

**UNIVERSITY OF GHANA  
COLLEGE OF HUMANITIES  
REGIONAL INSTITUTE FOR POPULATION STUDIES (RIPS)**

**THE INFLUENCE OF SOCIAL MEDIA USAGE ON ATTITUDES  
TOWARD TOBACCO USE AMONG ADOLESCENTS IN GHANA**

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**THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA,  
LEGON IN PARTIAL FULFILLMENT OF THE  
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**DECLARATION**

I certify that I am the sole author of this dissertation and that it has not been submitted, in whole or in part, in any previous degree application. I attest that appropriate acknowledgment has been accorded wherever others' research has been cited in this dissertation. Except where expressly mentioned otherwise in the text, all of the work given is my work carried out at the Regional Institute for Population Studies, University of Ghana.



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30<sup>th</sup> January 2023.



**ACCEPTANCE**

This dissertation has been accepted by the Regional Institute for Population Studies (RIPS), College of Humanities at the University of Ghana, Legon, in partial fulfilment of the requirements for the degree of Master of Arts (MA) in Population Studies.

Lilyk

10<sup>th</sup> October 2023.

Dr. Lily Kpobi

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**DEDICATION**

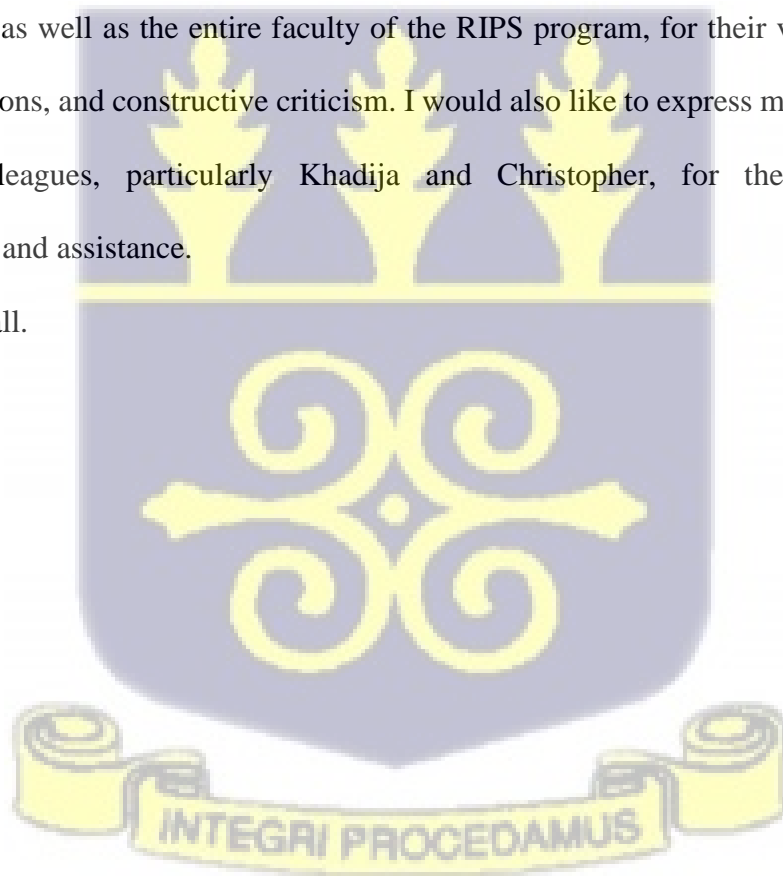
I dedicate my dissertation work to my lovely mum, Ms. Eunice Temeng.



## ACKNOWLEDGEMENTS

I would like to express my appreciation to the God entity for bestowing upon me His benevolence and granting me the opportunity to advance in this academic endeavour. I express gratitude towards my family for their prayers and unwavering support, as their contribution has been vital in enabling the successful completion of this dissertation. I express my gratitude to Dr. Lily Kpobi for her exceptional guidance and support, which facilitated the successful completion of my dissertation. I would also like to express my gratitude to Dr. Adriana Biney for her valuable insights and recommendations, which greatly contributed to the advancement of my research. Also, special recognition should be extended to Mr. Charles Asabere and Mr. Caesar Aguila, as well as the entire faculty of the RIPS program, for their valuable insights, astute observations, and constructive criticism. I would also like to express my gratitude to my competent colleagues, particularly Khadija and Christopher, for their advantageous encouragement and assistance.

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## ABSTRACT

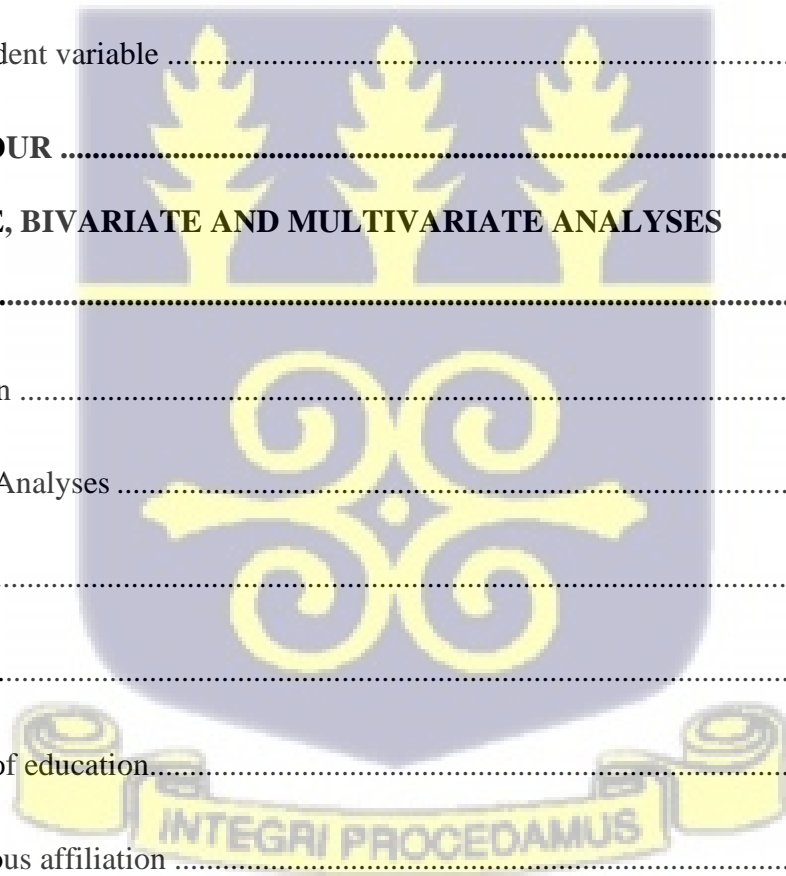
One of the key indicators of attitudes toward tobacco use among adolescents is their use of social media. In low- and middle-income countries, including Ghana, attitudes toward tobacco use are influenced by adolescent exposure to tobacco-related information on social media, demographics, and psycho-social dynamics. Using information from the 2017 Impact Assessment on Social Marketing (IASMG), this study examines the relationship between adolescent Ghanaians' use of social media and their attitudes toward smoking. In this study, a sample of 7,054 adolescent boys and girls was analyzed. The analysis was done in three stages. A descriptive study of the sample population's demographic and psycho-social characteristics was provided using univariate analysis. The associations between the independent variable, the control variables, the dependent variables, and the mediating factors were all studied in the bivariate analysis. Binary logistic regression was subsequently used to determine the factors that predicted attitudes toward tobacco usage in this sample. The analysis determined that 49% of social media users had favorable attitudes toward tobacco use. At the bivariate level, there was a statistically significant association between respondents' sex, place of residence, wealth index, tobacco knowledge, tobacco use among friends, and attitudes toward tobacco use, except in the case of religion, tobacco use among family members, friends, and peer influence. The results of the first model at the multivariate level, where binary logistic regression models were fitted at two levels, indicate that adolescent social media use was significantly associated with their attitudes toward tobacco use. The study recommends that more education on the negative consequences of tobacco use be implemented on social media to ensure that adolescents avoid tobacco use consumption by having attitudes toward it.

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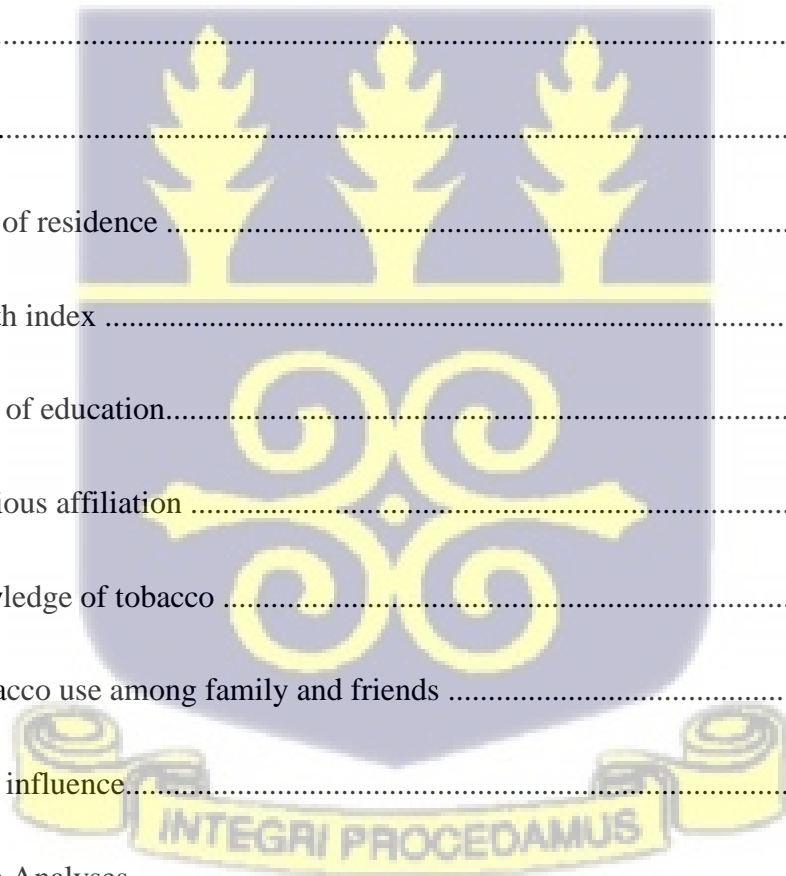
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## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background

Adolescence occurs between the ages of 10 and 19, and it is characterized by a period of rapid physiological, behavioral, and psychological development (World Health Organization, 2022). The adolescent stage is a critical phase in a person's life, as it reflects the transition to adulthood (Mirghafourvand et al., 2016; Shore & Shunu, 2017). Throughout the stages of their development into adulthood, adolescents encounter a diverse range of emotions (Manu, 2011). Many studies have found that adolescents' decisions to partake in potentially life-threatening actions are heavily influenced by various motivators (Arain et al., 2013; Acharya et al., 2010). Tobacco use, alcohol use, engaging in risky sexual activity, and school absences are only a few examples of the many risks that adolescents seek out. Adolescents eventually learn how to partake in certain unhealthy behaviors one of which includes tobacco use during this period (Arain et al., 2013; Acharya et al., 2010; Morton et al. 2001).

According to the World Health Organizations' report, the global population's prevalence of tobacco usage is 22.3% (WHO, 2020). Tobacco use causes more than 7.2 million deaths worldwide each year, and this figure is expected to rise in subsequent decades (WHO, 2015). Tobacco consumption is responsible for around 10% of mortality cases associated with non-communicable diseases, such as cancer, cardiovascular ailments, chronic respiratory diseases, and diabetes (WHO, 2011). Among the global population of smokers, a significant proportion, over 50%, is made up of people in the younger cohorts. On a global scale, an estimated 24 million adolescents aged 13-15 use cigarettes, and 13 million use smokeless tobacco products (WHO, 2019). Although there has been recent progress in reducing youth tobacco use, the use of other tobacco products has not declined equivalently. It is estimated that by 2030, low- and middle-income countries will account for 80% of

tobacco-related deaths, bearing the largest burden of tobacco-related illness and mortality (WHO, 2019).

In sub-Saharan Africa, tobacco use among adolescents varies, ranging from 1.4 % in Zimbabwe, and 1.5% in Nigeria to as high as 34 % in South Africa (Awabil & Strauch, 2019). In Ghana, an estimate suggests that about 3.7% of students use tobacco, of which 1.5% are males and 2.2% are females (Global Youth Tobacco Survey, 2017). Also, approximately 9% of adolescent boys and girls use some form of tobacco products (GYTS, 2017). The prevalence of tobacco use among school-aged adolescents has been the subject of research studies, which offer important insights despite a dearth of data on tobacco use among Ghana's school-aged adolescents (Mireku, 2003). In addition, Mireku noted that the prevalence rates were higher among boys than girls. The Youth Risk Behaviour Surveillance System shows a 22% decrease in secondary school students' cigarette smoking rates between 2007 and 2013. For instance, recent GYTS results from Ghana show declining trends for cigarette smoking, from 3.6% in 2000 to 2.8% in 2017, while higher rates of other tobacco products, such as smokeless tobacco (3.6%), shisha use (1.5%), and electronic cigarettes (4.9%), have been confirmed for the first time among adolescents (GYTS, 2017).

Several theories have identified significant motivators as key factors influencing adolescents' propensity to engage in a variety of risky behaviors, such as sexual activity, alcohol use, and smoking (Moreno et al., 2014; Arain et al., 2013; Acharya et al., 2010; Morton et al., 2001; Caffray & Schneider, 2000). The tendencies of adolescents are influenced by social circumstances through the presence of role models and the establishment of social norms (Lamorte, 2019). Familial figures, educators, and peers are the key influences on the social norms surrounding adolescents' smoking behavior (Lin et al., 2023). In recent times the interaction of adolescents with social media has been highlighted as one of the means by which adolescents develop and maintain tobacco use behaviors and attitudes (Moreno et al., 2014). Social media is now a source of exposure to alcohol and tobacco use as a result of its

multi-faceted feature and user-generated interaction on related content (Moreno et al., 2014). This differentiates social media from traditional mass media such as television, radio, newspaper, and magazines among others (Moreno et al., 2014).

