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Research Article

Magnitude and Predictors of Cigarette Smoking among High School Students in Addis Ababa, Ethiopia, 2020

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Abstract

Background: High proportion of adolescent uses illicit substance including cigarette smoking. Therefore, this research focused on the assessment of magnitude and predictors of cigarette smoking among Bole high school students in Addis Ababa, Ethiopia, 2020.

Methods: A quantitative school-based cross-sectional study was undertaken in June 2020. A total of 278 high school students were recruited by systematic random sampling method. The data e recollected by a self-administered questionnaire. A logistic regression model was employed to determine the association between Cigarette smoking and the socio-demographic and other predictor variables. Statistical significance was declared at p-value<0.05.

Result: The finding of this research revealed that the magnitude of cigarette smoking among the students was 96(34.5%). Students with low knowledge about cigarette smoking hazards and students with a positive attitude towards cigarette smoking practice cigarette smoking to a higher extent compared to those students with a high level of knowledge about cigarette smoking hazards and negative attitude towards cigarette smoking respectively [AOR = 114, 95%CI (25.71,508.57)] and [AOR = 0.2, 95%CI (1.49,12.0)].

Conclusion: The magnitude of cigarette smoking among the students was found to be high. Hence policymakers and other concerned bodies should work hormonally to increase awareness and enhance knowledge of smoking hazards among high school students.

Introduction

Compare to all other causes combined non-communicable diseases (NCDs) are the primary causes of death globally, [1]. Regardless of popular opinion, current evidence reveal that nearly 80% of NCD deaths occur in developing countries [2]. There is sufficient works of literature indicating that NCDs commonly occur among people who have a poor diet habits, lack of exercise, primary and secondary smoking, and smokeless tobacco [3]. Prevention of these factors has a positive implication for minimizing morbidity and mortality of NCDs [4,5]. It was stated that about 80% and 40% of mortalities caused by cardiovascular diseases, type 2 diabetes and cancers respectively could be halted by modifying known lifestyle risk factors like cigarette smoking [6].

Tobacco use is the most preventable cause of death in the globe which accounts for killing 5.4 million people annually and in the absence of intervention, it is estimated that it will cause the death of more than 8 million people by the year 2030 [7]. Cigarette smoking increases the risk of heart disease, risk related to the causes of cancer like lung, stomach, liver cancer, and many other cancers and deaths [8]. In the developed world, while cigarette smoking is a common phenomenon for years, it is expected to cause about 90% and 70% of lung cancer in men and women respectively, and nearly 22% of all cardiovascular disease [9].

Since smoking cigarettes is the leading and preventable cause of lung diseases and death in the -so-called developing world, increasing cigarette smoking will signal actual and potential health risks [10-12]. Among the practices concerning smoking cigarettes in Ethiopia, tobacco use either in the form of smoking, chewing or keeping tobacco dust between lips and gums gain paramount importance. The national survey of Ethiopia indicated that nearly there are 12% are current smokers [13].

A lot of research findings depicted that smoking, alcohol and other drugs usage habits are common to become addictive during young age [14] and sufferings from health, social, economic, and psychological problems are among the main causes of disability and death in developing countries [15].

Compared to other African countries, Ethiopia has a relatively low rate of smoking cigarettes but the country is not immune to the tobacco epidemic [16]. Although the Ethiopian government passed an

anti-tobacco bill in 2015, the magnitude of substance use including cigarette smoking among adolescents is still increasing at an alarming rate [17]. Therefore, this study has focused on investigating the magnitude and predictors of cigarette smoking among the students in Addis Ababa, Ethiopia, 2020.

Methods and Materials

Study Area and Period: This study was conducted at Bole High School, Addis Ababa, Ethiopia. Addis Ababa is the metropolitan city of Africa with more than 90 embassies and consular representatives, and it is the fourth diplomatic center in the world The total number of secondary school students in Bole High School in the year 2019/2020 is 1608 (715 male and 893 female).

Study Design: A quantitative high school-based cross-sectional study was carried out to assess the magnitude and predictors of cigarette smoking among Bole High School students in Addis Ababa, Ethiopia, 2020.

Inclusion Criteria: Students who were able to accept the consent or assent and who were in grades 11th and 12th at the time of the study were recruited for the study.

Sample Size Determination: Single population proportion formula was used by taking the proportion of smoking cigarettes to be 28.6% from a previous study conducted in Addis Ababa [18], at 95% CI with a margin of error of 5%. Adding a 10% non-response rate, a total of 346 sample sizes was obtained. However, the total number of secondary students in Bole High school at the time of the study was 1608, which is less than 10,000. Therefore, a population correction formal was used and a final sample size of 285 was obtained.

