Keywords: Tobacco use; Cigarette smoking; Adolescents; Prevalence; Global youth tobacco survey

Introduction

Tobacco use, in any form, is deadly. Smoking kills one-third to one-half of all lifetime users, and smokers die an average of 15 years earlier than non-smokers do. If current trends continue, tobacco will kill 7 million people annually by 2020 and more than 8 million people annually by 2030. Tobacco-attributable mortality is increasing rapidly in developing countries, and by 2030, about 83 percent of the world's tobacco deaths will occur in low- and middle-income countries. Tobacco also causes hundreds of thousands of deaths annually among nonsmokers [1].

A disproportionate share of the global tobacco burden falls on developing countries, where 84% of the 1.3 billion people current smokers reside. The World Health Organization (WHO) attributed approximately 5 million deaths a year. Recent trend indicate rising of smoking prevalence among children and adolescents and earlier age of initiation start below seven years of age to 18 years. If this trend continues tobacco use will result in the death of 250 million children and adolescents alive today and many from developing countries [2-7].

Tobacco kills more men than women worldwide because historical smoking prevalence has been higher among men than women. However, because smoking rates are increasing among women in many countries, particularly among young women, the gap in tobacco death rates between men and women is closing. This might be due to increase in smoking among young girls compared to adult female, the high susceptibility of smoking among never smokers, high levels of exposure to second hand smoking and pro-tobacco indirect advertising. The increase in number of death is due to new methods adapted by the tobacco products companies that encourages and deceives the community in particular the youth generation in using the products [8].

Almost 1 billion men in the world smoke about 35 percent of men in high-resource countries, and 50 percent of men in developing countries. Male smoking rates have now peaked, and trends in low- and middle-resource countries indicate slow but sure declines. However, this extremely slow trend is progressing over decades while, in the meantime, tobacco is killing about 5 million men every year [8,9].
With 88 million people in 2012, Ethiopia is the second most populous nation after Nigeria in sub-Saharan Africa with Children under the age of 15 years comprises about 45% of the total population. Tobacco use prevalence, according to third edition of Tobacco Atlas is 6.9% male and 0.5% female. The number of smokers in Ethiopia is higher than most African countries of its population size but the production of tobacco is increasing at a higher rate. Currently the demand for tobacco is about 4.4billion pieces but the production capacity is about 2.6billion cigarettes or 53% the remaining 46% are imported while 42% enters the country through contraband [10]. Several studies indicate that tobacco use among Ethiopian adolescents is considerably rising. Nowadays, tobacco use is widely consumed among high school and college students in Ethiopia [11-13].

The onset of tobacco use occurs primarily in early adolescence, a developmental stage that is far removed by several decades from the death and disability that are associated with smoking in adulthood. Therefore, the fact that many adult smokers initiated their smoking habit as adolescents makes adolescence smoking a significant public health problem. It is also important, as it is associated with respiratory health effects such as the incidence and exacerbation of asthma [14,15].

Most of the risk of dying prematurely due to smoking is reversed if people quit smoking before the age of 30. However smoking during childhood and adolescence also causes a range of immediate health problems, as well as laying the foundation for the development of serious disease in adulthood [16].

The World Health Assembly adopted the WHO Framework Convention on Tobacco Control on 21 May 2003 and it entered into force on 27 February 2005, it has been ratified in many of the African countries only Eritrea, Malawi, Mozambique, and Zimbabwe are yet to ratify the Convention. Even if Ethiopia ratified the convention in the late January 2014, there is a need to commitment, strength, and urge by all health development partners to intensify their support for the speedy implementation of the WHO FCTC and the placement of legislations to ensure that the public is protected from exposure to tobacco. Therefore this study can help magnificently for the different stakeholders, the community, and the government by revealing the magnitude and the determinants of tobacco use in the adolescents who are the future of the country.

Methods and Materials

Study setting and participants

The school based cross sectional study was conducted from April 10 to April 15, 2014in school adolescents aged 13-19 years who are enrolled in grade 9-12 in the public and private schools of Hawassa and Jimma town in Ethiopia.

Sample size and sampling procedures procedure

Sample size was calculated by using single population proportion formula with the assumption of 50% proportion of tobacco use among adolescents, 5% margin of error, and 95% confidence interval. Hence the sample size calculated was 1704 samples.

