RESEARCH ARTICLE

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Are Adolescents likely to Start Smoking Early if Their Parents are Smokers? A Study of Jamaican High School Students

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Abstract

Background: The prevalence of cigarette smoking is high among adolescents in the Caribbean, including Jamaica. Age of initiation of cigarette smoking varies among adolescents. A number of factors has been reported to influence early age of initiation of cigarette smoking. The aim of this study was to determine if parental smoking status was associated with early age of onset of cigarette smoking among Jamaican adolescents. **Methods:** Data from the Jamaican National School Survey (NSS) conducted in 2013 were analysed. The nationally representative sample comprised of 3,365 students enrolled in 8th grade to 12th grade in 38 public and private secondary schools. Descriptive and inferential statistics were computed using SPSS**. Results:** The mean age of initiation of cigarette smoking among the subjects was 12.4years [SD: 2.69]. There was no significant association between parental cigarette smoking status and the age of initiation of cigarette smoking among the adolescents (female $X^2 = 0.753$, $P = 0.861$; male $X^2 = 6.953$, $P = 0.073$). Logistic regression analysis showed that parental smoking status was not a predictor of early age of initiation of cigarette smoking among the adolescents (father/ guardian AOR= 0.81, 95% CI= 0.56- 1.11; mother/guardian AOR= 0.96, 95% CI= 0.44 – 2.10; both parent AOR= 0.49, 95%CI= 0.22- 1.07). However, having a parent with secondary education was a risk factor for early initiation of smoking (AOR= 1.71, 95%CI= 1.13-2.57), while being in 8th grade was a protective factor against early age of initiation of cigarette smoking (AOR= 0.43, 95% CI= 0.23 - 0.80). **Conclusion:** Parental smoking cigarette smoking status was not a predictor of early age of cigarette smoking initiation among Jamaican adolescents.

Keywords: Cigarette smoking- parental smoking status- age of initiation- adolescents- Jamaica

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Introduction

Globally, by 2030, tobacco smoking will kill more than 8 million people and 80% of these deaths will occur prematurely in low and middle-income countries (World Health Organization [WHO], 2011a). Fifty (50) percent of all lifetime smokers die in their most productive years (30-69 years) thereby reducing the country's productivity (Mackay et al, 2006). Cigarette smoking is one of the major risk factors shared by some groups of non-communicable diseases (NCDs) including cardiovascular disease, cancer, chronic lung disease and diabetes (WHO, 2017). Smoking is estimated to cause about 71% of all lung cancer deaths, 42% of chronic respiratory disease and nearly 10% of cardiovascular disease (WHO, 2011b). The World Health Organization reported that NCDs are jointly accountable for almost 70% of all deaths, and 82% of the 16 million people who died prematurely, or before the age of 70 years annually (WHO, 2017). Interestingly, most NCDs can be prevented by eradicating the known risk factors including smoking. Smoking has not only been implicated in NCDs but also in infectious disease like tuberculosis (TB) – more than 20% of global TB incidence may be attributable to smoking (WHO, 2007). Smoking endangers the health of smokers and those around them i.e., second hand smokers (SHS). SHS accounts for at least 600,000 annual deaths among non-smokers (Oberg et al., 2011) with nearly half of deaths from SHS occurring among adult women and over one quarter among children under the age of five.

Adolescents represent approximately 20% of the population in most countries and play substantial role in the economic, educational and social status of their societies (WHO, 2013). They search for self-identity through exploration of possibilities in their environment and express autonomy by taking a lot of risks (U.S Department of Health and Human Services, 2010).

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Although these are normal process of development, the adolescents take those risks in order to meet up with their expectations from the society. One of the most common and dangerous risks taken by the adolescent is the use of substances including cigarette smoking (Ibid, 2010). Studies have shown that early adolescence initiation of smoking increases the chances of being a long term smoker and its adverse health effect in adulthood (Leonardi-Bee et al., 2011). Adolescents who start smoking before the age 15 are twice at risk of developing lung cancer than those who start after the age of 20 years (Kuper et al., 2002).

Parents/ guardians being the first agent of socialization may influence the age of initiation of cigarette smoking among their children. Parental smoking has been linked to the risk of smoking among their children and even early-onset of nicotine dependence in low-exposure adolescent smokers (Selya et al., 2012). Previous studies revealed that there is association between parental smoking and their children's initiation and long term smoking (Avenevoli and Merikangas, 2003). Research has shown that adolescents whose parents smoke cigarettes are more likely to smoke and children whose parents do not smoke, or quit smoking, are less likely to smoke (Gilman et al., 2009; Bricker et al 2005). Furthermore, adolescents who are exposed to parents that actively smoke have increased risk of smoking (Gilman et al., 2009).