Sampling Procedure: Based on grade levels, a stratified sampling method was conducted for the selection of the required sample. Grade levels were stratified into two strata, grade 11 and grade 12. The allocation of the sample size for each grade level was made by sampling with probability proportional to the size of the number of students. As to the sampling frame the list of grade 11 and grade 12 students was taken from the school. To attain the desired sample size, school adolescents of both sexes were randomly selected (by simple random sampling) from both grade levels using a simple random sampling method. Accordingly, 285 school adolescents from grades 11 and 12 (from a total of 1608) were selected to participate in the study.

Data Collection Tool and Method: A self-administered questionnaire which was structured was used for data collection after obtaining assent/consent from each Participant. The questionnaire was adopted from several sources of literatures [19,20] and customized to the local situation. The questionnaires included four parts: (1) socio-demographic characteristics of students, (2) knowledge of Cigarette smoking hazards, (3) attitude towards Cigarette smoking, and (4) use of cigarettes and associated factors. Data collection was conducted in school by a trained diploma nurse who was not linked with the school authority and the teachers were not allowed to be available during the data collection. The finding of this study revealed that cigarette smoking among high school students was thought to be a sensitive issue that if disclosed to school authorities can result in coercion or disciplinary measures be taken against the student. To allay the fear of disclosure and extortion by the teachers and those in authority, this study has secured the anonymity of the respondents during the data collection.

Study Variables: The magnitude of cigarette smoking was the dependent variable. The independent variables for this study were age, sex, grade level, pocket money, source of income, religion, grade level, parent status, age of smoking initiation, history of smoking, parental or peer smoking, siblings' smoking, teachers' smoking, and reasons for smoking.

Data Analysis: Statistical Package for Social Science (SPSS) 23.0 software package was used to analyze the data. Categorical data are presented using frequency and percentages. Median was used to categorize respondents as having either poor or good knowledge about smoking or either a positive or negative attitude towards it. The binary logistic regression model was used to measure the association between smoking cigarettes and the predictor variable. Statistical significance was declared at p-value<0.05. The strength of association was expressed using OR at 95% CI.

Data Quality Assurance: The questionnaire was pretested among 5% of the students (40 eligible participants) similar to the study area to assure the consistency of the instrument. The internal consistency of Cronbach"s alpha was greater than 0.934 for knowledge about smoking hazards and 0.887 for attitude towards cigarette smoking questions.

Operational Definition and Its Measurement

Cigarette Smoking Practice: The following question was asked to assess the current smoking status: during the past days (one month), how many days did you smoke cigarettes? Being a current smoker" who smoked cigarettes at least 1 day in a month duration beforeat the survey [19].

Attitude Towards Cigarette Smoking: refers to either good or bad beliefs related to smoking cigarettes. Good attitudes are those beliefs related to the use of cigarettes by depicting the perceived benefits of cigarette smoking. Whereas bad attitudes refer to beliefs that dismay the use of cigarette among students. Students were asked nine questions (e.g. my cigarette smoking will harm others) to indicate their level of agreement in a five-scale response format from "strongly disagree" to "strongly agree" scored from1 to 5. Subscale scores were obtained by summing item scores and dividing by the total number of items. If it is above or equal to the average it will be indicative of a negative attitude.

Knowledge about Cigarette Smoking Hazards: indicates an understanding of tobacco products and the ailments caused by smoking. The level of knowledge was categorized into a low and high levels of knowledge. A low level of knowledge is indicated by the inability of a student to score more than six questions out of 13 questions regarding health risks caused by cigarette smoking. Scoring for knowledge was 1 for correct answers and 0 for incorrect answers.

Ethical Consideration: the ethical clearance was secured from the Institution Review Board (IRB) of Universal Medical and Business College (UMBC). Permission was also secured from the higher officials of Bole High School before data collection. The students were informed about the study objective and purpose. The written consent and assent were secured from heads of school, parents, and guardians. There were no incentives given to participants.

The participants have also been informed to discontinue or decline in participating in the study at any time. The confidentiality of the information was secured and the data was recorded anonymously throughout the study.