Multi stage sampling of students on grade 9-12 who were enrolled in the private and public schools of Hawassa and Jimma town were included in the sampling frame. At the first stage, three high schools from each towns and each sector [total of 12 schools] in Hawassa and Jimma town were selected randomly. Then at the second stage students from grade 9-12 were selected based on proportion to student size and included to the final study subjects by using simple random sampling from the registrar list of all students in their specific class until the desired sample size.

Data collection procedures

Global Youth Tobacco Survey [GYTS] questionnaire that were adapted to the Ethiopian context were used to conduct the survey. This questionnaire is self-administered type of questionnaire, which consisted of a core component and an optional component. The core questions have been used in all countries conducting the Global Youth Tobacco Survey [GYTS], which allow for international comparison of results, and some optional questions were used to address specific issues in Ethiopia. The GYTS core questionnaire aims to collect the following information: prevalence of cigarette smoking and other tobacco use among young people; knowledge and attitudes of young people towards cigarette smoking; role of the media and advertising on young people's use of cigarettes; access to cigarettes; tobacco-related school curriculum; exposure to environmental tobacco smoke [ETS] and cessation of cigarette smoking. All the questions were multiple choices and were translated to the official language, Amharic.

Both the data collectors and supervisors were trained for three days on the objective and methodology of the research, and data collection approach. Moreover, survey procedures were designed to protect the student's privacy by allowing for anonymous and voluntary participation.

Definition and measurement of outcome variable

Current status of smoking was assessed using question: during the past 30 days [one month], on how many days did you smoke cigarettes?

Data processing and analysis

Data were analyzed using SPSS version 20.0 software and Proportions and 95% confidence intervals were obtained as estimates of prevalence. Associations between independent variables and dependent variables were analyzed first using bivariate analysis to identify factors which are significantly associated with tobacco use. Then Multiple logistic regression was applied using enter method with p <0.05 and p > 0.25 criteria to enter and exit from the model respectively. The magnitude of the association between the different independent variables in relation to dependent were measured using odds ratios and 95% Confidence Interval (CI) and P values below 0.05 were considered statistically significance. Hosmer-Lemshow goodness-of-fit was applied to find the appropriateness of model.

Ethical consideration

Ethical clearance was obtained from of the program coordinating parties (IRBs and Councils of science and technology) and Jimma University Ethical review board. Permission from the officials governing the town educational department and the respective schools were obtained, and then informed consent was obtained from the study participants after explaining the purpose of the study. Participants were assured that their name will not be stated, data will be kept confidential and anonymous and it will be used only for research purpose. Confidentiality of the information given by the respondent was maintained and the privacy of the students were kept during data collection.

Result

A total of 1673 respondent's data were analyzed, with the response rate of 98.2%. Among them 47.7% were males and 52.3% were females and majority of them were in the age category of 16-17 years (60.2%).
Prevalence of Cigarette smoking

Among the surveyed school adolescents 28.6% (95% CI 26.5 – 30.9) were ever smoked cigarette at least one puff, 21.2% males and 7.4% females. An estimated 17.2% (95% CI 15.4 – 19.1) of the adolescents were current smokers, 13.3% males and 3.8% females (Table 1).

Majority of the respondents (18.1%) first initiated smoking at the age interval of 14 – 15 years. Among the respondents 253 (15.1%) of them usually smoked 2-5 cigarettes on the days they smoked, and majority (14.8%) of them buy their cigarette often from shop. Moreover 16.1% of the respondents who are smoking currently spend more than 20 birr for cigarette in the last month preceding the survey, while majority (44.6%) of them had pocket money of 51 – 100 birr in the month (Table 2).

Knowledge and attitude perceived about smoking

Overall, 329 (19.6%) of adolescents think that boys who smoke cigarettes have more friends and around 13% of adolescents think that girls who smoke cigarettes have more friends. Likewise, 526 (31.4%) of adolescents think that boys who smoke are more attractive and 30% of them think that girls who smoke are more attractive. Only 18.6% of the surveyed school adolescents indicated that they discussed the harmful effects of smoking with a family member. Majority of the adolescents (82.8%) indicated that once someone starts smoking it is difficult to quit. Almost all of the surveyed adolescents (94.6%) showed they definitely think that cigarette smoking is harmful to health. However most of the adolescents think that smoking helps to lose weight (74.9%) (Table 3). Parents of the adolescents were smokers in 85.1 % of current smokers and 52.8% of ever smokers. Similarly almost all of the adolescents smoking currently have smoker closest friends and so do 62% of ever smokers (Figure 1 and 2)