Social media (SM) are interactive technologies that enable the production and sharing of information, ideas, and other kinds of mediums through online networks and groups (Calhoun & Friel, 2013). Social media have grown from a popular information source to a lifestyle management platform (Calhoun & Friel, 2013). Pro-substance use postings, posting on the disadvantages of using substances such as tobacco (Cortese et al., 2018), and online displays of alcohol drinking on social media have been correlated with offline behavior (Moreno et al., 2014). Research on how adolescents use social media and how it affects their opinions about tobacco is growing, especially in developing nations (Davis, 2013; Sponcil & Gitimu, 2012; Lenhart et al., 2005; Moreno et al., 2014). Today's adolescents are nurtured in a society dominated by social networking platforms including Facebook, WhatsApp, YouTube, among others which encourage user-generated content and user interactions (Davis, 2013; Sponcil & Gitimu, 2012; Lenhart et al., 2005; Madden et al., 2013). Facebook, WhatsApp, Instagram, Snapchat, YouTube, and Twitter expose users to content including content on alcohol, tobacco, and other substances (Lindsay, 2011).

The use of social media throughout the everyday lives of individuals is becoming more prevalent such that modern social networks reflect how humans interact among themselves. Diverse social researchers have explored the protracted repercussions of substituting face-to-face communication with online media (Akram & Kumar, 2018; Lindsay, 2011). In the world today, new media is the internet and its link to technology, visuals, and sound. Traditional media includes radio, newspapers, and television while WhatsApp, Facebook, Twitter, LinkedIn, Instagram, and Snapchat are some of the new social media networking platforms that can be used on mobile phones and other electronic gadgets (Abdullahi & Abdulquadri, 2018; Lindsay, 2011).

Therefore, the use of technology, especially social networking sites, can have both good and negative effects on its users (World Bank, 2020). According to Seo et al. (2013), users can quickly share information on social media, to a much larger extent such that news, video content, and pictures can "go viral". With social media's flexibility and diversity acting as a direct conduit of communication among adolescents, they can widely disseminate information at significantly greater rates (Lilley et al., 2012; Seo et al., 2013). Previous research has shown that peer influence is a significant factor in adolescents' attitudes and health behaviors (Wood et al., 2004; Keefe, 1994). In a comprehensive study on the influence of substance use among adolescents, Huang et al. (2014) found that exposure to substance use on social media had a significant influence, surpassing the influence of adolescents' in-person peer networks. Therefore, observation of peers on social media influences attitudes and intentions toward tobacco use. In the present day, peer observations can occur both online and offline.

According to research, adolescent online self-presentations are diverse and project gendered identities (Brenner, 2012; Lenhart et al., 2011; Rideout et al., 2012; Gross, 2004; Livingstone and Bovill, 1999). Boys and girls are terms used to refer to the conventional mappings between gender with biological sex. There are major differences between the genders in terms of the social media sites people utilize and the frequency with which they do so (Herring & Kapidzic, 2015). Moreover, psychosocial differences between adolescent boys and girls may explain their differing smoking rates (Elmore, 2017). Male and female adolescent tobacco consumption may be explained by planned behavior (Ajzen, 1991). Female smokers have been found to have stronger social support and motivation than males (Branstetter et al., 2012). However, society tends to link adolescents' tobacco usage with masculinity (Fryar et al., 2009). Conversely, due to psychosocial inequities, it is common that adolescent males will be asked for identification while buying tobacco unlike adolescent females and this shows gender disparities in adolescent tobacco use risk variables (McGovern et al., 2015; Elmore, 2017).

According to Pechmann and Catlin (2016), media advertising is a major factor in the rising rates of adolescent alcohol use. Adolescent Facebook profiles often include alcohol and smoking content, according to previous research (Hinduja & Patchin, 2008; McGee & Begg, 2008; Moreno et al., 2007, 2009b). Moreover, social media users can gain insight into the behaviors and daily lives of people outside their immediate family networks, such as "influencers," or popular social media users who are offered money or products to endorse the product to increase the number of followers (De Veirman et al., 2017).

Adolescents may be more likely to use electronic cigarettes (e-cigarettes) if they see advertisements for them on social media (De Veirman et al., 2017). E-cigarettes are popular among adolescents due to a widespread marketing campaign that emphasizes young models and colors, as well as product features such as distinct use, visual value, desirability, and a variety of flavors that strongly influence their use (Jackler & Ramamurthi, 2019; Keamy-Minor et al., 2019; McKelvey et al., 2018). The e-cigarette industry due to its popularity among young people, has made extensive use of so-called influencer marketing on social media (Jackler et al., 2019). Certain studies suggest that the ingredients in e-liquid or vapor could be harmful to human health since e-liquids are vaporized at high temperatures, and hazardous formaldehyde is produced (Sleiman et al., 2016; Talih et al., 2016). Flavorings used in e-liquids may include diacetyl, 2, 3-pentanedione, and acetoin, all of which have been associated with serious respiratory diseases (Allen et al., 2016).

Adolescents who are exposed to online content on social media may come to perceive e-cigarette use as a pleasant habit as they observe other adolescents, friends, and influencers using it and appearing joyful and prominent amongst social networks and groups (McCausland et al., 2019). For instance, more adolescents than adults tweeted about marijuana in 2012 and 2013, and a significant proportion of these tweets reflected favorable

views toward marijuana. Social media serves as an important channel for the distribution of information about tobacco and other tobacco products and thus can influence the development of attitudes, especially among adolescents (Thompson et al., 2015).

Tobacco and other substance use were the most significant risk factors for mortality and DALYs among adolescents (Mokdad et al., 2016). Adolescents' health-related attitudes and behaviors while using social media are a significant determinant of the psychological and social factors that affect health (Madden et al., 2013). Smoking habits of adolescents and tobacco-related content displayed on social media are online components that adolescents view on social media, and are associated with adolescent tobacco usage (Ali & Dwyer, 2010; Mundt et al., 2012). In many ways, social media exposure can be comparable to offline equivalents (radio, television, magazines, public gatherings) in terms of awareness of tobacco use (Ali & Dwyer, 2010; Mundt et al., 2012).

According to studies on tobacco consumption, the implications that adolescents associate with tobacco are gendered, and consumption may function as a symbol of gender and identity (Nichter et al., 2006). This study seeks to understand how adolescents develop attitudes toward tobacco use on social media because these attitudes are critical in light of the harmful health consequences of adolescent tobacco use, including addiction, brain development challenges, school drop-out and lifelong attainment (Wang et al., 2014; Bray et al., 2000; Brook et al., 2013; Hall & Degenhardt, 2009; Meier et al., 2012; Volkow et al., 2014; Zalesky et al., 2012).



## 1.2 Statement of the problem

Social media is widely acknowledged as an important component in molding people's social and psychological development (Madden et al., 2013). Adolescent tobacco use is a significant concern due to the impact of attitudes and habits on health and the potential for future illnesses linked to these attitudes. According to the World Health Organization (WHO), tobacco use causes more than 7.2 million deaths worldwide each year, including those who are exposed to passive smoking (WHO, 2015). In sub-Saharan Africa, tobacco use among adolescents varies, ranging from 1.4 % in Zimbabwe, and 1.5% in Nigeria to as high as 34.4 % in South Africa (Awabil & Strauch, 2019). In Ghana, 3.7% of students use tobacco, 1.5% are males and 2.2% are females (Global Youth Tobacco Survey, 2017). According to findings, 8.7% of school-aged adolescents in Ghana smoke cigarettes, 8.8% smoke shisha, and 2.5% of males and 3.7% of females use smokeless tobacco. Surprisingly, the percentage of non-smoking 13- to 15-year-olds who stated they would start smoking if a friend provided them a cigarette increased from 14.6% in 2005 to 21.6% in 2017. This represents a significant increase from the previous number (GYTS, 2005; 2017) and the influence of friends on adolescent attitudes.

Extensive finding shows that e-cigarettes contain toxic chemicals with adverse effects on the lungs, heart, and blood vessels (Perrine et al., 2019; Alzahrani et al., 2018; Chaumont et al., 2018). In addition, nicotine interferes with and alters the developing brain, hence increasing the chance of nicotine dependence (Yuan et al., 2015). Other negative repercussions include cancer, theft, accidents, suicide, mental disorders, and a reduction in life expectancy causing significant economic, psychosocial, and public health challenges to society (WHO, 2014; Jernigan, 2011). In some social and geographical contexts, adolescent tobacco use is prevalent with an indication that gender, age, household characteristics, and social networks including peers and other social units

continue to play an important role in influencing attitudes and practices toward tobacco use among adolescents (Doku, 2012).

A study by Pitel et al (2011), found that the rate of tobacco use among females rises concurrently with urbanization, while it remains relatively stable among males. Recent global trends show that smoking and social disadvantages such as low income and education adversely impact females (Pampel & Denney, 2011; Graham, 2009; Mackenbach et al., 2008). This illustrates how gender-specific social, cultural, and economic factors mediate the effects of tobacco consumption (Pampel & Denney 2011; Lopez et al., 1994). Gender and its impact on tobacco consumption initiation have received little to no attention in tobacco control campaigns until lately (Amos et al., 2012; 2018; Haglund & Amos, 2011; Hutchinson et al., 2020). Different outcomes are experienced in the health of males and females as a result of varying sociocultural influences including social status, educational level, age, and religious affiliation among others. This is extremely important for tobacco-reduction programs because it acknowledges the fact that different people have different smoking patterns depending on their age and their environment and a person's perspective on society can be profoundly shaped by a multitude of circumstances (Amos et al., 2011).

Some research has been conducted to explore the impact of traditional media portrayals of tobacco use on adolescent's attitudes and behaviors (Hoffman et al., 2014; Moreno et al., 2014; Komesuor & Teye, 2012), however, these did not consider the influence of the new emerging social networking sites on attitudes towards tobacco use in sub-Saharan African countries. This notwithstanding, most global prevalence studies indicate that social media is a crucial determinant in the formation of tobacco usage norms (Lattie et al., 2017; Moreno et al., 2011). Previous research further revealed that adolescent social media profiles frequently depict alcohol use, some tobacco

consumption, and smoking habits, (Moreno et al., 2009; McGee & Begg, 2008) lending credence to the need for research and enlightenment regarding this social and public health problem.

Therefore, research is increasingly focusing on the types of social media used by adolescents and the influence it has on attitudes toward tobacco use, notably the extensive research that has been done in developed nations (McCausland et al., 2019; Lattie et al., 2017; De Veirman et al., 2017; Jackler et al., 2019; Egan & Moreno, 2011; LaBrie et al., 2011; Thompson et al., 2015). However, few studies have focused on adolescent social media use and its influence on attitudes towards alcohol and tobacco use in Ghana (Hutchinson et al., 2020, Karletsos et al., 2021; Bannor, Asare & Bawole, 2017).

### 1.3 Research questions

1. Which socio-demographic characteristics influence attitudes toward tobacco use among adolescents in Ghana?
2. What is the association between social media use and attitudes toward tobacco use among adolescents in Ghana?
3. Do knowledge and attitudes toward tobacco use among adolescents in Ghana differ by gender?
4. In what ways does social media use vary by gender?

### 1.4 Rationale for the study

This study aims to determine the relationship between social media usage and attitudes towards tobacco use, as well as the relationship between socio-demographic factors and attitudes toward tobacco use among adolescents in Ghana. The findings of this study have significance for the development of gender-specific preventative initiative programs and policies. Although gender and its impact on tobacco consumption

initiation have received some attention in tobacco control campaigns in Ghana by some researchers (Amos et al., 2012; 2018; Haglund & Amos, 2011; Hutchinson et al., 2020) More studies on gender-related use of tobacco are required. This is essential because adolescent girls' use of tobacco may be linked to a variety of risk factors for their mental health, including increased mortality and morbidity (Haglund & Amos, 2011). This study highlights research gaps in our understanding of the role of social media and exposure to messages about tobacco being the intermediary variable and how it influences attitudes toward tobacco use in Ghana. This will fill a gap in knowledge as it addresses the influence of exposure to harmful messages on tobacco as an intermediary factor and its influence on attitudes towards tobacco use in the Ghanaian context.

Although smoking behaviors are substantially predominant among males, the number of females who smoke has increased in low- and middle-income countries, yet few studies have examined this trend (Maritz & Mutemwa, 2012; Samet & Yoon, 2010; Greaves et al., 2006 Hutchinson et al., 2020). This study will identify if the knowledge and attitudes towards tobacco use differ by gender in Ghana. This will fill a gap in knowledge in developing strategies that can increase awareness of the gender-specific risks and protective factors for tobacco use in Ghana. This will help to inform policies on the utilization of social media among students on literacy development and also contribute to political mobilization, enhancing democratic participation, and media policies on adolescents' use of social media. Moreover, this will provide a platform to promote health information on the effectiveness of online health information on social media over mass media, online health campaigns which will serve as an innovative method of disseminating quality health information

This study also sought to identify the role of social media usage among adolescent boys and girls in Ghana. Adolescents' attitudes towards tobacco and their social media use are linked, therefore necessitating localized and contextualized research since the majority of these studies have been done in high-income contexts where media availability, parental influence, and regulations surrounding media usage and representation are more likely to align with prevalent cultural values. This study therefore seeks to understand how adolescents develop attitudes toward tobacco use through social media use.

### **1.5 Objective**

The goal of this study is to explore the influence of social media usage on attitudes toward tobacco use among adolescents in Ghana.

#### **1.5.1 Specific objectives**

1. To determine the socio-demographic characteristics associated with tobacco use in adolescents in Ghana.
2. To identify the gendered knowledge and attitudes towards social media and attitudes towards tobacco use.
3. To explore the association between social media use and attitudes towards tobacco use among adolescents in Ghana.

To explore the gendered use of social media among adolescents.