Result

Socio-Demographic Characteristics of the Respondents

Out of 285 students, 278 responded to the questionnaire making a response rate of 97.5%. Seven (7) questionnaires were excluded from the analysis because of gross inconsistency and incompleteness. The ages of the respondents ranged from 15 to 21 years with a mean ± SD of 16.98 ± 1.76 years. The majority of the students 206(74.1%) were in the age category of 15 - 17 years. One hundred twenty-five (45.5%) of the stu¬dents were male and 153 (55.0%) and 136(48.9%) were orthodox by religion. The majority 230(82.7%) of the respondents were living with both of their parents.

Concerning the respondents' income, 248 (89.2%) of them obtained pocket money mainly from their family members. The variation in the amount of money received from their family is notably observed even within the month duration among students, with 166(66.9%) receiving below one thousand per month. More than half 179(64.4%) of the respondents were in 11th grade and the rest 99(35.6%) were 12th-grade students (Table 1)

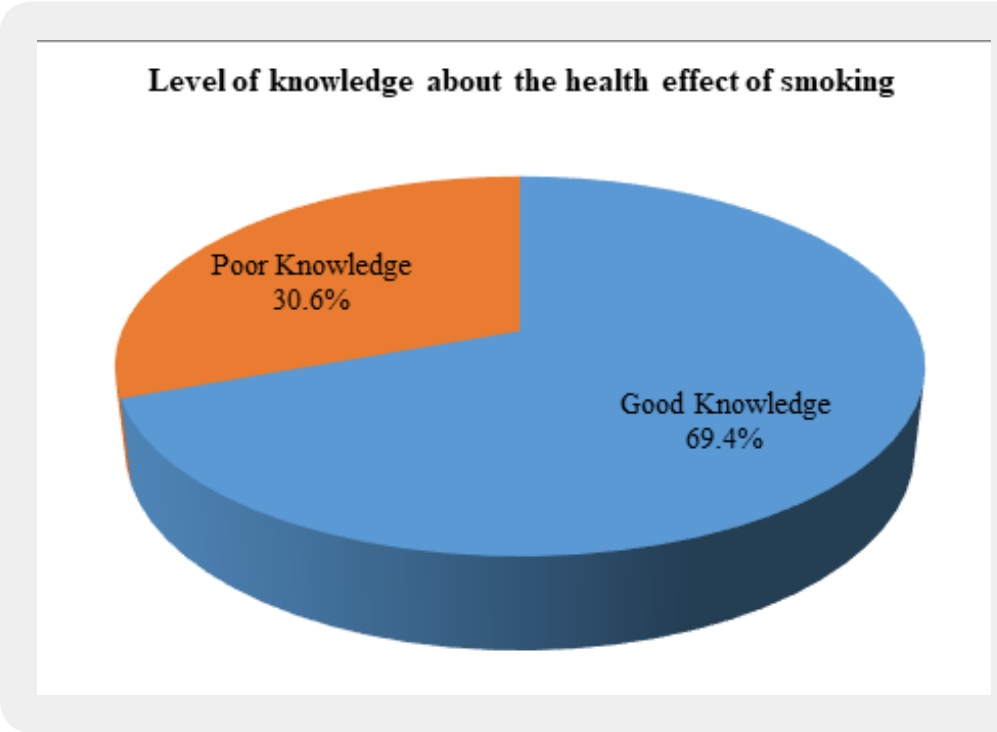
Table 1: *Socio-Demographic Characteristics of the Respondents, Bole High School, Addis Ababa, Ethiopia, June 2020*

Variable	Category	Frequency	Percentage
Sex	Male	125	45.0
	Female	153	55.0
Grade Level	11th	179	64.4
	12th	99	35.6
Age	<18	206	74.1
	>18	72	25.9
Religion	Orthodox	136	48.9
	Protestant	34	12.2
	Muslim	69	24.8
	Catholic	39	14
Parents Status	Both Alive	259	93.2
	Mother or father alive	19	6.8
Caretaker	Both Parents	230	82.7
	One Parent	25	9
	Others(Siblings relative)	23	8.2

Knowledge the Students Regarding the Ill Effect of Cigarette Smoking

Concerning students' knowledge concerning the ill effect of cigarette smoking on health, it was measured by thirteen reliable questions with Cronbach's alpha, 0.934. The mean value of these items was 8 ± 3.43 with a median value of 10. The majority of 193(69.4%) were knowledgeable about the effect of cigarette smoking (figure 1).