This study sought to determine if parental smoking status (smokers /nonsmokers) was associated with early age of onset of cigarette smoking among Jamaican adolescents using the 2013 National School Survey. The findings may be useful in formulating contextually relevant prevention programmes and/ or review of the existing programmes on tobacco smoking prevention.

Materials and Methods

The study utilized data from the Jamaican National Secondary School Survey [NSS] 2013. The survey was conducted under the sponsorship of the Organization of American States /Inter-American Drug Abuse Committee (OAS/ CICAD). The survey included a national representative sample of secondary school students in 38 schools across Jamaica drawn randomly from a list of both private and public secondary schools. A sample 3,365 students from grades 8, 10, 11 and 12 completed the survey. Details of the survey design are described elsewhere (Atkinson et al., 2015).

Dependent variable

The dependent variable was the age of initiation of smoking among the adolescents which was assessed with the question: 'How old are you when you smoked cigarettes for the first time in your life? The students were required to write the age at which they first smoked.

Independent variables

The main independent variable was the parental cigarette smoking status, which was assessed using the question: "Does any of your parents /guardian(s) regularly smoke at least one cigarette per day? The four response options were 1= Yes, Father/ guardian smoking, 2=Yes, Mother/ guardian, 3 = Yes, both, 4= No, neither of them.

Covariates

The covariates for the analysis include: (i) The type school attended by the adolescents, which had the response options as: 1= public, 2= Private. (ii) The class the students were attending was assessed using four options: 1= Second form or eighth grade, 2= Fourth form or 10th grade, 3 = Fifth form or 11th grade, and 4= Sixth form or 12th grade respectively. (iii) Gender was also assessed as 1= Male, 2 = Female. (iv) Parents'/ guardians' highest educational level was measured using the following options: 1= No formal education, 2 = Primary, 3= Secondary/high school, 4= Vocational training and 5= College/university/ tertiary level. (iv) The students' relationship with their parents/ guardian(s) was assessed using three questions: (a) "How would you describe the relationship you currently have with your father/guardian? (b) "How would you describe the relationship you currently have with your mother / guardian? (c) "How would you describe the relationship the parents/guardian(s) have with each other? Describe even if they do not live together". However, question 'a' and 'b' was used for the analysis. The outcome was measured using the following responses: 1=Very good, 2= Good, 3= Bad, 4= Very bad, and 5= Not applicable (if they do not have relationship with their parents or have no living father/mother/guardian).

Ethical Considerations

The NSS was approved by the national Ministry of Health and implemented in line with the international best practices (Atkinson et al, 2015). Informed consent was obtained from all students/guardian prior to participation in the survey. This study is based on analysis of secondary data with all participant identification information removed.

Data Analysis

Descriptive statistics were calculated for social and demographic characteristics of participants. The age of initiation was transformed into a binary variable, namely, early age of initiation (2 – 10 years) and late age of initiation (11 – 18 years). This was predicated on the median age of cigarette smoking initiation of 10 years such that late initiators commenced beyond median age of 10 years. Bivariate analyses (Pearson's Chi Square) were performed to determine if there was a relationship between the parental smoking status and age of initiation of smoking. The significance level was set at $P < 0.05$. Multivariate analysis was done using binary logistic regression. Crude odds ratio (COR), adjusted odds ratio (AOR) and 95% confidence intervals (95% CI) were computed to assess if parental cigarette smoking status was an independent predictor of the outcome variable (age of initiation of cigarette smoking) after adjusting for potential confounders. All statistical analyses were done using Statistical Package for the Social Sciences (SPSS) version 20 (IBM Inc. Armonk, New York).

Results

There were 3,365 participants with girls being more than half (57.3%). The average age of the participants was 14.97 years (Standard Deviation [SD] =1.71). Female participants' mean age was 14.88 years compared to male students (15.10 years). The mean age of cigarette smoking initiation was 12.4 years [SD: 2.69]. Most 3,295 (97.9%) were from the public schools. Majority 1,109 (33.3%) of the students were in tenth grade, followed by eighth grade.

Most of the students had a very good relationship with their mother 2,063 (61.3%) compared to their father or both parent (35.1% and 28.0%, respectively). Majority, 1,407 (41.8%), of their parents had secondary/ high school education as their highest educational attainment while 147 (4.4%) had no formal education (Table 1).