### **1.6 Organization of the Dissertation**

This dissertation is organized into seven chapters. This introductory chapter provides context for the study, a description of the problem of concern, the main research questions, its overarching goals, and the rationale behind the study being conducted. Chapter Two consists of a review of the related literature, the theoretical and conceptual

frameworks as well as the research hypotheses. Chapter Three presents the methodology of the study. Chapter Four describes the results of the univariate analyses, the bivariate analyses using Pearson chi-square to test for association between social media use, socio-demographic factors and attitudes towards tobacco use, and the gendered attitudes towards tobacco use in Ghana. The multivariate analyses tested the association between the socio-demographic factors and attitudes toward tobacco use among adolescents in Ghana. Chapter five provides a discussion of the results, conclusion, and recommendations for future studies.



## CHAPTER TWO

### LITERATURE REVIEW

#### 2.0 Introduction

In this chapter, previous studies on the use of social media (SM) and the sociodemographic factors that influence how adolescents feel about alcohol and tobacco use will be reviewed. This will include a definition and description of key concepts, as well as a discussion of how these key concepts and theories have been used in other studies. This chapter will also outline the theoretical framework that informed the study's design.

#### 2.1 Review of Related Literature

##### 2.1.1 Concept of Adolescence

According to Mirghafoury et al. (2016), Adolescence is a significant time in a person's life. It is a phase of human life that occurs between the ages of ten and nineteen and is marked by the transition from childhood to adulthood (Darroch et al., 2016). This is the time in certain cultures when a person is first exposed to adult responsibilities and expectations. Therefore, it represents a change in the way the mind and emotions are processed by the body (Shore & Shunu, 2017). However, Stang and Story (2005) disagree and indicate that the onset of the shift varies widely among individuals, largely as a result of nutritional and genetic differences (Stang & Story, 2005; McCauley et al., 1995). The period of adolescence is a phase of life where adolescents are more vulnerable to a variety of risks that have the potential to have a detrimental impact on their lives (National Research Council, 2011). This is a result of the desire of adolescents to be free from the control of their parents, along with their natural curiosity, which typically leads them to experiment in ways, including sometimes with various kinds of

things (Eccles et al.,1993). This is supported by a study conducted by Morton et al. (2001) who indicated that adolescents learn how to partake in certain unhealthy behaviors like tobacco and alcohol consumption during this period (Arain et al., 2013; Acharya et al., 2010; Smart & Fejer, 1972). During this phase, adolescents spend the majority of their time in school, when significant socialization and identity development takes place. This is where adolescents meet peers and form various attitudes as a result of the pressure from peer groups. Adolescents choose peers who are similar to themselves, these peers influence their behaviour, and they frequently participate in risky activity together (Arain et al.,2013).

### **2.1.2 Adolescence and social media use**

The use of social media as a means of communication among friends, family members, and acquaintances is now widespread around the world. Social media, as defined by Kuss and Griffiths (2011, p.3529), “are virtual communities where users can set up individual public profiles, engage with real-world connections, and meet new users based on similar interests.” One of the oldest social media sites to gain popularity globally in the early 2000s was MySpace whose features enabled the sharing of music files (Lenhart & Madden, 2007). In 2004, Facebook was launched and available to students at Harvard University but gradually expanded to other university students and the general public in 2006, whereas MySpace began to decrease in its number of users. Following this decline, Twitter was launched in 2006, with its purpose of sending short text messages to its users (Lenhart et al., 2010). Subsequently, other social networking sites such as LinkedIn for creating professional networks, Instagram, Snapchat, and Pinterest which focus on sharing images, and video sharing networking platforms including YouTube, TikTok, and Vimeo have gained popularity.

In recent decades, interacting with others online has followed this trend, as a result of the rise in popularity of social media platforms including Facebook, Twitter, TikTok, Instagram, LinkedIn, WhatsApp, Viber, IMO, and video calling apps like Skype. It has been estimated that social media users increased by around 9 percent annually to 3.8 billion in January 2020 (Kemp, 2020), and social media constitute approximately 64 percent of all internet users. Facebook a clear market leader, reportedly has 1.59 billion active users while other popular platforms such as Instagram and WhatsApp are reported to have more than 900 million active users (Kemp, 2020). It has been observed by Greenfield (2010), that adolescents can learn about the acceptability of particular risk behaviors through their use of social networking sites like Facebook. Content that facilitates communication on the website can be published on the user's Facebook page, which often contains images of the user and information about their interests. In addition to reading each other's profiles, members can communicate with one another through interactive boards and correspondence. Images and user comments are, according to adolescents, the most preferred types of online information regarding the activities and locations of their peers (Pempek et al., 2008). Conversely, Madden (2007) argued that the contents of the images and comments are likely to shape, at least in part, the adolescent's notions of normal and acceptable behavior. This corroborates with Greenfield's study that adolescents can indeed adopt a certain attitude through the use of social media.

Social media capabilities and their features have enhanced the sharing of all types of content, including alcohol- and tobacco-related content, and have the possibility of reaching a significant number of users at a time, especially adolescents. Different elements of social media sites, including the structure of user posts and the expectation of anonymity and privacy, may influence the risk of exposure to tobacco-

related content. Some studies assert that minors under the age of 13 can still use Facebook if they submit a bogus date of birth and age (Jernigan & Rushman, 2014). In 2014, the Facebook experience included users, posting on their ‘timeline’, where the user could display status updates, photos, and videos. However, Moreno et al. (2012) identified that some adolescents could have an exaggerated sense of their ability to create and sustain their private settings. Alternatively, Twitter posts or tweets are text messages of at most 140 characters, due to the limited text content on Twitter, adolescents do not engage in Twitter as much as they do on Facebook (Madden et al., 2013). On the contrary, Twitter does not ask for age when registering a new account for users, although its policy states that all accounts below the age of 13 years will be disconnected, unlike Facebook.

### **2.1.3 Alcohol and Tobacco-related Content on social media**

Several studies have indicated that individuals and businesses can post personal information on social media platforms to advertise and promote their goods and services (Mundt et al., 2012; Jernigan 2011; Moreno et al., 2009). Kaplan & Haenlein, (2010) revealed that most traditional forms of mass media, such as television, radio, newspapers, and magazines, whereby the content provided by only one organization at a time are distinguished from social media since it lacks the described multi-faceted characteristics and subscriber engagements on content (Kaplan & Haenlein, 2010). This study argued that understanding the changing patterns and multi-faceted features of social media is part of knowing how adolescents get exposed to alcohol and tobacco-related content in this present day. Moreover, numerous social media platforms have emerged and faded in recent years, with some surging in popularity and others losing influence, whereas the most contemporary platforms are constantly being updated to match the needs of their user community (Kaplan & Haenlein, 2010).

Adolescent drinking, drinking among peers, and alcohol marketing have all made their way onto social media, hence researchers (Mundt et al., 2012; Ali & Dwyer, 2010; Jernigan, 2011) are gauging the reach and impact of alcohol-related content on social media to develop effective interventions. Despite these concerns, there have been few attempts to investigate the influence of tobacco-related content on social media on adolescents (Hutchinson et al., 2020). The few attempts that have been made have tended to focus on alcohol-related content rather than tobacco-related content. Some researchers have revealed that Twitter content can be shared on other platforms by including a hashtag (# ) followed by the word (Hinduja & Patchin, 2008; McGee & Begg, 2008; Moreno et al., 2009). According to West et al. (2012), underage drinking tweets were most extremely common on Friday and Saturday nights between 10 p.m. and 2 a.m. During the holidays, there were usually more tweets. Holidays and special events, according to Neighbors et al. (2011), have relatively higher rates of alcoholic risk behaviors than nonholidays.

On the other hand, Moreno et al. (2009) posit that the risky online behaviors of teens tend to have an impact on real-world behaviors, such as alcohol use and sexual content. He further stated that adolescents are more likely to bring up alcohol discussions if a peer brings it up, just as they would be more likely to do so in an offline peer group discussion (Moreno et al., 2011). However, he further argued that alcohol consumption-related content posted excluded posts on the negative consequences of alcohol use, such as hangovers and embarrassment. Correspondingly, other researchers have looked at alcohol-related content on Twitter (Chew & Eysenbach, 2010; Signorini et al., 2011), yet few studies have been done on tobacco-related content. Consequently, alcohol marketing has an impact on user-generated alcohol content as well (Nicholls, 2012). According to Nicholls (2012), alcohol companies requested that Facebook users

"like" and "share" their products, as well as post photos and videos of themselves drinking the alcohol or attending company-sponsored events. Twitter users are encouraged to "follow" companies and post pictures of people with a hashtag to help the brand's trademark. For instance, one may tweet about the best day of the week to consume a specific brand of alcohol on a specific day of the week. As an illustration, the Bacardi brand has been using the hashtag "#mojitomonday" to boost sales on Mondays in the United States (West et al., 2012). However, according to Nicholls (2012), only a small number of tweets encouraged followers to drink responsibly and find sober transit home. In contrast, some researchers state that traditional media sources limit the amount of alcohol advertising that broadcasts during youth-oriented programming, and comparable commercials continue to appear in other traditional media formats (King et al., 2009; Rhoades & Jernigan, 2013). The ability to properly tailor message content and actively foster connections with clients is what makes social media such a beneficial and innovative channel for alcohol marketers (Jernigan & Rushman, 2014). Due to the ease with which young people under the age of 21 can be reached through various forms of social media, this campaign focuses primarily on reaching them. Conversely, the current study determines if exposure to tobacco-related content posted on social media influences adolescents' attitudes toward tobacco use.

#### **2.1.4 Attitudes toward alcohol and tobacco use**

Attitudes are opinions about things and actions, like the belief that smoking is bad or that drinking alcohol is fun (Park et al., 2016; Albarracn et al., 2005). The word "attitude" refers to how a person decides if a behavior is good or bad, which is affected by how they see the behavior's benefits and consequences (Park et al., 2016). Therefore, attitudes about tobacco use are linked to initiating or continuing to use tobacco, even though there are a lot of different factors that affect each other according to Park et al

(2016). Attitude towards tobacco use can be linked to its usage. People's answers to questions about something or a behavior reveal their explicit attitudes whereas implicit attitudes are usually feelings that may not be said out loud (Park, 2016; Albarracn et al.,2005). They are measured more subconsciously and involve more natural interconnection between something and being good or bad. This is important because explicit and implicit attitudes may not match when it comes to socially controversial issues like adolescent smoking or tobacco use (Park, 2016; Hofmann et al., 2005).

Previous studies have indicated that adolescents' attitudes toward tobacco use are the primary factor of their usage (Dempster et al., 2005; Williams & Hine, 2002). Kuther and Higgins-D'Alessandro (2003) for instance found that a favorable attitude regarding alcohol usage explained adolescent drinking behavior. According to Park et al. (2016), adolescents who had favorable attitudes toward tobacco use by way of explanation believed that tobacco consumption makes them appear cool or fit were more likely to use tobacco in the future compared to those who did not hold similar opinions. This is supported by Leventhal et al (1980) whose findings indicated that adolescents who feel there is a direct link between tobacco use and longevity are more likely to consume tobacco products. Contradictory to these findings, Van de Ven et al (2007) in a study of the coping strategies associated with quality of life in adolescents revealed that adolescents with asthma were more opposed to tobacco than those without asthma and eighteen months after this modification in attitude, asthmatic adolescents smoked less according to his findings.

Considering that it is widely known that tobacco use throughout adolescence can have major impacts in later life, efforts to manage this issue also concentrate on adolescents and young people (Park et al., 2016). Hughes (1993) discovered that there is

a significant connection between tobacco consumption and alcoholism, as well as the fact that the same factors influence one's propensity to use either tobacco or alcohol (Grant et al., 2009). Following this study, Reed et al. (2007) findings revealed that drinking and smoking are significantly connected among college students. It is essential to understand people's attitudes toward tobacco use, as attitudes have been found to significantly influence behavior (Castro et al., 2014; Albarracín et al., 2005).

### **2.1.5 Development of Adolescents' attitudes towards alcohol and tobacco use**

According to the social learning hypothesis (Akers et al., 1979; Bandura, 1977), individuals develop attitudes and plans for their behavior based on what they observe other individuals doing frequently before they are cognizant of doing so. According to Lang and Stritzke (1993), attitudes toward alcohol and tobacco use are formed in children and adolescents before they use it for the first time. Furthermore, there is a substantial association between an adolescent's behavior and that of his or her peer (Bandura, 1977). This is supported by a study conducted by Albarracín (2017), where the social indicator could be exemplified by how adolescents behave in the presence of their peers and how their attitudes alter under the influence of their peers. Additionally, if a new habit is adopted, cognitive dissonance may result, which may lead to a shift in attitude that supports the new behavior (Albarracín, 2017; Gerrard et al., 2008; McMaster & Lee, 1991). Longitudinal research has demonstrated that peers influence on how individuals use marijuana, alcohol, and tobacco products, regardless of the specific method (Gerrard et al., 2008). This study corroborates a study conducted by Albarracín et al. (2017), adolescents who used tobacco during the previous semester were more likely to continue using it during the subsequent semester, even if they also used another tobacco product during the previous semester, however when the smoking peers were socially close, there was a greater likelihood of this occurring. As opposed

to the study by Albarracin et al. (2017), without peers, adolescents who develop favorable attitudes towards tobacco are strongly associated with a willingness to drink, thus the more favorable the image, the more likely adolescents are to engage in the behavior (Gibbons et al., 2004). Recently, some researchers' findings indicated that notwithstanding the known harmful effects of nicotine on the growing brain, chemical exposure, and greater likelihood of using regular cigarettes, adolescent e-cigarette use has increased considerably (England et al., 2017; Miech et al., (2017). This can be ascribed to the globalization trends and marketing systems of some tobacco companies, in making these products attractive to young people in Africa, specifically Ghana.

## **2.2 Socio-demographic characteristics influencing attitudes towards alcohol and tobacco use**

Donohew et al. (2012) revealed that there is a link between getting older and smoking cigarettes in all kinds of groups and people from different countries often have very different social and economic situations. Low household income and low parental education are linked to higher lifetime and current smoking rates and can be used to predict who will start smoking (Conrad et al., 1992).