Environmental exposure to tobacco smoke

About 17% of adolescents are likely to be exposed to tobacco smoke from others in their home in the past 7 days preceding the survey and more than half (60.8%) of adolescents are likely to be exposed to tobacco smoke from others in public places in the past 7 days preceding the survey. Majority of the adolescents (84.6%) think that smoke from others is harmful to them. Moreover almost all the adolescents (95.7%) indicated that smoking should be banned from public places; among them 47.3% showed they definitely think that cigarette smoking is harmful to health. However most of the adolescents think that smoking helps to lose weight (74.9%) (Table 3). Parents of the adolescents were smokers in 85.1 % of current smokers and 52.8% of ever smokers. Similarly almost all of the adolescents smoking currently have smoker closest friends and so do 62% of ever smokers (Figure 1 and 2).

Attitude towards stopping smoking

Among those currently smoking, 62.2% of the adolescents want to stop smoking cigarette at the time of survey. However, only 20.8% of them tried to stop smoking cigarette during the past year. Moreover among half of the currently smoking adolescents indicated that they would be able to stop smoking if they wanted to do and only half of them received help or advice that encourage them to quit smoking.

From ever smokers around 40% of the adolescents had quit smoking cigarette in the last year, and they have mentioned reasons for quitting it.
smoking as to improve health (26.7%), to save money (31.9%) because family dislike it (34.1%) and friends dislike it (7.3%), (Table 5).

**Exposure to Media and Advertisements**

Only 37.2% of adolescents saw anti-smoking media messages in the past 30 days on television, radio, Billboards, posters, newspapers, magazines, or movies. Similarly only 28.8% of adolescents were exposed to anti-smoking messages in sports events, fairs, concerts, community

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Want to stop smoking now</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>179 (62.2%)</td>
</tr>
<tr>
<td>No</td>
<td>109 (37.8%)</td>
</tr>
<tr>
<td>Total</td>
<td>288 (100%)</td>
</tr>
<tr>
<td>Ever tried to stop smoking cigarettes</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>60 (20.8%)</td>
</tr>
<tr>
<td>No</td>
<td>228 (79.2%)</td>
</tr>
<tr>
<td>Total</td>
<td>288 (100%)</td>
</tr>
<tr>
<td>Quit smoking</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>191 (39.9%)</td>
</tr>
<tr>
<td>No</td>
<td>288 (60.1%)</td>
</tr>
<tr>
<td>Total</td>
<td>479 (100%)</td>
</tr>
<tr>
<td>Main reason to stop smoking</td>
<td></td>
</tr>
<tr>
<td>To improve health</td>
<td>51 (26.7%)</td>
</tr>
<tr>
<td>To save money</td>
<td>61 (31.9%)</td>
</tr>
<tr>
<td>Family dislike it</td>
<td>65 (34.1%)</td>
</tr>
<tr>
<td>Friends dislike it</td>
<td>14 (7.3%)</td>
</tr>
<tr>
<td>Total</td>
<td>191 (100%)</td>
</tr>
<tr>
<td>Think you would be able to stop smoking if you wanted</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>157 (54.5%)</td>
</tr>
<tr>
<td>No</td>
<td>131 (45.5%)</td>
</tr>
<tr>
<td>Total</td>
<td>288 (100%)</td>
</tr>
<tr>
<td>Ever received help or advice to stop smoking</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>261 (54.5%)</td>
</tr>
<tr>
<td>No</td>
<td>218 (45.5%)</td>
</tr>
<tr>
<td>Total</td>
<td>479 (100%)</td>
</tr>
</tbody>
</table>

**Table 6: Exposure to media and advertisements among school adolescents of Ethiopia, June 2014 (n = 1673).**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taught about dangers of smoking</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>233 (13.9%)</td>
</tr>
<tr>
<td>No</td>
<td>1440 (86.1%)</td>
</tr>
<tr>
<td>Discussed reasons why people their age smoke</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>411 (24.6%)</td>
</tr>
<tr>
<td>No</td>
<td>1262 (75.4%)</td>
</tr>
<tr>
<td>Taught effects of smoking</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>307 (18.4%)</td>
</tr>
<tr>
<td>No</td>
<td>1366 (81.6%)</td>
</tr>
</tbody>
</table>

**Table 7: school curriculum on tobacco use among school adolescents of Ethiopia, June 2014 (n = 1673).**
events, or social gatherings (Table 6).