In the bivariate analysis, there was no significant association between the age of initiation of cigarette smoking among the adolescents and their parental smoking status (female $X^2 = 0.753$, $P = 0.861$; male $X^2 = 6.953$, $P = 0.073$) (Table 2).

However, there was a significant association between the type of school the adolescents were attending and the age of initiation of tobacco smoking ($X^2 = 4.150$, $P = 0.042$). Students attending private schools (37.1%) were more likely to initiate cigarette smoking at an older age (11 – 18 years) when compared to those in public schools (18.2%). The grade at school of the students also showed significant association ($X^2 = 22.974$, $P < 0.001$) with the age of initiation of tobacco smoking among the

Table 1. Key Sociodemographic Characteristics and Relationship with Parents/Guardians of Jamaican Adolescents, 2013

Key Characteristics	All Participants, n (%)	Males, n (%)	Female, n (%)
Total	3,365	1426	1,915
Age , mean [SD]	14.97 [1.71]	15.10 [1.71]	14.88 [1.71]
Type of school			
Public	3,295 (97.9)	1,383 (97.0)	1,888 (98.6)
Private	70 (2.1)	43 (3.0)	27 (1.4)
Grade at school			
8th grade	1,037 (30.8)	426 (29.9)	605 (31.6)
10th grade	1,109 (33.0)	462 (32.4)	637 (33.3)
11th grade	888 (26.4)	412 (28.9)	469 (24.5)
12th grade	331 (9.8)	126 (8.8)	204 (10.7)
Parents'/guardians'			
Educational level*			
No formal education	147 (4.4)	53 (3.7)	92 (4.8)
Primary	200 (5.9)	91 (6.4)	108 (5.6)
Secondary/high school	1,407 (41.8)	585 (41.0)	816 (42.6)
Vocational training	439 (13.0)	168 (11.8)	268 (14.0)
College/university/tertiary	858 (25.5)	386 (27.1)	486 (24.4)
Relationship with father/			
guardian*			
Very good	1,181 (35.1)	523 (36.7)	651 (34.0)
Good	1,254 (37.3)	543 (38.1)	705 (36.8)
Bad	378 (11.2)	158 (11.1)	218 (11.4)
Very bad	291 (8.6)	95 (6.7)	196 (10.2)
Not applicable	153 (4.5)	54 (3.8)	97 (5.1)
Relationship with mother/guardian*			
Very good	2,063 (61.3)	904 (63.4)	1,148 (59.9)
Good	935 (27.8)	376 (26.4)	556 (29.0)
Bad	156 (4.6)	55 (3.9)	100 (5.2)
Very bad	86 (2.6)	31 (2.2)	54 (2.80
Not applicable	31 (0.9)	9 (0.6)	20 (1.0)
Conversation about dangers of drugs			
with parents'/ guardian(s)*			
Yes	1,522 (45.2)	713 (50)	800 (41.8)
No	1,813 (53.9)	697 (48.9)	1,105 (57.7)

*, Some data were missing for the variable and so values may not add up to total and 100 %, SD= standard deviation

Table 2. Association between Parental Smoking Status and Age of Initiation of Smoking among Jamaican Adolescents, by Gender, 2013

	Parents'/Guardian(s) Smoking Status				
Age of Initiation (years)	Yes, my mother	Yes, my father	Yes, both	No, neither	X^2 (P value)
	n (%)	n (%)	n (%)	n (%)	
Male*					6.953 (0.073)
2 – 10	40 (10.9)	5 (1.4)	6 (1.6)	57 (15.5)	
11 – 18	66 (18)	10 (2.7)	9 (2.5)	174 (47.4)	
Female*					0.753 (0.861)
2–10	35 (7.5)	8 (1.7)	7 (1.5)	68 (14.6)	
11–18	112 (24)	25 (6)	16 (3.4)	193 (41.3)	

*, Some data were missing for the variable and so the value may not add up to total

Table 3. Associations between Key Sociodemographic Variables and Age of Initiation of Cigarette Smoking among Jamaican Adolescents, 2013