### **2.2.1 Age and attitudes toward tobacco use**

Age is a significant predictor of adolescent attitudes toward tobacco and alcohol use. A recent study highlighted the moderating effect of age on the association between e-cigarette use and other risk factors (Chang & Seo, 2020). Adolescent susceptibility was associated with age groups, where adolescents aged 13-19 were more likely to be susceptible to using e-cigarettes compared to young adults aged 20–29. This contradicts another study among adolescents in a survey (Garcia et al., 2021), in which adolescents aged 15-17 had lower odds of using e-cigarettes in the previous 12 months than young

adults aged 21–29. According to findings by Ross and Perez (1998) age significantly impacts attitudes toward smoking. It further stated that young people from ages 12 to 24 years were least concerned about the health consequences of smoking as compared to older adults.

### **2.2.2 Sex, age, and attitudes toward tobacco use**

According to a recent study, e-cigarette use is associated with other risk factors, but sex appears to play a mediating role (Chang & Seo, 2020). Chang and Seo (2020) discovered, for example, that female e-cigarette users were more likely than males to use alcohol and tobacco, and that younger female e-cigarette users were more likely to smoke and use tobacco than older female adolescents. Hrywna et al. (2020) support this study stating that when the interaction of gender and age is considered, older adolescents have a higher risk of current e-cigarette use (Lourdes et al., 2019). However, Pitel et al. (2011) disagree and found that the rate of tobacco use among females rises concurrently with urbanization, while it remains relatively stable among males (Pitel et al., 2011). Recent global trends show that smoking and social disadvantages such as low income and education adversely impact females (Pampel & Denney, 2011; Graham, 2009; Mackenbach et al., 2008). This illustrates how gender-specific social, cultural, and economic factors mediate the effects of tobacco consumption (Pampel & Denney 2011; Lopez et al., 1994). According to studies on tobacco consumption, the implications that adolescents associate with tobacco are gendered, and consumption may function as a symbol of gender and identity (Nichter et al., 2006). A female's perspective on society, for instance, can be profoundly shaped by a multitude of circumstances, including but not limited to her social status, educational level, age, and religious affiliation.

Different outcomes are experienced in the health of men and women as a result of these varying sociocultural influences. This is extremely important for tobacco-reduction programs because it acknowledges the fact that different people have different smoking patterns depending on their age and their environment (Amos et al., 2011). Gender and its impact on tobacco consumption initiation have received little attention in tobacco control campaigns in Ghana until lately (Amos et al., 2012; 2018; Haglund & Amos, 2011; Hutchinson et al., 2020). Inconsistent with these findings a relationship between tobacco use and demographic factors was investigated by Jalilian et al. (2015) and Hu et al. (2007) whose findings show that the rate of tobacco usage was higher among males than among females (51 percent vs. 4.9 percent). Adolescent males with higher levels of education were found to have a more favorable attitude toward smoking by Xu et al. (2015). However, this knowledge of education and attitude did not necessarily translate into the acknowledgment of tobacco health-related consequences. Additionally, prior research has shown that girls are often more anxious than boys about adjusting to new social environments (Frank et al., 2008; Kretschmer et al., 2018). Moreover, adolescent girls worry more about being abandoned and losing friends than adolescent boys do (Maccoby, 1998; Rose & Rudolph, 2006) and so may experience increased peer pressure to act like their peers as a result shift their attitude easily (Kretschmer et al., 2018).

### **2.2.3 Place of residence and attitudes towards tobacco use**

Place of residence has been found to have a significant association with adolescent attitudes towards tobacco use. According to Noland et al. (2018), there is a strong significant interaction between locality and tobacco use. This is a result of urban dwellings being greatly influenced by modernization and the adoption of Western culture compared to peri-urban and rural areas. A study on e-cigarette use among high school

students reported a significant interaction between locality and cigarette smoking; urban cigarette smokers were more likely to use e-cigarettes than rural cigarette smokers (Noland et al., 2018). Consistent with the findings, Pitel et al (2011) have found that the rate of tobacco use among females rises concurrently with urbanization, while it remains relatively stable among males. This reason can be attributed to the increasing trends in modernization and the adoption of Western culture in urban and peri-urban areas.

#### **2.2.4 Religious affiliation and attitudes towards tobacco use**

It's widely recognized that religious affiliation is a powerful indicator of health attitudes and tobacco use (Garrusi & Nakhaee, 2012; Bonelli & Koenig, 2013; Behere et al., 2013). Higher religiosity has been correlated with lower rates of tobacco, and alcohol use. Indeed, a recent literature analysis found that unfavorable attitudes toward tobacco use were associated with more religious involvement (Garrusi & Nakhaee, 2012). Although the relationship between religion and tobacco use has drawn significant attention from scholars recently, few studies from non-Christian or developing nations have been conducted (Koenig, 2012).

#### **2.2.5 Tobacco use among family members and attitudes toward tobacco use**

Parental behavior is one of the primary indicators of tobacco use. Adolescents whose parents smoke are more likely to begin smoking than those whose parents do not (Bauma et al., 2001). However, children whose parents have quit smoking or are attempting to quit are less likely to become smokers than those whose parents continue to smoke (Farkas et al., 2000). Similarly, Kosterman et al. (2016) revealed that parental attitudes toward alcohol can have a direct impact on the amount of alcohol their adolescents consume. public health, behavioral sciences, and sociology researchers have conducted extensive research about the complex and multifaceted factors related

to adolescents' tobacco use, particularly the influence of parents' attitudes toward tobacco on adolescents (Chang et al., 2011; Bauman et al., 2017). Alcohol consumption behavior with family relations, which adolescents may view as a positive trait and may imitate or oppose depending on their obedience or defiance, is likely to be an outcome of their attitudes according to Kosterman et al. (2016). In disagreement with this study, Bailey et al (2016) revealed that 81 percent of parents did not want their adolescents to use tobacco before school graduation. He further discovered that the attitudes of parents who do not use tobacco predicted the attitudes of their adolescents, and that parental tobacco use also predicts adolescent use (Skenderian et al., 2008). Therefore, it is evident that social learning occurs regarding the use of tobacco and alcohol use, and that family attitudes influence adolescent attitudes.

#### **2.2.6 Knowledge of Tobacco**

A recent study discovered that female smokers had a 25 percent higher relative risk of coronary heart disease than male smokers (Johnson et al., 2011;2020). Tobacco use has been linked to several diseases and conditions, including lung cancer, respiratory issues, upper respiratory and digestive cancers, ischemic heart disease, stroke, and peptic ulcers, all of which increase disease and death rates (Mathers et al., 2001; Turrell and Mathers, 2001; Turrell et al., 2006). According to the findings of several studies, the vast majority of people who smoke now actually started doing so as early in their adolescence (Chang et al., 2011; Bonevski et al., 2010, Sanchez et al., 2010; Park, 2011) with up to ninety percent of people who smoke now developing their habit before they turned 18. In light of this, tobacco addiction is classified as a disease that predominantly affects young individuals (Sanchez et al.,2010). Even though there is universal awareness of the risks associated with smoking, including an increased

chance of developing cancer, heart disease, and lung disease, hundreds of adolescents start smoking every day in nations all over the world (Park, 2011; Sanchez et al., 2010).

### **2.3 Social media influence in the formation of attitudes toward tobacco use**

Huang et al. (2014) discovered that adolescent exposure to tobacco use on social media boosted their use of tobacco and alcohol, in contrast to the impacts of tobacco use among their in-person social networks. Users of social media spend a considerable amount of time in both actively creating content for their social networks and passively viewing that content. Recent studies raise concerns that adolescent e-cigarette use may eventually turn into a prolonged, regular, and dependent habit as a result of the transition from conventional methods of smoking to a more modern way (Vogel et al., 2018; National Academies of Sciences and Medicine, 2018). Social media is a modern tool that is increasingly being used to spread social norms among adolescents (Simons & Farhat, 2012). Given that social norms have a significant impact on adolescents' decision to smoke, it is important to examine how these social norms may affect adolescents' attitudes toward tobacco use. Certain research has examined the influence of media exposure on adolescents' attitudes toward tobacco-related content (Johnson et al., 2013; Kooderman et al., 2012; Wills et al., 2009; Dal Cin et al., 2009). Users of social media spend a considerable amount of time. In concordance with Johnson et al (2013) study, Kooderman et al. (2012) revealed that alcohol exposure in the media had varying effects on various participants although it did encourage drinking (Johnson et al., 2013).

Several studies have tried to explicate the relationship between smoking and drinking alcohol among adolescents and have discovered that there is a repercussive impact of the use of both on society (Orlando et al., 2005; Charrier et al., 2014; Ostergren et al., 2017).

Adolescents who consistently engage in drinking and smoking, exhibit elevated levels of aberrant conduct and aggression, and are more prone to encountering legal complications during their twenties (Charrier et al., 2014). The financial burden associated with cigarette usage, encompassing both social and health care expenditures, is substantial and continues to escalate. Despite being avoidable causes of death and disease, smoking and alcohol use continue to have a detrimental impact on the life expectancy of both men and women (Orlando et al., 2005; Charrier et al., 2014; Nowak et al., 2018). The widespread availability of the Internet and social media has given rise to a new, largely unregulated industry; alcohol advertising and alcohol-related personal material (Moreno & Whitehill, 2014). There is a positive association between risky behavior and exposure to pro-alcohol content on social media platforms, just as there is with more traditional forms of media (Moreno & Whitehill, 2014). A survey of 5,000 tweets found that 54 percent promoted drinking, 24 percent preferred smoking, 2 percent preferred alcohol, and only 7 percent warned against using either alcohol or tobacco (Krauss et al., 2017). Tweets that promote drinking or normalize alcohol consumption provide the message that these behaviors are socially acceptable (Krauss et al., 2017). In another study, secondary schoolers were surveyed for two weeks on their exposure to alcohol marketing (D'Amico et al., 2017). Results from the survey showed that 3.6 percent of the alcohol advertisements seen by students were viewed on a digital device.

D'Amico et al. (2017) found a correlation between viewing alcohol advertisements online and subsequent drinking and tobacco use (Cavazos-Rehg et al., 2015). There were tweets about using tobacco with friends, in sex and romance, and believing it's safer than alcohol, normalizing and encouraging tobacco usage (D'Amico et al., 2017). Consistent with this study, Neighbors et al. (2008) discovered that implicitly condoning tobacco use via social media can lead to greater use because users see their peers with favorable attitudes toward tobacco use. A total of 637 adolescents participated in the research conducted by Hoffman et al. (2014) to determine the correlation between the adolescents' use of social media and alcohol use. The researchers found that social media usage and trends that

promote alcohol marketing are prevalent among adolescents (Hoffman et al., 2014; CavazosRehg et al., 2015). Adolescent tobacco usage is therefore linked to the presence of tobacco advertising in more places (Arora et al., 2012; Slater, 2005). Inconsistent with Wakefield et al (2006) study, it was found that exposure to tobacco advertising, irrespective of the target population, reduced the perceived harm of smoking, increased favorable attitudes towards smoking, and increased future smoking intentions. Although electronic cigarettes (e-cigarettes) are positioned as a healthier alternative to conventional smoking, social media portrayals of their use are linked to increases in daily smokers' need to smoke, and some demographic groups, notably female adolescents, seem to be particularly susceptible to such tobacco marketing (Maloney & Cappella, 2016; Yang, 2002).

Tobacco producers effectively advertise their goods on social media, even though only 12 percent of young people report interacting with online tobacco advertising (Pierce et al., 2017). Moreover, tobacco advertising did not only influence people's unfavorable attitudes regarding the health dangers of smoking, but it did influence their favorable attitudes regarding the advantages of tobacco use and the social acceptability of tobacco use (Cavazos-Rehg et al., 2015; Kowlessar, 2009). While adolescents are made to feel that tobacco use is trendy and will result in positive rewards, they will be more likely to try to use tobacco and develop addiction issues over time according to Newton et al (2012). Therefore, researchers have tried to adjust adolescent attitudes regarding alcohol use, which is consequently one of the primary objectives of many alcohol prevention and control programs (Bingham et al., 2011; Dempster et al., 2005; Newton et al., 2010; 2012). During interventions designed to alter people's perspectives, one study conducted by Bingham et al (2011) utilized unpleasant images such as those on the warning labels of tobacco products. The objective of these pictures was to urge viewers to reconsider a certain behavior by highlighting potential undesirable outcomes or by making them more apparent and memorable (Bingham et al., 2011; Newton et al., 2010; Newton et al., 2012).

Conversely, these interventions may not only be ineffective but may encourage people to keep consuming (Hansen et al., 2010). After viewing the photos', longitudinal smoking data was acquired and it revealed that some smokers, smoked more because they believed that tobacco would lower their self-esteem. Therefore, it can be deduced that fear-inducing messages and negative feedback regarding alcohol and tobacco use may be successful or unsuccessful if consumers resort to consciously accepting or disapproving of it (Giovazolias & Themeli, 2014; Ophir et al., 2017; Prestwich et al., 2016; Tebb et al., 2016). In another study, Botvin (2000) found that the success of resistance training programs depends on changing attitudes toward peer use trends. According to him, it is best to concurrently reduce favorable tobacco attitudes, educate self-efficacy and self-resistance methods, and modify peer norms. In Ghana, similar preventative programs on social media have been conducted to target adolescent alcohol and tobacco-related attitudes (Hutchinson et al., 2020). Both the general public and academic experts agree that adolescents' risky health behaviors are influenced by their social environment. As a result, social media which is predominantly a social environment in this current generation has enhanced adolescent's exposure to certain risky health behaviors (Moreno et al., 2012).

Findings from Lloyd and Anthony (2003) revealed that the majority of individuals claimed that peer pressure was the primary factor why adolescents participate in risky behaviors such as drinking alcohol. In addition, research has demonstrated that a positive social image or favorable attitudes toward an alcohol consumer influences adolescents' willingness to consume alcohol (Gerrard et al., 2008; Gibbons & Gerrard, 1997). Social images gain significance during adolescence due to the heightened concern for social appearance and peer approval that characterizes this life period (Finkenauer et al., 2002; Harter, 1998; Steinberg & Morris, 2011). The related literature presented above depicts the various interactions between social media use, socio-demographic factors, and adolescent attitudes toward tobacco and alcohol use. It is critical to consider the dynamics of adolescents' attitudes toward tobacco use as well as their use of social media in the context of Ghana. The findings of existing studies highlight the importance of additional research in the area of

adolescent social media use and the effects it has on their health attitudes and behaviors. This will contribute to global efforts to reduce the rate of mortality associated with adolescent tobacco use.