Concerning the exposure to tobacco advertisement, more than three-fourth (75.8%) of the adolescents saw actors smoking in movies or television drama shows (Figure 3 and 4). Moreover majority of them also saw people smoking in sport events and gathering of people. Even though, only 33% of the adolescents were exposed to tobacco messages in billboard and posters.

School curriculum about smoking

Only 14% of adolescents had been taught about the dangers of smoking in class during the past year and 24.6% of adolescents had discussed in class the reasons why people of their age smoke during the past year. Similarly, only 18.4% of adolescents had been taught in class about the effects of smoking during the past year (Table 7).

Factors associated with tobacco use

Those variables with P-value < 0.25 in bivariate analysis were entered into multivariate analysis using multiple logistic regressions in order to predict factors associated with current use of tobacco.

Accordingly sex, parent smoking, peer smoking, perceiving the danger of smoking, exposure to movie with actors smoking, exposure to anti-smoking media messages, discussion in the class about danger of smoking and alcohol use were seen significantly associated with current tobacco use among adolescents.

Male adolescents were 2.6 times more likely to use tobacco than the female adolescents (AOR = 2.669, 95% CI 1.280-6.693) and those who drink alcohol were also seen more likely to use tobacco (AOR = 11.08, 95% CI 3.515-28.266). Likewise, adolescents having either of their parents smoking were 13 times more likely to use tobacco than the counterpart adolescents (AOR = 13.24, 95% CI 2.737-26.03) and similarly adolescents having their closest friends smoking were more likely to use tobacco than those adolescents whose close friends were not smokers (AOR = 8.06, 95% CI 4.51-14.561).

Concerning to the exposure to the tobacco related messages; adolescents who were exposed to movies whose actors are smokers were seen 2.8 times more likely to use tobacco than those adolescents who were not exposed (AOR = 2.84, 95% CI 1.703 – 11.116). However exposure to anti-smoking media messages was seen protective to tobacco use among adolescents. Thus, those adolescents who were not exposed to anti-smoking media messages on television, radio, newspaper or magazines were seen more likely to use tobacco than those who were exposed (AOR = 4.43, 95% CI 1.838 – 7.13).

Adolescents who perceived that smoking is dangerous for health were less likely to use tobacco than those who didn’t perceive (AOR = 0.147, 95% CI 0.105-0.249). Moreover, those adolescents who were not taught about the danger of smoking in the class room were more likely to use tobacco than those adolescents who were taught (AOR = 3.75, 95% CI 1.122 – 16.80). Nevertheless, other variables like Age, income, and perception of being more attractive, perception of having many friends, tobacco advertisement in billboard, and shopkeeper refusing to sell cigarette were not shown statistically significant association (Table 8).

Discussion

Tobacco use is one of the most serious public health problems globally. This study aiming at assessing the prevalence and factors associated with tobacco use among adolescents of Ethiopia has described the magnitude and predictors of tobacco use and discussed as follows.

Researches on current smoking prevalence and behaviors among adolescents have reported disturbing trends for the future. The Global Youth Tobacco Survey, assessing data from more than 130 countries and principalities, has found that: the gap in smoking rates between school-aged girls and boys is decreasing, use of tobacco products other than cigarettes is widespread, a sizeable proportion of children who
currenty do not smoke are contemplating adopting the behavior, and children are widely exposed to secondhand smoke [17-22]. Similarly, this study has indicated increased prevalence of tobacco use among adolescents, decreased gap between the genders and high magnitude of exposure to second hand smoke in Ethiopia.

The prevalence of ever smoker among adolescents was found to be 28.6% (21.2% males and 7.4% females), and current smokers were 17.2% (13.3% males and 3.8% females). This finding of the present study is relatively lower than the prevalence from many countries globally [1,23–25]. However it is higher than studies conducted in Addis Ababa, Butajira and eastern part of Ethiopia [26-30]. This discrepancy in the prevalence might be attributed to the time of study, as many of the studies conducted in the country are not recent.

In the current study it is indicated that male adolescents are more likely to use tobacco than female adolescents are, which is consistent with many reviewed studies conducted in Addis Ababa, Eastern Ethiopia, Butajira and China [1,28-30]. This might be explained by the cultural and traditional background of the country, at which males are more mobile and responsible for outdoor activities and females are usually responsible for the activities inside their home.