	Age of Initiation of Cigarette Smoking		
Characteristics	2 - 10 years, n (%)	11 - 18 years, n (%)	X^2 (P value)
Gender*			1.553 (0.213)
Male	110 (7.7)	269 (18.9)	
Female	119 (6.2)	353 (18.4)	
Type of school*			4.150 (0.042)
Public	226 (6.9)	599 (18.2)	
Private	3 (4.3)	26 (37.1)	
Grade at school*			22.974 (0.000)
8th grade	57 (5.5)	74 (7.1)	
10th grade	83 (7.3)	257 (23.2)	
11th grade	61 (6.9)	217 (24.4)	
12th grade	28 (8.5)	72 (21.9)	
Parents'/guardians'			6.082 (0.193)
Educational level*			
No formal education	11(7.5)	33 (22.4)	
Primary	16 (8)	42 (21)	
Secondary/ high School	82 (5.8)	275 (19.5)	
Vocational	31 (7)	95 (21.6)	
College/university/tertiary	67 (7.8)	141 (16.3)	
Relationship with father/guardian*			7.684 (0.104)
Very good	42 (3.6)	101 (8.6)	
Good	107 (8.5)	236 (18.8)	
Bad	34 (9)	95 (25.1)	
Very bad	31 (10.7)	72 (24.7)	
Not applicable	13 (8.5)	39 (25.5)	
Relationship with mother/guardian			5.326 (0.225)
Very good	115 (5.8)	325 (15.8)	
Good	85 (9.0)	208 (22.2)	
Bad	17 (10.9)	143 (9.2)	
Very bad	5 (5.8)	29 (33.7)	
Not applicable	4 (13)	4 (13)	
Conversation about dangers of drugs with parents' / guardian(s)*			0.827 (0.363)
Yes	94 (6.2)	135 (8.7)	
No	227 (12.5)	345 (19.0)	

*, Some data were missing for the variable and the values may not add up to total / not add up to 100

Table 4. Factors Associated with Age of Initiation of Cigarette Smoking among Jamaican Adolescents, 2013

Variables	Crude OR	95% CI	Adjusted OR	95% CI
Type of school				
Private	1		1	
Public	0.3	0.09 - 1.020	0.4	0.15 - 1.42
Grade at school				
12th grade	1		1	
8th grade	0.47	0.27 - 0.82	0.43	0.23 - 0.80
10th grade	1.12	0.68 - 1.85	1.13	0.65 - 1.95
11th grade	1.29	0.77 - 2.17	1.28	0.72 - 2.25
Parents'/guardians' educational level				
College/university/tertiary	1		1	
No formal education	1.42	0.67 - 2.99	1.66	0.74 - 3.74
Primary	1.24	0.65 - 2.37	1.28	0.63 - 2.60
Secondary/high school	1.59	1.08 -2.33	1.71	1.13 - 2.57
Vocational training	1.45	0.88 - 2.39	1.32	0.78 - 2.23
Relationship with father /guardian				
Not applicable	1		1	
Very good	1.27	0.62 - 2.60	0.99	0.42 - 2.31
Good	0.73	0.37 - 1.43	0.58	0.26 - 1.28
Bad	o.93	0.44 - 1.95	0.67	0.28 - 1.58
Very bad	0.77	0.36 - 1.64	0.52	0.23 - 1.35
Relationship with mother / guardian				
Not applicable	1		1	
Very good	2.82	0.69 - 11.48	3.05	0.52 - 17.72
Good	2.5	0.61 - 10.25	2.6	0.44 - 15.18
Bad	2.52	0.56 - 11.28	3.89	0.61 - 15.18
Very bad	5.8	1.08 - 31. 11	4.98	0.66 - 37.58
Conversation about dangers of drugs with parents'/ guardian(s)				
No	1		1	
Yes	1.15	0.84 - 1.56	1.2	0.84 - 1.77
Parents'/ guardians' smoking status				
No, neither	1		1	
Yes, my father/guardian	0.82	0.57 - 1.12	0.81	0.56 - 1.11
Yes, my mother/guardian	0.98	0.51 - 1.91	0.96	0.44 - 2.10
Yes, both	0.65	0.32 - 1.30	0.49	0.22 - 1.07

OR, Odds Ratio, 95%CI = 95% Confidence interval

adolescents (Table 3).

Table 4 shows the multivariable logistic regression analysis of independent predictors of the age of initiation of cigarette smoking among the adolescents. No association was found between parental smoking status and age of initiation of tobacco smoking (father: COR= 0.82, 95%CI= 0.57 - 1.12; mother: COR= 0.98, 95%CI= 0.51 - 1.91; both parents: COR= 0.65, 95%CI= 0.32 – 1.30). After adjusting for potential confounders, parental smoking status was found not to be a predictor of age of initiation of tobacco smoking among the adolescents (father: AOR= 0.81, 95% CI= 0.56 - 1.11; mother: AOR= 0.96, 95%CI= 0.44 - 2.10; both parents: AOR= 0.49, 95%CI=0.22 - 1.07). Also, the type of school attended by the adolescents was not an independent predictor of the age of initiation of cigarette smoking (COR = 0.30, 95% CI = 0.09 - 1.020; AOR = 0.4, 95%CI = 0.15 - 1.42).