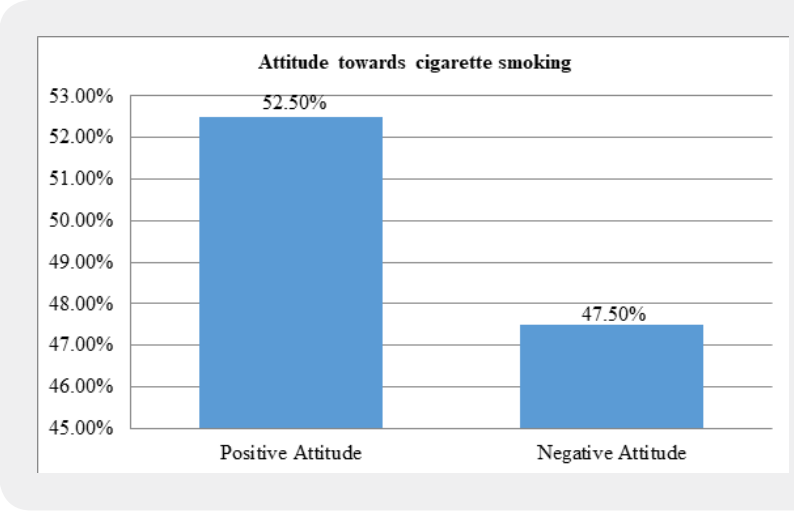
Figure 1: *Level of Knowledge about Cigarette Smoking Effect on Health among Bole High School, Addis Ababa, Ethiopia, June 2020*



Attitude Towards Cigarette Smoking

Concerning the student's attitude towards cigarette smoking, it was measured by nine reliable questions with Cronbach's alpha, 0.887. The mean value of these items was 26.5 ± 9.43 with a median value of 24. More than half 146(52.5%) of the students had a negative attitude toward cigarette smoking (Figure 2).

Figure 2: *Attitude towards Cigarette Smoking among Bole High School, Addis Ababa, Ethiopia, June 2020.*



Magnitude and Pattern of Cigarette Smoking

The magnitude of recent cigarette smokers among the students was about 96(34.5%). The rest 13(4.7%) and 169(38.9%) were former smokers and were never smokers respectively. The mean age for starting cigarette smoking was (mean ± SD) 13.5 ± 1.41 with a range of 10 to 16 years. Nearly 99(91%) started smoking at the age of 10-15 years. The majority the students 66 (68.8%) smoked less than five cigarettes per day. Royal brand cigarettes 46(47.9%) were found to be the most common form of cigarette smoked by the students. The rationale given for this preference was because the brands were 36(37.5%) good test, 10(3.6%) affordable, and also because they were easily available and accessible from the majority of tobacco vendors 50(52.1%). The triggering factors for cigarette smoking have peered influence 45(46.9%), stress alleviation 25(26.0%), style and fun or relaxation 22(22.9%), and availability of money and addiction 4(4.1%). About the regularity of smoking, 53(55.2%) of students reported that they smoke weekly followed by a daily basis which accounts for 29(30.2%) (Table 2).

Table 2: *Prevalence and Pattern of Cigarette Smoking among Bole High School Students, Addis Ababa, Ethiopia, June 2020.*

Characteristics	Categories	Frequency	Percentage
Smoking status	Current	96	34.5
	Former	13	4.7
	Never	169	60.8
Reason for smoking(n=278)	Peer influence	45	46.9
	Stress relief	25	26.0
	Relaxation	22	22.9
	Addiction & availability of money	4	4.1

Age at start of cigarette smoking (n=96)	<15 years	99	90.8
	>15 years	10	9.2
Number of cigarette smoking per day	<5 years	66	68.8
	>5 years	30	31.3
Brand of Cigarette usually smoke	Royal	46	47.9
	Nyala	27	28.1
	Rose-man	23	24
Reason for Brand Preference	Good test	36	37.5
	Available	50	52.1
	Affordable	10	10.4
Frequency of smoking	Daily	29	30.2%
	Weekly	53	55.2%
	Rarely	14	14.6%

Social Factors Related to Smoking

This study also identified different social such as parents smoking, siblings smoking, peers smoking, and environmental factors related to smoking.;. According to the evidence collected from the students, 78(28.1%) of the parents and 55(19.8%) of the siblings smoke a cigarette out of this, 59(75.6%) of parents and 21(38.2%) of siblings were smoked cigarette in the presence of the student. Concerning teachers and friends smoking, 14(5%) of their teachers and 45(16, 2%) of their friends smoked cigarettes of which 11(78.6%) of their teachers and 35(77.8%) of their parents smoked cigarette in the presence of the student (Table 3).