## 2.4 Theoretical framework

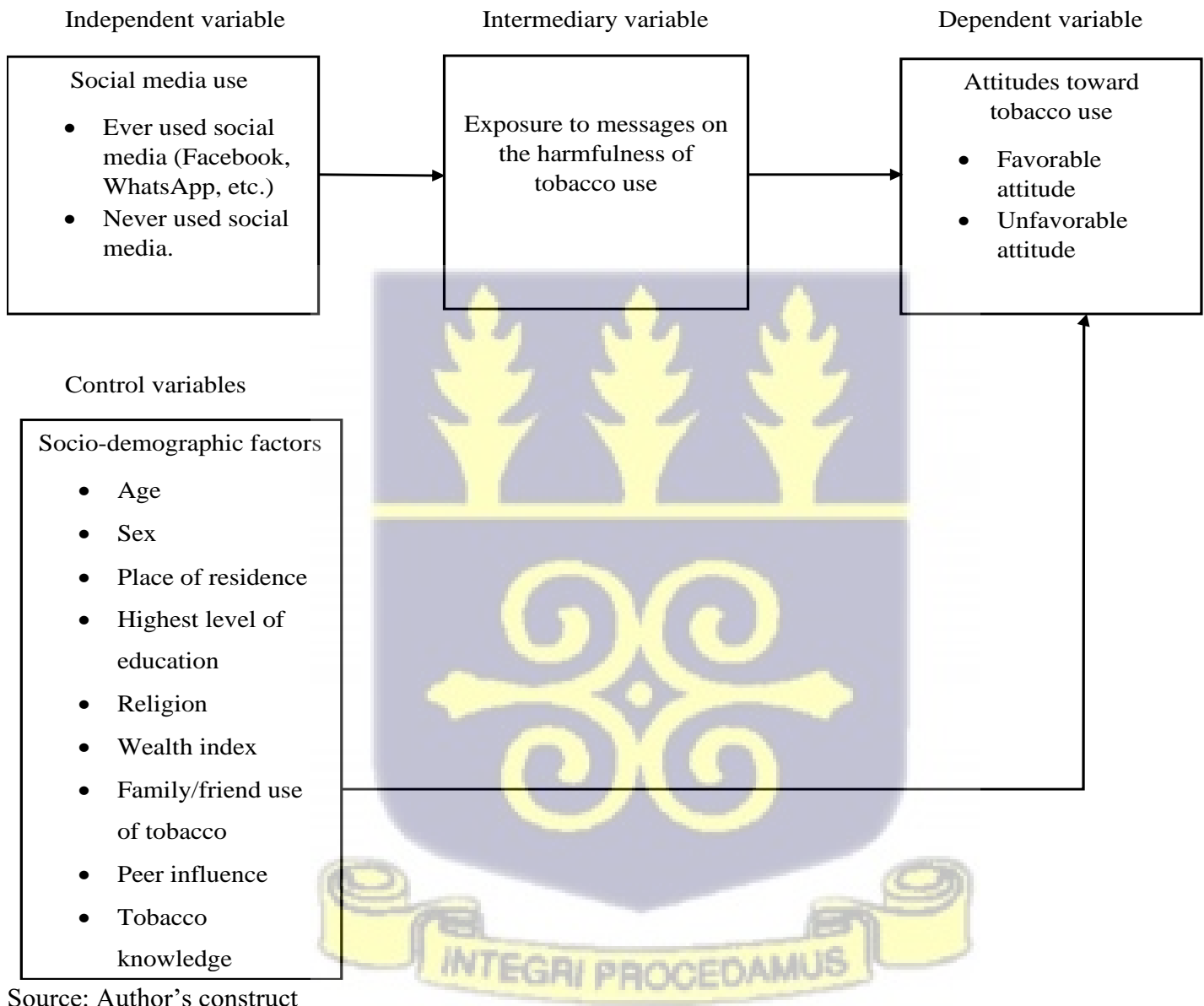
### 2.4.1 Social learning theory

According to the Social Learning Theory (SLT), adolescent learning can occur through personal experience and observation (Bandura, 1977;1986). The Social Learning Theory (Bandura, 1977; 1986) emphasizes the significance of peer influence on behavior and attitudes through the influence of social media on tobacco displays. Previous research has found that adolescents' attitudes, intentions, and behaviors regarding their health are highly influenced by their peers (Keefe 1994; Wood et al., 2004). The prevalence of alcohol consumption among adolescents' peers and the characteristics of their social networks influence the initiation of alcohol use at a young age (Ellickson & Hays 1991; Mundt, 2011). Applying the social learning theory, a person's use of tobacco, as well as their attitudes and habits are influenced by their peers. In recent times, these observations can occur both in real life and online. The social learning theory is predicated on the idea that people acquire new habits by observing and modeling the rewarded behavior of others (Bandura, 1977). Through social media, adolescents can follow the activities of their peers and adults. Adolescents are prone to mimic the actions depicted in social media posts because they convey their content engagingly, such as pro-tobacco use messages that promote the benefits of smoking or advocate tobacco lifestyles (Cortese et al., 2018). Adolescents are also more likely to hang out with friends who use tobacco if they perceive these peers as flamboyant or "cool. The social learning theory is therefore useful for explaining how exposure to pleasant information about tobacco can influence favorable attitudes toward its use in adolescents.

The literature reviewed above explains that adolescent social media use influences attitudes toward tobacco use and has shown that in many ways. This influence is contingent on certain socio-demographic variables, such as the adolescents' education, age, religion, sex, place of residence, wealth index, family/friends' tobacco use, peer influence, and tobacco knowledge (Chang & Seo, 2020;

Hrywna et al., 2020). The development of specific attitudes toward tobacco use may also be mediated by exposure to messages on the harmfulness of tobacco use those adolescents encounter on social media. The hypothesized relationships between the variables are summarised in the conceptual framework below.

## 2.5 Conceptual Framework



Source: Author's construct

The intermediate variable acts as a link between adolescent social media use, adolescent socio-demographic characteristics, and attitudes toward tobacco use. The relationship between adolescents' attitudes toward tobacco use and social media use must function through exposure to

messages on the harmfulness of tobacco use, peer influence, tobacco knowledge, and tobacco use by family/friends. According to the social learning hypothesis, a person's use of tobacco, as well as their attitudes and behaviors, are influenced by observations that they perceive from their peers.

## 2.6 Hypotheses of the study

1. Adolescents who have ever used social media are more likely to have favorable attitudes toward tobacco use.
2. Male adolescents are more likely to have favorable attitudes towards tobacco use than female adolescents.



## CHAPTER THREE

### METHODOLOGY

#### 3.0 Introduction

Research methodology explains the procedure that will be followed to complete the study (Burns & Bush, 2013). The approach, design, population, sampling, data collection, analysis, and ethical issues are all components of the study's research methodology. This chapter describes the methods used for the research. It includes a source of data, study area, study design, sampling methods, and data analysis.

#### 3.1 Source of data

This study makes use of secondary data derived from the 2017 baseline survey for the "Impact Assessment of Social Marketing in Ghana" (IASMG) project (Hutchinson et al., 2020). The initial objective of the IASMG project was to collect data to evaluate the effects of social marketing campaigns on the attitudes and behaviors of Ghanaian adolescents aged 13 to 16.

#### 3.2 Study area

The project was conducted in four locations in Ghana: Accra, Kumasi, Sunyani, and Teshie. The objective of the IASMG project was to design and implement effective youth-focused smoking prevention interventions and programs (SKY Girls) in developing countries, with an emphasis on social influence and social competence in reducing adolescent smoking initiation. The initiative promotes normative and behavioral change through school and community-based events, a magazine, movies, a radio program, social media, and other marketing initiatives. The survey incorporated diverse research interests in social media usage, normative change, and behavioral change. The survey was conducted between late January and mid-February 2017 (IASMG Report, 2017).

### 3.3 Study design

This study was a longitudinal study with a total sample size of 7,054 adolescents aged 13 to 15 years old. Data were collected from face-to-face surveys, a baseline survey in early 2017, and an end-line survey in late 2018. This study makes use of the IASMG 2017 data set, which was compiled through direct participant engagement. All eligible households were surveyed and interviews with all eligible household members aged 13-16 were conducted up to three times. The questionnaire enquired about the respondent's socioeconomic background, tobacco knowledge, exposure to messages about tobacco, beliefs, and attitudes regarding shisha and cigarette smoking, empowerment, social norms and social influences concerning smoking, as well as smoking behaviors and intentions while some questions were however modelled after those in the Global Youth Tobacco Surveys.

### 3.4 Sampling technique

The sample used a multi-stage sampling strategy in addition to data from the 2010 Ghana Population and Housing Census. 70 of the 380 census enumeration areas (EA) in the SKY Girls catchment region were chosen using a size-based proportional probability of selection (PPS). All houses in the chosen EAs were contacted, and a household listing was performed to determine whether or not each household was eligible for research participation. Using data from the 2010 Ghana Population and Housing Census, 281 enumeration areas (EAs) were drawn up. In Accra, the sample was purposefully limited to ten communities within the SKY Girls intervention's catchment region (Achimota, Spintex, Legon, Madina, Adenta, Dome, St. Johns, Christian Village, Haatso, and Kisseman). As a result, the Accra sample is not representative of the entire city. Using the probability of selection proportional to size (PPS), 70 out of a total of 380 census enumeration areas (EA) were drawn among the localities in the SKY Girls catchment region. In Kumasi, the Ghana Statistical Service first limited the sample to 16 locations that were socially and economically matched to Accra localities (Nhyiaeso, Asuoeyboa, Aboabo, Asokwa, Old Tafo, Kwadaso, Ash Town, Bantama, Old

Suame, Dichemso/Yenyawoso, Ayigya, Asafo, Atonsu, and New Suame are some of the neighborhoods. PPS was used to choose 79 out of 733 EAs within these matching areas. EAs were chosen using simple random sampling in Teshie and Sunyani (50 out of 220 and 78 out of 101, respectively). All households in the selected EAs were contacted, and a household listing was performed to establish whether the household was eligible for involvement in the study.

Ethical clearance for the data collection was provided by the Institutional Review Board of the Noguchi Memorial Institute for Medical Research in Ghana (#078/16–17) and subsequently renewed on January 22, 2018. The study protocol was also reviewed and approved by the Tulane University Biomedical Institutional Review Board. Parental consent and child assent were obtained before the start of the interviews.

### **3.5 Data analysis**

Data analysis is vital in any research for obtaining the findings of the study. The study uses SPSS version 26 for analyses of data. The data presented include descriptive analysis using frequency distribution tables, charts, and cross-tabulations. Before conducting the data analysis for this study, the researcher adopted the IASMG 2017 data set for the study. Data were analyzed at univariate, bivariate, and multivariate levels. The univariate level consisted of frequency tables and charts of the socio-demographic factors of respondents, social media use, and attitudes toward tobacco use. At the bivariate level were used; cross tabulations and Pearson chi-square test were used to identify associations between social media use and attitudes towards alcohol and tobacco use between the dependent variable (attitudes towards tobacco use) and the main independent variable (social media use) and the control variables at a confidence level of 95 percent. Binary logistic regression analysis was used at the multivariate level to identify which variables predicted attitudes toward tobacco use among adolescents.

A binary logistic model was used because of the dichotomous nature of the dependent variable with unfavorable attitudes coded as '0' and favorable attitudes coded as '1'. The Odds ratio was the parameter estimate used to interpret the results of the regressions model in which a variable was declared a significant predictor of attitudes towards tobacco use if the alpha level of  $p < 0.05$  was associated with the odds ratio. All analyses were carried out separately for male and female respondents to establish the significant variations that may exist between the sexes.

### 3.6 Measurement of variables

Three types of variables were used in the study including the independent variable, control variables, and the dependent variable as summarized below.

#### 3.6.1 Independent variable

The independent variable in this study is the use of social media. The respondents were asked to rate how frequently they used social media websites, including Facebook, Twitter, Snapchat, Instagram, WhatsApp, YouTube, on a scale of 'never=0', '1-2 times=1', '3-5 times=2', 'everyday=3'. These six social media platforms were summed up and recategorized with scores of (1-3) re-coded as = 1 for 'ever used social media' and never was left uncoded. This categorization was necessary because a significant proportion of respondents reported 'never' using social media, leaving only a small fraction as 'ever' using. This could be attributed to respondents' lack of access to social media due to most secondary school restrictions on student use of mobile phones in Ghana.

#### 3.6.2 Intermediary variable

The intermediary variable was exposure to messages on the harmfulness of tobacco through social media. This was computed from the question of whether respondents had seen or heard messages about the harmfulness of tobacco on social media in the past 6 months. Responses were given as no=0, yes, some=1, yes, lots= 2. Scores of 1 or 2 were recategorized into "Yes" and No was left as (0).

### 3.6.3 Control variables

#### a. Sex

The respondent sex was coded as female = 0 and male = 1. As mentioned in the literature review, some studies have found a difference in how adolescent girls and boys react and interact with social media resulting in a causality that affects attitudes towards tobacco (Amos et al., 2011; Nichter et al., 2006).

#### b. Wealth index

The wealth index was measured based on household indices and ranked as follows: Poor=1, Middle=2, and Rich =3. Household wealth served as a proxy for socioeconomic status (Centerwell, 1984; Gullo & Dawe, 2008; Pokhrel et al., 2015; 2016).

#### c. Level of education

Education refers to the highest level of education a person has attained. The highest level of education was determined by the responses to the question. “What is the highest level of education?” The level of education was initially classified as pre-school=0, primary=1, middle/JHS=2, secondary/SHS=3, and higher=4. These were recategorized as (0-1) = (1) Up to Primary’, ‘Middle/JHS= (2) and (3-4) recorded as (3) Secondary/SHS/Higher’. The preschool category was added to the primary category since the adolescents who reported having preschool was less than 7 percent, and thus could not be grouped on their own.