There was a significant relationship between the grade at school (8th grade: COR= 0.47, 95% CI = 0.27 - 0.82) and the age of cigarette smoking initiation. This relationship remained significant after adjustments for the confounding effects of type of school, parental education, relationships with parents and guardians, and conversation with parents regarding dangers of tobacco smoking were made (AOR= 0.43, 95% CI= 0.23 - 0.80). Also, participants whose parents / guardian had a secondary/ high school education had higher odds of initiating cigarette smoking early (2 – 10 years) when compared to those whose parents were university or college graduates (COR= 1.59, 95% CI = 1.08 - 2.33; AOR = 1.71, 95% CI =1.13 - 2.57). There

was no association between relationships with parents and guardian (s) and age of initiation of smoking. Students who have had a conversation with their parents/guardian (s) about dangers of drug use were more likely to initiate cigarette smoking early compared to student that did not, although the association was not statistically significant (COR= 1.15, 95% CI= 0.84 – 1.77); after controlling for other confounders, the effect strengthened but was still not statistically significant (AOR= 1.2, 95%CI = 0.84 – 1.77) (Table 4).

Discussion

Age of initiation of smoking among Jamaican adolescents was found to have no association with the parental / guardian smoking status. This is contrary to the findings of previous studies which revealed that parental smoking status is associated with their children's smoking (Gilman et al., 2009; Bricker et al., 2005), early initiation of tobacco smoking and long-term smoking, and may likely increase their children's dependency on nicotine (Avenevoli and Merikangas, 2003; Selya et al., 2014). Possible reason for this finding in the Jamaican context may be due to the type of family structure that exists within the Jamaican family system which comprises mostly single parent family structure especially lone-mother (Hill, 2011). Majority had a very good relationship with their mother, and since a higher proportion of their mothers did not smoke (94%), it might be inferred that the participants model their behaviour after their mother's. This is similar to the findings of Wilkinson et al., (2007), Edelen et al., (2007) and Paul et al., (2008), which show that most children whose mothers do not smoke are less likely to smoke and those whose mother smoke are more likely to smoke and even initiate smoking early in life.

Studies suggest that the level of tobacco use may vary according to the type schools, environment as well as the rules and regulation or policies guiding the school (Aveyard et al., 2004). In this study students from public school were more likely to initiate tobacco smoking early in life (2 – 10 years) than those in private school. This is similar to the findings of Pradhan et al., (2013) where students from government schools were more likely to use tobacco than those in private schools. One explanation may be the differences between the socio economic statuses (SES) of students that attend public schools when compared to those that attend private schools. As mostly students from higher socio economic status attend private school and vice versa and studies have shown that low SES is a risk factor for tobacco use (Patrick et al., 2010).

Furthermore, the findings of this study show that 8th grade students were less likely to initiate cigarette smoking early (2 – 10 years) compared to the 12th grade students. Reasons are not clear but may be related to their age, being relatively new in school and so still forming friendships and social networks as well as grappling with the challenges of academic pursuit at the secondary level. Thus, being in grade eight confers protection against early initiation of cigarette smoking to the participants. Adolescents whose parents had secondary education were at risks of initiating cigarette smoking. This is similar to the findings of Zaloudíková et al., (2012) which found that the level of parents' education significantly influenced their children exposure to smoking especially those with middle and low levels of education.

In conclusion, parental cigarette smoking status was not a predictor of early age of initiation of cigarette smoking among Jamaican adolescents. However, being a student in a public high school was a risk factor for early initiation of cigarette smoking while being in 8th grade in a high school significantly reduced the risk of initiating cigarette smoking early. This calls for the government to improve on the surveillance and policies guiding the schools and the parents/ guardians to improve on the monitoring of the activities of their children outside the family

Limitations

The major strength of this study is that it was based on a nationally representative data among adolescents in Jamaica therefore, our findings will most likely reflect existing realities. However, the study has some limitations. The study design was a descriptive questionnaire survey, and therefore, participants might give answers they thought were socially acceptable.

Funding Statement/ Conflict of Interest

This study received no funding from any source. The authors declare no conflict of interest.

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