Table 3: *Social factors related to smoking among Bole High School Students, Addis Ababa, Ethiopia, and June 2020*

Characteristics	Category	Frequency	Percentage
Parent smoking status	Yes	78	28.1
	No	200	71.9
Smoke amidst their kid	Yes	59	75.6
	No	19	24.4
Siblings smoking status	Yes	55	19.8
	No	233	80.2
Smoke amidst student	Yes	21	38.2
	No	34	61.8
Teaches smoking status	Yes	14	5.0
	No	264	95.0

Smoke amidst students	Yes	11	78.6
	No	3	21.4
Friends smoking status	Yes	45	16.2
	No	233	83.8
Smoke amidst student	Yes	35	77.8
	No	10	22.2

Factors Associated with Cigarette Smoking Practice

Logistic regression model was employed to determine the factors associated with the cigarette smoking practice. Variables with a p-value ≤ 0.05 (grade level, receive pocket money, the amount of pocket money, parent, sibling, friends' and teacher's smoking status, knowledge, and attitude) were incorporated in the multivariate regression.

To control possible confounding factors multivariate regression was applied. Grade level, parent status, sibling status, friends' status, and teacher's smoking status, knowledge about cigarette smoking hazard, and attitude towards smoking were significantly associated with cigarette smoking practice with a p-value < 0.05.

Twelfth (12^{th}) grade students were more likely to smoke cigarette compared to students 11th grade students [AOR = 2.79, 95%CI (1.02, 7.63)]. Students with no history of parents', siblings', and friends' smoking cigarette were less likely to smoke cigarette compared to students with history of parents', siblings' and friends' smoking [AOR = 0.05, 95%CI (0.01,0.14)], [AOR = 0.23, 95%CI (0.06,0.96)], and [AOR = 13.9, 95%CI (2.57,75.43)] respectively.

Similarly, students with low knowledge about cigarette smoking hazards to health and students with a good attitude towards cigarette smoking smoke cigarettes to a higher extent compared to those with students with a bad attitude towards cigarette smoking and high-level knowledge about cigarette smoking hazards [AOR = 114, 95%CI (25.71,508.57)] and [AOR = 2.20, 95%CI (1.49,12.0)] respectively (Table 4).

Table 4: *Association between Cigarette Smoking Practice and Associated Factors among Bole High School Students, Addis Ababa, Ethiopia June 2020.*

Variables	Category	Cigarette smoking		COR (CI 95%)	AOR (CI 95%)
		Yes	No		
Age	<18	76	130	0.66(0.37,1.19)	
	>18	20	52	1	
Grade	11th	43	136	3.64(2.16,6.15)*	2.79(1.02,7.63)**
	12th	53	46	1	1

Sex	Male	38	87	1.39(0.85,2.31)	
	Female	58	95	1	
Receive pocket money	Yes	94	154	0.12(0.03,0.50)*	0.97(0.45,3.16)
	No	2	28	1	1
Amount of money per month	<1000	54	112	1.9(1.15,3.39)*	1.97(0.75,5.16)
	>1000	40	42	1	1
Parents Status	Both alive	89	170	1.13(0.43,2.96)	
	Either alive	7	12	1	
Parents smoking	Yes	65	13	0.04(0.02,0.07)*	0.05(0.01,0.14)**
	No	31	169	1	1
Sibling smoking	Yes	31	24	0.32(0.17,0.58)*	0.23(0.06,0.96)**
	No	65	158	1	1
Friends smoking	No	24	21	0.39(0.21,0.75)*	13.9(2.57,75.43)**
	Yes	72	161	1	1
Teachers smoking	Yes	11	3	0.13(0.04,0.48)*	0.1(0.01,1.86)
	No	85	179	1	1
Attitude toward cigarette smoking	Positive	9	137	29.43(13.70,63.21)*	114(25.71,508.57)**
	Negative	87	45	1	1
Knowledge about cigarette	Low	40	45	0.46(0.27,0.78)*	2.20(1.49,12.0)**
	High	56	137	1	1

Discussion

This current study determined the magnitude of cigarette smoking and associated factors among students at Bole high school in Addis Ababa Ethiopia. The study was conducted with the expectation that the information obtained from the study can be used for prevention and control measures of cigarette smoking among students in the study area.

Students' knowledge concerning the ill effect of cigarette smoking on health, the current study revealed that 69.4% were knowledgeable about cigarette smoking effect. A study conducted in Malaysia and Ethiopia also showed that below 50% of the respondents thought to have good knowledge about the effect of smoking on health. The students have already understood that nicotine is the main ingredient of cigarettes, which reacts with body receptors and leads to addiction and the development of diseases such as cancers and congenital anomalies [4,5,23]. This might be due to a greater chance of exposure to awareness programs and the presence of clubs in the school.