#### d. Religion

This variable identifies one’s religious convictions, if any. Participants were categorized according to their religious beliefs into Catholic=1, Protestant Christian=2, Pentecostal/Charismatic=3, Muslim=4, Traditionalist/Spiritualist=5, and 6= Other groups. (Garrusi & Nakhaee 2012; Bonelli & Koenig 2013; Behere et al., 2013).

**e. Place of residence**

The place of residence was grouped into the cities where data was collected that is Accra=1, Teshie=2, Kumasi=3 Sunyani=4.

**f. Tobacco use among family members**

To determine family use of tobacco towards adolescent attitudes, the respondents were asked to indicate if any of their close family members smoked. With responses measured as 0= No, 1=Yes. (Kosterman et al., 2016).

**g. Tobacco use among friends**

This variable was measured by asking respondents how many of their friends smoked. With responses 'None'=0, 'Yes, some'=2, and 'Yes, all'= 3. This variable was recategorized and coded as 'No'=0 and 'Yes'=1 tobacco use among friends (Cambron, 2018; Yoon, 2019).

**h. Peer Influence**

Peer influence through peer beliefs and norms on attitudes towards tobacco use was measured with 9 items. To measure this, respondents were asked to imagine that a close friend was offered a cigarette and they took it. They were then asked to rate why and how much they agreed or disagreed with the close friend's decision to take the cigarette. The questions include young girls or boys smoke because they want; to become more popular with girls/boys, to fit in the group, to become more rebellious, to make decisions for themselves, to stand out in a group, to feel grown up, because they can't afford it and it will be rude to refuse. These variables were summed to get a composite score, where scores that were greater and equal to the mean (3.17) indicated strong peer influence meaning adolescents were strongly influenced by their peers' behavior. A score lower than the mean indicated low peer influence on tobacco use. Scores were

coded as 0=low peer influence and 1=high peer influence (Westgate et al., 2016; Huang et al., 2014).

#### **i. Tobacco knowledge**

The knowledge of tobacco among adolescents was measured with 12 items where respondents were asked to indicate the types of tobacco products and the health consequences of smoking (cigarettes, marijuana/weed, snuff, betel leaves, hash, shisha, chewing tobacco, e-cigarettes, cigars, khat). Responses were summed to get a total score of 12, those who scored 1-4 out of 12 were coded as (1), 5-8 were coded as (2), and 9-12 were coded as (3). These categories of scores were measured as and 1= 'Poor', 2= 'Good', and 3= 'Very good'.

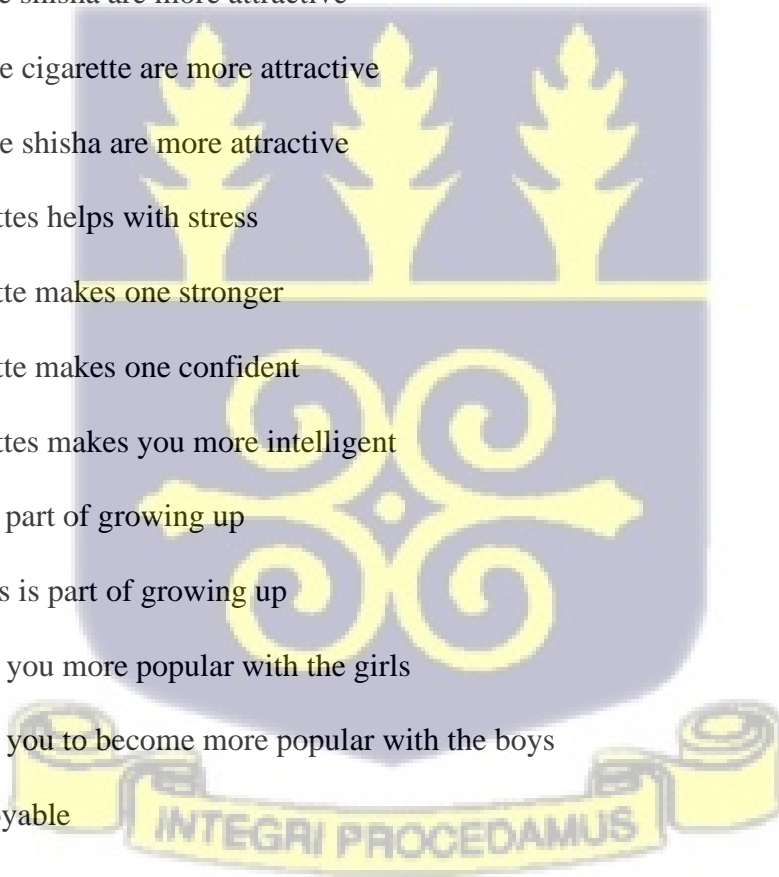
#### **3.4.4 Dependent variable**

##### **Attitudes toward tobacco use**

An attitude may be considered as negative or positive evaluation of an object which influences human behavior towards that object. According to Ajzen and Fishbein (2011) attitude can be a learned predisposition to respond in a favorable or unfavorable manner towards people, an object, an idea or a situation. An attitude is “a relatively enduring organization of beliefs, feelings, and behavioral tendencies towards socially significant objects, groups, events or symbols” (Hogg & Vaughan 2005, p.150). The study adapts the Ajzen and Fishbein (2011) definition to operationalize the understanding of attitude in this study. To measure smoking attitudes, participants were asked to rate twenty-one items related to smoking attitudes on a 5-point scale ranging from 1 (strongly agree) to 5 (strongly disagree). The degree to which the respondent has a favorable attitude is when he or she agrees to a positive assessment of tobacco use such as ‘smoking shisha makes one attractive’ or ‘confident’. On the other hand, unfavorable

attitudes are negative assessments of tobacco use such as ‘smoking cigarette is expensive’. A composite score was created and reverse coded, such that scores which were higher than or equal to the mean ( $x=1.95$ ) were categorized as favorable, and scores which were lower than the mean were categorized as unfavorable attitudes (Park et al., 2016; Xu et al., 2015). The 21 items used in the measurement of the dependent variables are:

1. Smoking cigarettes makes one appear cool
2. Smoking shisha makes one appear cool
3. Girls who smoke cigarettes are more attractive
4. Girls who smoke shisha are more attractive
5. Boys who smoke cigarette are more attractive
6. Boys who smoke shisha are more attractive
7. Smoking cigarettes helps with stress
8. Smoking cigarette makes one stronger
9. Smoking cigarette makes one confident
10. Smoking cigarettes makes you more intelligent
11. Trying shisha is part of growing up
12. Trying cigarettes is part of growing up
13. Smoking makes you more popular with the girls
14. Smoking makes you to become more popular with the boys
15. Smoking is enjoyable
16. Smoking makes you fit in with a group
17. Smoking cigarettes is expensive
18. Smoking shisha is expensive
19. Smoking makes you rebellious towards teachers and parents



20. Smoking makes one to show that they can make decisions for themselves

21. Smoking cigarettes makes your teeth yellow.

The measurement of variables for this study is summarized in Table 3.1 below:

**Table 3.1: Measurement of variables**

<b>Variables</b>	<b>Label and code</b>
Social media use	Use of any social media; Facebook, Twitter, etc. (1) Never used (0)
Attitudes towards tobacco use	Favorable attitudes (1) Unfavorable attitudes (0)
Exposure to messages about the harms of tobacco on social media.	Yes (1) No (0)
Sex	Male (1) Female (0)
Wealth index	Poor (1) Middle (2) Rich (3)
Highest level of education	Up to Primary (1) Middle/JHS (2) Secondary/SHS/Higher (3)
Religion	Catholic (1) Protestant Christian (2) Pentecostal/Charismatic (3) Muslim (4) Other groups (5)
Place of residence	Accra (1) Teshie (2) Kumasi (3) Sunyani (4).
Tobacco use among family members	Yes (1) No (0)

Tobacco use among friends	Yes (1) No (0)
Peer Influence	High influence (1) Low influence (0)
Tobacco knowledge	Poor (1) Good (2) Very good (3)

Source: Author's construct



## CHAPTER FOUR

### UNIVARIATE, BIVARIATE AND MULTIVARIATE ANALYSES

#### 4.0 Introduction

This chapter provides the results of univariate, bivariate, and multivariate analyses of the variables of interest. The objective of the univariate analysis was to describe the respondents' background characteristics. The descriptive analysis results are presented using graphs and tables to offer information on the frequencies and relative proportions of the study's variable categories. The bivariate analysis was conducted to examine the relationships between the independent variable (social media use and sociodemographic characteristics), control variables, and dependent variable. Furthermore, the chapter examines the binary logistic regression analysis results.

#### 4.1 Univariate Analyses

This section will include the demographic and psychosocial characteristics of respondents to better understand the dynamics of adolescent attitudes toward tobacco use. The results depict the univariate studies of the conceptual framework variables. The descriptive analysis results are presented in pie charts, graphs, and tables to depict information on the frequencies and of the study variables. These variables include age, sex of respondent, place of residence, highest level of education, religion, wealth index, social media use, exposure to tobacco-related messages, tobacco knowledge, peer influence, tobacco use among family members, tobacco use among friends, and attitudes towards tobacco use.

#### Socio-demographic Characteristics of Respondents

##### 4.1.1 Age of respondents

The ages of respondents were 13, 14, 15, and 16 years with a mean age of 14 years. A higher proportion (30.6 %) of adolescents were aged 13 years, while 25.5% of the adolescents were 14

years. The oldest age groups consisting of 15 and 16 years were the least reported at 21.2% and 22.7% respectively. The distribution of the ages is presented in Table 4.1.

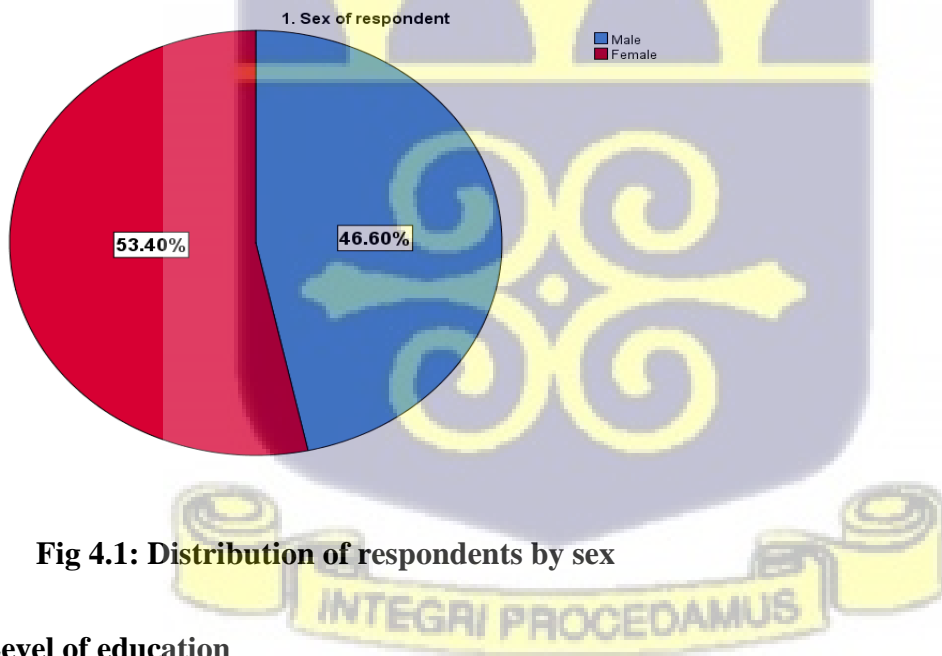
**Table 4.1: Descriptive statistics for respondents' age**

Age	Frequency	Percent (%)
13	2159	30.6
14	1800	25.5
15	1494	21.2
16	1601	22.7
<b>Total</b>	<b>7054</b>	<b>100</b>
<b>Mean = 14.36</b>		

Source: Computed from the 2017 IASMG dataset

#### 4.1.2 Sex of Respondents

From Figure 4.1 below, more than half (53.4%) of the respondents were adolescent females while adolescent male respondents were 46.6%.

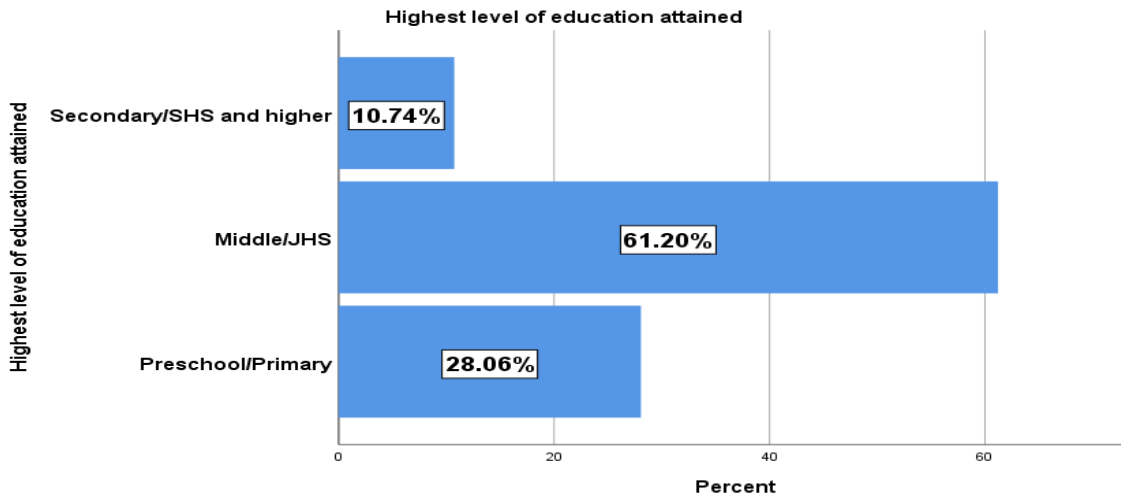


**Fig 4.1: Distribution of respondents by sex**

#### 4.1.3 Level of education

Figure 4.2 shows the percentage distribution of respondents by their educational level. More than half (61.2%) of respondents had middle/JHS education, followed by

(28.1%) who had preschool or primary education and, those who had higher/SHS education formed the lowest proportion (10.7%).



