensive tobacco regulations were enacted in 2010. The GYTS data serves as evidence for policy makers and helps monitor youth smoking behaviours.

The Health Services Regulations prohibiting smoking in public places and protecting minors from tobacco were passed in 2010 and the GYTS played a very important role in this enactment. The 2007 GYTS showed that tobacco use was increasing rapidly in both males and females, with 14.3% of males and 9.3% of females reporting that they currently smoked. That survey showed that more of the youth were being exposed to outdoor second-hand smoke and advocates against smoking such as Dr. Tony Gale[13] provided evidence that the government needed to be more proactive in tobacco control.

The GYTS conducted between 2013 and 2014 showed that tobacco use was still a pressing issue in Barbados and the government began working on regulations that would require that all tobacco products came with graphic warning labels[49]. Electronic cigarettes were also gaining popularity around this time and were largely unregulated by the government. In order to counteract this popularity, the older regulations were revoked, and new regulations were implemented in 2017 that prohibited the use of electronic cigarettes by minors[50]. These regulations also addressed public smoking bans and tobacco label graphic warnings[50].

The WHO FCTC offers guidelines and regulations in counteracting tobacco promotion and advertising. It would be very beneficial for Barbados to follow Article 13's recommendations and place a comprehensive ban on indirect and direct forms of tobacco promotion[51]. It is currently illegal to sell any item that resembles any form of tobacco but items with tobacco branded logos are still being given to minors. Barbados should also prohibit tobacco companies and distributors from creating campaigns and programmes to prevent youth smoking as this can serve as indirect promotion and advertising[51].

Fortunately, Barbados seems to be taking a step in the right direction by helping develop a regional standard for tobacco advertising, promotion and sponsorship for CARICOM. This was announced in June 2020 and various stakeholders are being asked to contribute[52].

4.2 Effectiveness of this Research

The results obtained from this study imply that current and ever cigarette use has decreased overall but significant gender gaps still remain. This information can be useful to the Barbadian government and Ministry of Health when implementing tobacco control policies to ensure both male and female prevalence decrease.

These results also suggest that the youth are using tobacco products other than conventional cigarettes and these products must be targeted to fully combat tobacco use. One such product is

electronic cigarettes, which are not covered by the GYTS questions in Barbados, and hopefully this research can serve as evidence to include it in future surveys.

4.3. Study Limitations

Since the GYTS is conducted through self-reporting, there may be cases of under-reporting and over-reporting. The GYTS data only applies to students enrolled in schools and who were not absent on the day the survey was administered.

Another limitation is that electronic cigarette use has not been included in any of the surveys. The Barbadian has realized that electronic cigarettes are becoming increasingly popular and the Health Services Act, Cap. 44 has been amended in 2017 to reflect this. The Act now calls for the "protection of persons, particularly minors, from the consumption of tobacco products and electronic smoking devices and from exposure to tobacco smoke and emissions from electronic smoking devices;"[50]. Therefore, electronic cigarette use should also be included in future GYTS questions.

Chapter 5. Conclusion

This study has shown that there were significant gender differences in tobacco use and exposures in the 1998, 2002, 2007 and 2013 Barbados GYTS. Current and ever cigarette use decreased but current use of other forms of tobacco increased significantly from 1999 to 2013. Gender, age, exposure to second-hand smoke in outdoor places, the home, exposure to anti-tobacco media messages and ownership of a tobacco brand logo were associated with current smoking status. In non-current smokers, being female, older than 13 years, exposed to second-hand smoke in the home, outside the home and the media and owning a tobacco brand logo was significantly associated with intention to smoke.

The GYTS surveys played an important role in implementing tobacco legislature and some decreases in prevalence were seen after the laws were taken into effect. But factors such as indirect tobacco promotion and direct promotion via the media needs to be addressed. Barbados must continuously monitor the prevalence of smoking among youth in order to further reduce tobacco use and to establish more positive proactive to prevent students under the age of 18 from starting smoking and to protect them from the risk of second-hand smoking.

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국문초록

바베이도스의 Global Youth Tobacco Survey (1999 년, 2002 년, 2007 년, 2013 년) 자료와 담배 규제 정책의 연계

퀸타인 도리얼 로렐린

보건학과 역학전공

보건대학원 서울대학교

연구배경 및 목적

흡연은 만성 질환의 주요 위험 요인이며, 많은 성인 흡연자들이 청소년시기에 처음 흡연을 시작하고 있기 때문에 청소년 흡연은 보건학에서 중요한 이슈이다. 2015 년에 15 세 미만인 세계 인구 중 약 20.2 %가 흡연자이다. 바베이도스는 Global Youth Tobacco Survey 를 (GYTS) 시행한 최초 국가 중 하나이며 지금까지 네 차례의 조사를 실시하였다. GYTS 시행과 담배 규제 정책 도입의 결과로 바베이도스는 청소년 흡연율이 감소했다. 본 연구의 목적은 1999 년부터 2013 년까지 시행한 네 번의 설문 조사를 통해 바베이도스 청소년의 흡연 추세를 분석하고자 한다.

연구방법

본 연구는 Global Youth Tobacco Survey(1999 년, 2002 년, 2007 년, 2013 년)에 참가한 총 4,786 명의 청소년을 대상으로 분석을 시행하였다. 종속변수는 현재 흡연 상태와 흡연 의도이고, 독립변수는 야외 및 가정 실내에서의 간접흡연 노출, 미디어를 통한 흡연 장면 노출, 금연 교육 경험, 담배 회사의 로고가 박힌 물건의 소유, 금연을 권고하는 광고에의 노출, 공공 장소에서 금연하는 것에 대한 찬성, 담배 규제 정책 시행 여부 등이 있다. 모든 통계 분석은 SAS 9.4 와 R 3.5.2 를 이용하여 수행했다.

연구결과

2007 년 조사에서는 성별 흡연율이 유의한 차이를 보였고, 일반적으로 여성의 흡연율이 남성보다 더 많이 감소했다. 로지스틱 회귀 분석 결과, 남성, 고령자, 가정 실내 및 야외에서 간접흡연에 노출된 적 있는 경우, 담배 회사 로고가 박힌 물건을 소유한 경우 등이 현재 흡연과 유의한 연관성이 있는 것으로 나타났다. 2010 년에 시행한 담배규제 정책은 현재 비흡연자인 경우에, 여성, 고령자, 가정 실내 및 야외에서 간접흡연에 노출된 경우, 언론의 흡연 장면에 노출된 경우, 담배 회사 로고가 박힌 물건을 소유하는 경우가 흡연 의도와 통계적으로 유의한 연관성이 있

었다. 그러나, 담배 규제 정책을 시행한 2010 년에는 비흡연자들이 미래에 담배를 피우고 싶어 할 가능성이 높았다.

결론

GYTS 는 담배 규제 정책을 입안하는 데 중요한 역할을 했고, 정책이 시행된 후에 흡연율이 일부 감소하는 양상을 보였다. 바베이도스는 청소년 흡연율을 더 감소시키며, 18 세 미만 학생들의 흡연시작을 금지하고 간접흡연 위험을 감소시키기 위한 다양한 정책을 시행하기 위해 청소년 흡연율을 지속적으로 모니터링해야 한다.

키워드: 청소년 흡연, 담배 규제 정책, 흡연, 바베이도스

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