In this study, 52.5% of the students had a positive attitude toward cigarette smoking. This is in line with the study conducted among Lebanese medical students and among male teenagers in Tehran, Iran: where above

50% of the participants had a good attitude toward anti-smoking behavior [21,22]. However, this is lower than a study conducted among students in Muzaffarabad, Pakistan where 82% of the students have a positive attitude toward anti-smoking [23].

The findings of this research revealed that the magnitude of cigarette smoking among Bole high school students was 34.5%. This is similar to the study done in China [24] and with the study conducted among high school students of Nay Pyi Taw [25]. This finding however exceeds compared to the study conducted among school adolescents in eastern Ethiopia which were 12.2% [26], the study done in Addis Ababa, Ethiopia which was 2.9% [16, 27], and with the systematic review and meta-analysis done among school-going adolescents in East Africa where the prevalence of smoking was 9.02% [28]. This might happen as a result of study area difference, design of the study, and cultural practices.

Family history of smoking and peers potentially will encourage them to become smokers in the future, which was reported by a few previous studies [28-30]. Similarly, smoking is a behavior that is imitated from their role models, teachers, and other groups who play an important role in influencing of cigarette smoking among the youth [31,32]. Similarly, the current study finding revealed that students with no history of parents', siblings', and friends' smoking cigarettes were less likely to smoke cigarettes compared to students with a history of parents', siblings', and friends' smoking.

Attitudes and knowledge of adolescents about smoking are among the determinants of cigarette smoking practice. Hence in this study, students with low knowledge about cigarette smoking hazards to health and students with positive attitudes towards cigarette smoking smoking cigarettes to a higher extent compared to those with students with a negative attitude towards cigarette smoking and high-level knowledge about cigarette smoking hazards [33,34].

Limitations

The study was of cross-sectional design; hence, it didn't show the causal association between the independent and dependent variables. Moreover, adolescents normally deny their cigarette smoking behaviors due to social desirability bias and smoking status was not confirmed using biomarkers such as nicotine levels in saliva or exhaled carbon monoxide, resulting in an underestimate of the correct prevalence of cigarette smoking. Furthermore, because recall biases likely exist, the 30-day timeframe for asking students about tobacco use is employed to limit the recall bias.

Conclusions

Although the majority of students had good knowledge regarding smoking hazards to health, the magnitude of smoking (practice) among students in Bole High School in Addis Ababa was very high. It was also found that most of them had a positive attitude towards smoking. Grade level, parent, sibling, friends and teacher's smoking status, knowledge, and attitude were significantly associated with cigarette smoking practice with a p-value <0.05. Therefore, enhanced health education and counseling that especially focuses on the health, social, economic, and psychological effects of cigarette smoking should be designed and implemented by the school.

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Conflict of Interests

The authors affirm that there is no conflict of interest concerning the publication of this manuscript.

Authors' Contributions

TTB, TAB, GAA, GWT, ATS and RND have been made a substantial contribution to the concept design of article; or the acquisition, analysis, or interpretation of data for the article ;and drafted the article or revised it critically for important intellectual content and approved the version to be published and agreed to be accountable for all aspect of work in ensuring the questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Permission for Publication

Consent to publish is not applicable for this manuscript because there is no individual data details like images or videos.

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Accessibility of Data and Materials

The result of this research was extracted from the data gathered and analyzed based on the stated methods and materials. Original data and other supplementary data that support this research project can be made accessible if asked.

Ethical Consideration

Approval and ethical clearance was obtained from the Institution Review Board (IRB) of Universal Medical and Business College (UMBC). Official permission was also obtained from the principals of Bole High School before approaching the study participants. The objective and purpose of the study was clearly explained to the study subjects to obtain written informed assent before data collection. Participants were also informed that they can discontinue or decline to participate in the study at any time.

Written consent was obtained from heads of schools, parents, guardians and assent from the students. By signing the consent form and assent forms it indicated that the participants and their parents/guardians had agreed to participate in the study. There were no incentives given to participants. Participation in this study was voluntary and consent was sought from parents for students below 18 years and assent sought from students. For students above 18 years written consent was sought directly from student's. Participants were also informed that they can discontinue or decline to participate in the study at any time. Confidentiality of the information was maintained and the data was recorded anonymously throughout the study.

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