**Fig. 4.2: Distribution of respondents by level of education**

#### 4.1.4 Religious affiliation

Religion is an important part of the lives of the vast majority of Ghanaians. Given the differences in doctrines of religion concerning tobacco beliefs, different religions were considered. Table 4.2 depicts that the Pentecostal/Charismatic religion formed half (50.1%) of respondents, followed by Protestant Christians (21.8%) and Muslims (18.2%). The other religious group catholic had a lower proportion of respondents (4.8%) and (5.1%) respectively.

**Table 4.2: Percent distribution of respondents by religious affiliation**

Religious Affiliation	Frequency	Percent
Catholic	365	5.2
Protestant Christian	1534	21.8
Pentecostal/Charismatic	3534	50.1
Muslim	1281	18.2
Others	340	4.8
Total	7054	100

Source: Computed from the 2017 IASMG dataset

#### 4.1.5 Place of residence

The study surveyed respondents from four places in Ghana. The results displayed in Table 4.3 show that respondents from Sunyani constituted a higher proportion (27.9%) of respondents, followed by Kumasi (24.9%), Accra (23.7%), and Teshie (23.5%) constituted a lower proportion of respondents.

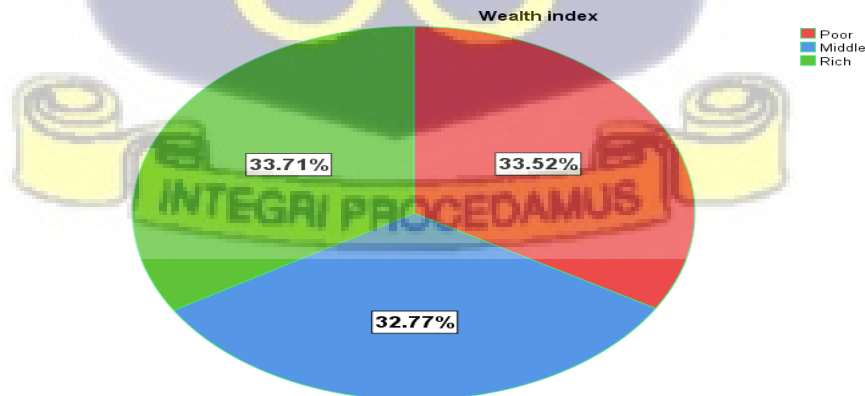
**Table 4.3: Percent distribution of respondents' place of residence**

Place of residence	Frequency	Percent (%)
Accra	1671	23.7
Teshie	1656	23.5
Kumasi	1756	24.9
Sunyani	1971	27.9
<b>Total</b>	<b>7054</b>	<b>100</b>

Source: Computed from the 2017 IASMG dataset

#### 4.1.6 Wealth index

The wealth index was subdivided into three groups: poor, middle, and rich. Although the distribution of the wealth index was fairly equal, respondents in the rich group had a slightly higher proportion (33.7%), while respondents in the middle categories had a proportion of 33.5%. Respondents in the middle category had the lowest proportion (32.7%). These proportions are shown in Figure 4.3.



**Fig 4.3: Distribution of respondents by wealth index**

#### 4.1.7 Knowledge of Tobacco

Table 4.4 depicts the knowledge of tobacco among respondents. The knowledge score is a composite score of a total of 12, where participant accurate identification of tobacco products as well as their consequences showed their poor (0-4), good (5-8), and very good (9-12) knowledge of tobacco. A higher proportion (47.3%) of respondents had good knowledge of tobacco, followed by 33% of respondents who had poor knowledge of tobacco. The lowest proportion of respondents (19.7%) had very good knowledge of tobacco. Thus, only a few respondents have very good knowledge of tobacco while a greater number had good knowledge of tobacco.

**Table 4.4 Percent distribution of respondents by knowledge of tobacco**

<b>Knowledge of tobacco</b>	<b>Frequency</b>	<b>Percent (%)</b>
Poor	2327	33
Good	3335	47.3
Very good	1392	19.7
<b>Total</b>	<b>7054</b>	<b>100</b>

Source: Computed from the 2017 IASMG dataset

#### 4.1.8 Distribution of Tobacco-related Variables by Sex

As seen in Table 4.5, the majority of female adolescents reported they did not have friends who used tobacco (45%), while 35 % of male adolescents did not have friends who use tobacco. Meanwhile, the highest proportion of those who had friends who did use tobacco were males (11.5%) while the lowest proportion were females (8.5%). With tobacco use among family members, 42% percent of female adolescents reported that they had family members who used tobacco compared with 32% of male participants. Among respondents who reported have not been exposed to harmful messages about

tobacco on social media, the majority (48%) of the respondents were females while males reported 40%. However, 6.4 % of males constituted a higher proportion of respondents who were exposed to harmful messages on social media while a lower proportion (6%) of respondents were females. With the knowledge of tobacco, the majority of respondents (18.4%) who reported poor knowledge were females while males were 14.6%. In the same vein, with those respondents with good knowledge of tobacco, females formed the highest proportion of respondents (24.4%) as compared to males (23%). For peer influence, a higher proportion of respondents with high peer influence were females (28.3%) and a lower proportion (25%) were males. Those respondents who reported a high proportion of using any type of social media were males (2%) while females were 1.1%. Females formed a higher proportion (41.6%) of respondents who never used social media compared to males (30.3%).

**Table 4.5: Percent distribution of respondents' socio-demographic and psychosocial characteristics**

Characteristics	Frequency (n)	No %	Yes %
<b>Tobacco use among friends</b>			
Male		35	11.5
Female		45	8.3
<b>Frequency (n)</b>		5,644	1,399
<b>Tobacco use among family members</b>			
Male		38	8.6
Female		42.2	11
<b>Frequency (n)</b>		5,655	1,388
<b>Exposure to harmful messages of tobacco on social media</b>			
Male		40	6.4
Female		48	6
<b>Frequency (n)</b>		6,195	851

	Frequency(n)	Male (%)	Female (%)
<b>Knowledge of tobacco</b>			
Poor	2,327	14.6	18.4
Good	3,335	23	24.4
Very Good	1,392	9	10.7
<b>Peer influence</b>			
Low	3328	22.2	25
High	3716	24.4	28.3
<b>Social media use</b>			
Never	5070	30.3	41.6
Used	184	2	1.1
<b>Total</b>	<b>7054</b>	<b>100</b>	<b>100</b>

Source: Computed from the 2017 IASMG dataset.

#### 4.1.9 Attitudes towards tobacco use.

This study defined favorable attitudes toward tobacco use as adolescents having positive beliefs about tobacco use and unfavourable attitudes toward tobacco use as adolescents having negative beliefs about tobacco use. In this study, table 4.6 shows that out of a total of 7,054 adolescents, those who had favorable attitudes toward tobacco use constituted the highest proportion (53.1%), whereas adolescents who reported unfavorable attitudes toward tobacco use formed the lowest proportion (46.8%) of respondents.

**Table 4.6: Percent Distribution of Respondents' Attitudes towards tobacco use.**

Attitude toward tobacco use	Frequency	Percent
Unfavorable	3313	46.8
Favorable	3741	53.1
<b>Total</b>	<b>7054</b>	<b>100</b>

Source: Computed from the 2017 IASMG dataset.

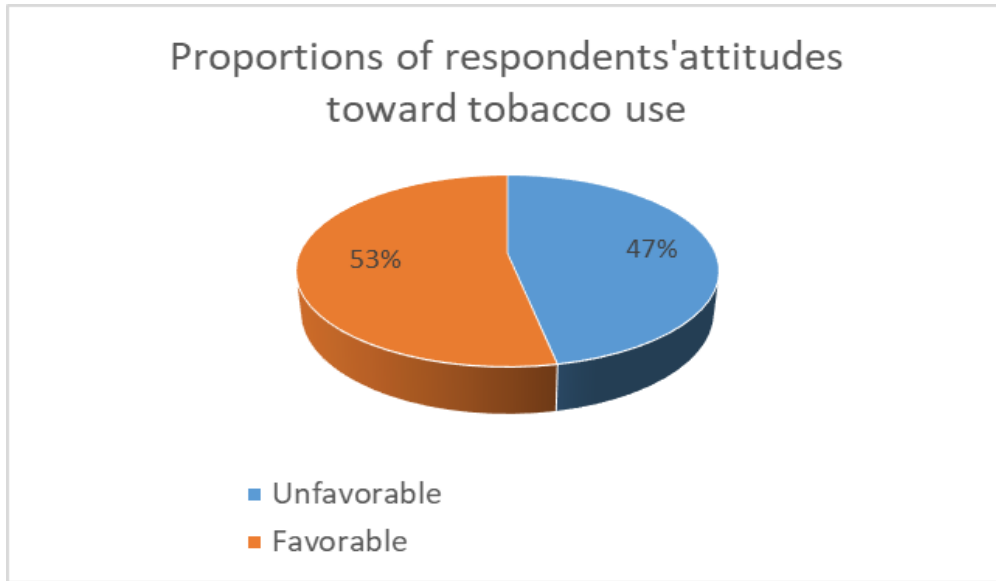


Figure 4.4: Proportions of respondent's attitude toward tobacco use

## 4.2 Bivariate Analyses

This section outlines the bivariate analyses conducted to examine the association between the psychosocial and demographic characteristics and the attitudes toward tobacco use by adolescents. These characteristics included social media use, age of adolescent, level of education, religion, place of residence, wealth index, social norms, tobacco knowledge, tobacco use among family members and friends, and the intermediary variable, exposure to tobacco content. The association between these variables is shown using cross-tabulations. The significance of the relationship between psychosocial, demographic characteristics, intermediary variables, and attitudes towards tobacco use was determined using a Chi-square test and one sampled t-test at a 95% confidence level.

### 4.2.1 Social media use and attitudes toward tobacco use.

As has been discussed in previous sections, social media use among adolescents has been found in other studies to influence attitudes towards tobacco use (Park et al., 2016; Xu et al., 2015; Amos et al., 2011; Nichter et al., 2006). To test whether this

applied to this sample of adolescents, a Chi-square test was conducted. Table 4.7 shows that there is a statistically significant association between adolescent social media use and attitudes toward tobacco use at a p-value of less than 0.05. The majority of adolescents who used social media had a higher proportion of unfavorable attitudes (50.9%) compared to those who never used social media (45.3%). However, adolescents who never used social media had a higher proportion of favorable attitudes (54.7%) compared to those who used social media (49.1%). The fact that the majority of adolescent respondents had never used social media at the time of the survey was likely due to their enrolment in boarding schools, where they did not have access to mobile phones.

**Table 4.7: Crosstabulation depicting social media use and attitudes towards tobacco use**

	Attitudes towards tobacco %		Number of adolescents
	Unfavorable	Favorable	
Never	45.3	54.7	5070
Used	50.9	49.1	1984
<b>Total</b>	<b>46.9</b>	<b>53.1</b>	<b>7054</b>
<b>X<sup>2</sup>= 17.8    df= 1    p=0.00</b>			

Source: Computed from the 2017 IASMG dataset

#### **4.2.2 Exposure to messages about the harmfulness of tobacco on social media and attitudes toward tobacco use**

Results from Table 4.8 show a statistically significant association between exposure to tobacco-related messages on social media and attitudes toward tobacco use at a p-value of less than 0.05. Adolescents who were exposed to messages about tobacco's harmfulness on social media had a higher proportion (52.2%) of unfavorable attitudes compared to those who were not exposed to harmful messages of tobacco on social media (46.2%). However, adolescents who were not exposed had

a higher proportion (53.8%) of favorable attitudes compared to those exposed (47.8%).

**Table 4.8: Crosstabulation depicting exposure to messages about the harmfulness of tobacco on social media use and attitudes towards tobacco use.**

Exposure to messages about the harmfulness of tobacco on social media	Attitudes towards tobacco use (%)		Number of adolescents
	Unfavorable	Favorable	
No	46.2	53.8	6195
Yes	52.2	47.8	851
<b>Total</b>	46.9	53.1	7046

**X<sup>2</sup>= 11.05    df= 1    p=0.001**

Source: Computed from the 2017 IASMG dataset

**Control variables**

**4.2.3 Age and attitudes towards tobacco use**

A t-test was appropriate for examining the relationship between a count variable (age) and a dichotomous variable (attitudes toward tobacco use). Table 4.9 depicted a t-test result where the age of respondents was statistically significant with attitudes towards tobacco use at a 0.05 significance level. This agrees with the results of

**Table 4.9: One sample t-test results of respondents by age and attitudes toward tobacco**

One sample t-test	t	df	Sig. (2tailed)	Mean Difference	95% Confidence Interval of the Difference
Age	1059.174	7053	0.00	14.36	14.33
Attitudes towards tobacco	89.307	7044	0.00	0.531	0.52

Source: Computed from the 2017 IASMG dataset

#### 4.2.4 Sex and attitudes towards tobacco use

Table 4.10 depicts that there is a statistically significant association between the sex of adolescents and attitudes towards tobacco use with a p-value less than 0.05. The results of the chi-square test suggest that female adolescents had a higher proportion (56.9%) of favorable attitudes compared to male adolescents (42.8%). However, male adolescents had a higher proportion (51.2%) of unfavorable attitudes compared to female adolescents who had the lowest proportion (43.1%) of unfavorable attitudes.

#### 4.2.5 Place of residence and attitudes towards tobacco use

Table 4.10 also depicts that there is a statistically significant association between place of residence and attitudes towards tobacco use at p-value < 0.05. Adolescents in Sunyani had a higher proportion (28.9%) of favorable attitudes compared to those in Accra (21%). However, a lower proportion (22.8%) of unfavorable attitudes were from Teshie.

#### 4.2.6 Wealth index and attitudes towards tobacco use

Table 4.10 results show that the wealth index is statistically significantly associated with attitudes towards tobacco use at p-value < 0.05. Adolescents from rich backgrounds had a higher proportion (52.6%) of favorable attitudes compared to those from poor backgrounds who had a lower proportion (42.1%) of favorable attitudes. However, adolescents with poor backgrounds had a higher proportion (57.9%) of unfavorable attitudes compared to those in the middle class (53.9%) and rich class (47.4%) respectively. This is in support of Conrad et al (1992) which revealed that low household income could be a significant predictor of favorable attitudes towards tobacco use.