This study also revealed that exposure of adolescents to second hand smoke is unacceptably very high, where over 6 in 10 are exposed to smoke in public places even though almost all the students are favoring law prohibiting smoking in public places and agreed in banning. This finding of the current study is much higher from the study finding conducted in Kampala, Uganda [26,27]. However some efforts are being made to protect nonsmokers from environmental smoke by some service providers in Ethiopia, there is a need to intensify efforts are being made to protect nonsmokers from environmental smoke, as it causes danger to the health of individuals.

On the other hand since there is no law prohibiting sales of tobacco products to minors [to children less than 18 years of age] in the country, the level of underage sales of tobacco products is significantly higher, almost all of current smokers showed that they purchased cigarettes in a shop that weren't refused because of their age. This data has a clear message that an easy access to tobacco products could lead to an increase in tobacco use among the youths; which in turn can increase the current smoking rate.

Many reviewed studies have shown that adolescents whose parents are smokers are more likely to use tobacco than those adolescents whose parents are not smokers [24,25]. Similar finding is seen in the present study too. This result can show us there is a need to include parents in
youth tobacco control programs. Moreover adolescents whose closest friends are smokers are more likely to use tobacco than the counterpart adolescents are. This finding is also in line with study conducted in Southern Taiwan, and Eastern Ethiopia [24,29].

A number of studies have implicated tobacco industry advertisement as possible causal agents in the stimulation of demand for cigarettes among adolescents [31-35]. However the present study revealed that tobacco industry advertisement on Billboard are not associated with tobacco use among adolescents. This inconsistency might be due to there is a ban of advertisement of tobacco products and sponsorships by tobacco industries on media, billboard, and any sport or other events [2]. On the other hand anti-smoking media messages are seen protective of tobacco use among adolescents. This show us smoking prevalence can be decreased and its spread can be halt through strengthening media anti-smoking messages.

Several review articles have shown that smoking in movies is associated with increases in adolescent smoking initiation [36,37]. Positive images through pro-advertisements in movies, dramas, spots, and access to other television channels, a significant number of youths are made to believe that smoking is cool, fun, glamorous, and modern, and watching their role models smoke further encourages them to smoke [2]. Similarly another study in US revealed that those adolescents who had watched more movies with smoking depiction are more likely to be smokers [38-47]. This study also revealed that adolescents who are exposed to movies whose actors are smoking were more likely to use tobacco than the counterpart adolescents. This finding indicates that the national electronic or press media should involve not only in ban of advertising but also in different media, movie, and show production industries in order to assure total ban of advertisement and promotion of tobacco.

More than three-fourth of the adolescents didn’t discussed the dangers and effects of smoking in class during the past year, these shows the health hazards of smoking are not being adequately given within the school environment. Adolescents who were not taught about the danger of smoking in the class are more likely to use tobacco than those who were taught. In addition, those adolescents who perceived the danger of tobacco use are less likely to use tobacco. This result shows that there is a need to revise school curriculums, refresh the school community about the dangers of tobacco, and need for strong engagement for increasing the awareness of the students.

In this study income [pocket money], age, and perception that smoking makes attractive were not seen significantly associated with adolescent tobacco use which is inconsistent with the study conducted in Nepal [25]. This discrepancy might be attributed to the difference in the study areas and the socio-economic status of the individuals. Since this study is cross sectional survey using GYTS, it might not show cause effect relationship. Therefore we recommend another study in order to establish cause effect relationship and attribution of the factors to tobacco use.

Conclusion and Recommendations

According to the study it is possible to conclude that the prevalence rate is increasing in its spread, the gap between male and female is decreasing and environmental exposure to tobacco smoke is wide spreading. If the current trend is not controlled many of those adolescents who currently smoke would have to endure a life time addiction and may die prematurely from tobacco-related diseases. This study finding also indicated that parent and peer smoking, lack of perception on the dangers of tobacco use, and exposure to movies whose actors smoking were associated with tobacco use among adolescents. Therefore the government of Ethiopia should legislate, enact, and enforce laws that decrease accessibility of cigarette, totally ban smoking in the public places, and totally prohibit tobacco advertisement and promotions in Medias and movies. Moreover adolescents of the country should be enriched with the knowledge on the dangers of tobacco use.

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First of all I would like to thank Almighty God for everything in my life; I know this couldn’t happen without his help.

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