#### 4.2.7 Level of education and attitudes towards tobacco use

Education refers to the highest level of educational attainment a person has obtained (Ballal et al., 2016). Table 4.10 results show that adolescents' level of education is statistically significant with attitudes toward tobacco use at a p-value less than 0.05. More than half (56%)

of adolescents in the secondary/higher level of education reported unfavorable attitudes compared to those in middle/JHS (47.7%) and primary level (42.5%) respectively. However, adolescents with primary level education had a higher proportion (57.5%) of favorable attitudes compared to those in middle/JHS (52.3%) and secondary/higher level (44%) respectively.

#### 4.2.8 Religious affiliation and attitudes towards tobacco use

Religion is a significant predictor of health attitudes including attitudes toward tobacco (Garrusi & Nakhaee 2012; Bonelli & Koenig 2013; Behere et al., 2013). From Table 4.10 results show that adolescents' religious affiliation is not significantly associated with attitudes toward tobacco use at p-value less than 0.05. Majority of adolescents. Muslims had a higher proportion (56.5 %) of those who had favorable attitudes towards tobacco use compared to other religions. However, Pentecostal/Charismatic adolescents had a higher proportion (48%) of unfavorable attitudes while a lower proportion (43.5%) of Muslim adolescents reported unfavorable attitudes.

**Table 4.10: Cross-tabulation of Respondents' knowledge of tobacco and attitudes toward tobacco use**

	Attitudes toward tobacco use		Total (n)
	Favorable	Unfavorable	
<b>Sex</b>			
Male	51.2	48.4	3285
Female	43.1	56.9	3760
X <sup>2</sup> = 45.8 df=1 p=0.00			
<b>Wealth index</b>			
Poor	42.1	57.9	2357
Middle	46.1	53.9	2303
Rich	52.6	47.4	1125
X <sup>2</sup> = 53.2 df=2 p=0.00			
<b>Level of education</b>			
Up to Primary	42.5	57.5	1956
Middle/JHS	47.7	52.3	4339
Secondary/SHS and Higher	56	44	750
X <sup>2</sup> = 41.2 df=2 p=0.00			

<b>Place of residence</b>			
Accra	52.8	47.2	1669
Teshie	45.5	54.5	1651
Kumasi	44.5	55.5	1754
Sunyani	45.1	54.9	1971
$X^2= 31.4$ $df= 3$ $p=0.00$			
<b>Religious affiliation</b>			
		53.7	
Catholic	46.3	365	365
		53	
Protestant Christian	47	1534	1534
		52	
Pentecostal/Charismatic	48	3531	3531
Muslim	43.5	56.5	1277
Others	47.9	52.1	338
$X^2= 7.8$ $df= 3$ $p=0.099$			

Source: Computed from the IASMG 2017 dataset.

#### 4.2.9 Knowledge of tobacco and attitudes toward tobacco use

From Table 4.11 results show that adolescent's knowledge of tobacco is statistically significant with attitudes towards tobacco use at a p-value less than 0.05. For adolescents with poor knowledge, there was a higher proportion (58.4%) who had favorable attitudes compared to adolescents with good (50.6%) and very good knowledge (50.2%) of tobacco. However, adolescents with very good and good knowledge of tobacco, had a higher proportion of unfavorable attitudes 49.8% and 49.4% respectively while a lower proportion (41.6%) constituted adolescents with poor knowledge of tobacco.

**Table 4.11: Cross tabulation of Respondents' knowledge of tobacco and attitudes toward tobacco**

Knowledge on tobacco	Attitudes towards tobacco use (%)		No. of Adolescents
	Unfavorable	Favorable	
Poor	41.6	58.4	2321
Good	49.4	50.6	3333
Very good	49.8	50.2	1391
<b>Total</b>	46.9	53.1	7045
$X^2= 39.436$ $df= 2$ $p=0.00$			

Source: Computed from the 2017 IASMG dataset

#### 4.2.10 Tobacco use among family members and friends

This study's result is in contrast to studies by Horn et al. (2000) that tobacco use among family members is an important predictor of attitudes toward tobacco use (Cambron,2018; Kosterman et al., 2016; Yoon, 2019). Table 4.12 results shows that tobacco use among family members and friends is not statistically significant with attitudes towards tobacco use at a p-value less than 0.05. The majority (53.1%) of adolescents with no family members who use tobacco reported favorable attitudes towards tobacco use while 46.9% of them had unfavorable attitudes. While 53% of adolescents who had family members who use tobacco reported favorable attitudes and 47%, unfavorable attitudes. Additionally, adolescents whose friends do not use tobacco had a higher proportion (53%) of favorable attitudes and 47% had unfavorable attitudes. Also, adolescents whose friends use tobacco had a lower proportion (46.6%) of unfavorable attitudes.

**Table 4.12: Cross tabulation of respondents by tobacco use among family/friends and attitudes towards tobacco use**

	Attitudes towards tobacco (%)		(n)
	Unfavorable	Favorable	
<b>Tobacco use among family members</b>			
No	46.9	53.1	
Yes	47	53	
Total	46.9	53.1	
<b>X<sup>2</sup>= 0.003 df= 1 p=0.959</b>			
<b>Tobacco use among friends</b>			
No	47	53	
Yes	46.6	53.4	
Total	46.9	53.1	7045
<b>X<sup>2</sup>= 0.066 df= 1 p=0.797</b>			

Source: Computed from the 2017 IASMG dataset

#### 4.2.11 Peer influence and attitudes toward tobacco use

According to research, peer influence is a significant predictor of adolescent tobacco use as well as their attitudes toward it (Westgate et al., 2016; Huang et al., 2014). Table 4.13 depicts that peer influence on adolescents is not statistically significant with attitudes towards tobacco use at a p-value

less than 0.05. Adolescents with higher peer influence had a higher proportion (54.4%) of favorable attitudes compared to adolescents with low peer influence (51.4%). While adolescents with low peer influence had a higher proportion (48.6%) of unfavorable attitudes compared to those with high peer influence (45.6%).

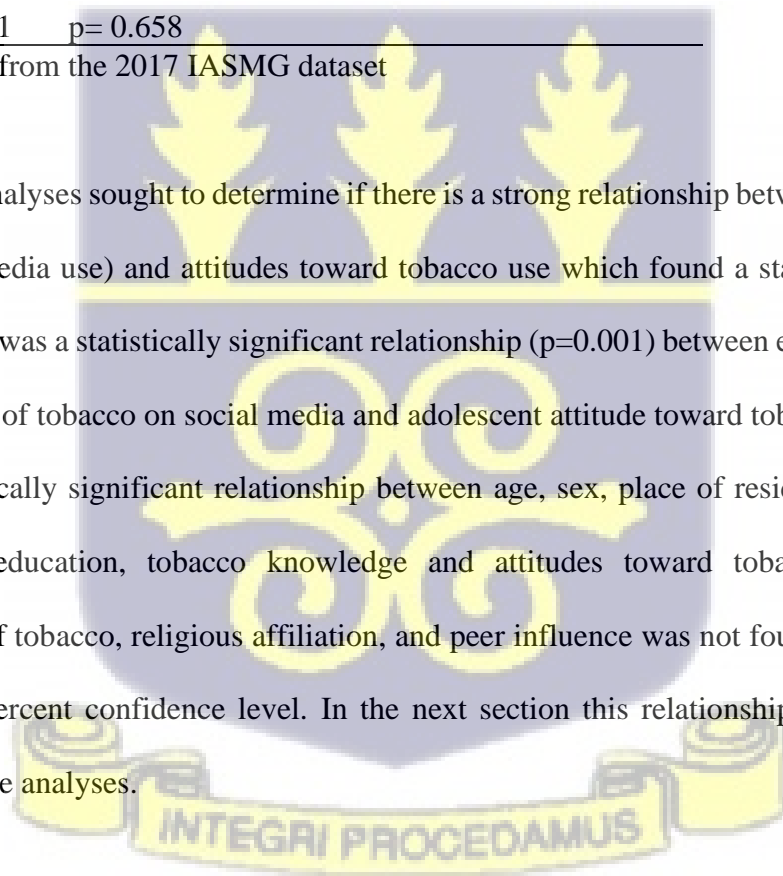
**Table 4.13: Cross-tabulation of Respondents by Peer influence and attitudes towards tobacco**

Peer Influence	Attitudes towards tobacco use (%)		No. of adolescents
	Unfavorable	Favorable	
Low	46.6	53.4	3329
High	47.1	52.9	3716
Total	46.9	53.1	7045

$X^2= 0.196$      $df= 1$      $p= 0.658$

Source: Computed from the 2017 IASMG dataset

The bivariate analyses sought to determine if there is a strong relationship between the independent variables (social media use) and attitudes toward tobacco use which found a statistically significant relationship. There was a statistically significant relationship ( $p=0.001$ ) between exposure to messages on the harmfulness of tobacco on social media and adolescent attitude toward tobacco use. Moreover, there was a statistically significant relationship between age, sex, place of residence, wealth index, highest level of education, tobacco knowledge and attitudes toward tobacco use. However, family/friend use of tobacco, religious affiliation, and peer influence was not found to be statistically significant at 95 percent confidence level. In the next section this relationship is further explored through multivariate analyses.



### 4.3 Multivariate Analyses

This section presents multivariate analyses of all the variables included in this study; it analyses the extent of the association of the dependent variable (attitudes towards tobacco use) with the independent variable (social media use), intermediate variable (exposure to harmful messages about tobacco on social media) as well as the control variables. The dependent variable was a dichotomous categorical variable (favorable and unfavorable attitudes). As such, a binary logistic regression was appropriate for the multivariate analysis. The logistic model was used to identify the influence of the selected demographic and psycho-social variables in predicting attitudes toward tobacco use.

There were two models specified in this analysis. Model 1 examined the relationship between adolescents' social media usage and attitudes towards tobacco use, while model 2 examined the influence of the mediating factors (social media use and exposure to harmful messages about tobacco use) while controlling for selected sociodemographic variables on attitudes towards tobacco use. In the models, as shown in the tables below, odds ratios were used to explain the association between the predictor variables and the outcome variable, thus the exponent of the coefficient (B) represented the odds, p-value indicated the significance level ( $p\text{-value} < 0.05$ ), and the confidence interval showed the range of values within which the odds ratio of 1 is depicted. The reference category for each variable was labelled as RC.

Therefore, an odds ratio of 1 represents an absence of a relationship, a value less than 1 reveals a lower likelihood of favorable attitudes and an odds ratio greater than 1 represents a greater likelihood of favorable attitudes toward tobacco use.

#### 4.3.1 Social media use and attitudes toward tobacco use

The first model focused on predicting the influence of adolescent social media use and tobacco attitudes. As seen in table 4.14 there is a significant relationship between social media use and tobacco attitudes. Adolescents who used social media had a higher likelihood of having favorable attitudes toward tobacco use than those who did not. Therefore, adolescents who utilized social media had a higher likelihood of holding positive opinions about tobacco use than adolescents who did not use social media.

**Table 4.14: Binary logistic regression showing the association between social media use and attitudes toward tobacco use among adolescents (Model 1)**

Model 1			
Social Media Use	B	OR, [95% CI]	P-value
Never (RC)	0	1	
Use	0.2	1.3 [1.13, 1.39]	0.00
Nagelkerke R <sup>2</sup> (%)	0.003		

From Table 4.14 above, adolescents who used social media were 1.25 times as likely as those who did not use social media to have favorable attitudes toward tobacco use. A Nagelkerke R<sup>2</sup> value indicates that social media accounted for 0.3 percent of the variation in favorable attitudes among adolescents. This implies that the individual characteristics and psychosocial and socioeconomic factors may best explain the model's variations in attitudes toward tobacco use among adolescents.

#### 4.3.2 Social media use, socio-demographic variables, and attitudes toward tobacco use.

In order to further examine the relationship between social media use, socio-demographic characteristics of adolescents and attitudes toward tobacco use, a second model was fitted.

Results from model 2 in Table 4.15 indicate that after controlling for the effects of individual characteristics and psycho-social factors on tobacco attitudes, social media use did not have a significant association with favorable attitudes toward tobacco use ( $p=0.84$ ). According to the second model in Table 4.15, the likelihood of adolescents having favorable attitudes or holding positive opinions about tobacco use is not significantly predicted by their use of social media. We see that adolescent social media users are less likely to express positive opinions about tobacco use compared to adolescents who never used social media. It was shown that adolescents who used social media were 1% less likely to have favorable attitudes toward tobacco use as compared to adolescents who never used social media. This stands in contrast to the first hypothesis, which claimed that adolescents who used social media were more likely to have favorable attitudes than those who did not use it at all. Hypothesis 1 was therefore rejected.

Furthermore, no significant relationship was discovered between adolescents who saw messages on the harmfulness of tobacco use on social media and having a favorable attitude towards tobacco use ( $p=0.44$ ) when adolescents who had no exposure to tobacco harm messages on social media was used as the reference group. Adolescents who saw messages on the harmfulness of tobacco use on social media were 7% more likely to have a favorable attitude toward tobacco use.

**Table 4.15: Binary logistic regression showing the association between indicator variables and attitudes towards tobacco use among adolescents (Model 2)**

Indicator variable	B	OR, [95%, CI]	P-value
<b>Social Media Use</b>			
Never (RC)	0	1	
Used	-0.01	0.99 [0.87, 1.12]	0.84

<b>Exposure to harmful messages of tobacco on social media</b>			
No (RC)	0	1	
Yes	0.06	1.07 [0.91,1.25]	0.44
<b>Sex of respondent</b>			
Male (RC)	0	1	
Female*	-0.34	0.71 [0.65, 0.79]	<b>0.00</b>
<b>Age of respondent</b>			
13 (RC)	0	1	
14	-1.04	0.90 [0.76, 1.05]	0.18
15	-0.06	0.95[0.81,1.10]	0.46
16	-0.01	1.01 [0.87, 1.17]	0.94
<b>Place of residence</b>			
Accra (RC)	0	1	
Teshie*	-0.31	0.74 [0.64, 0.84]	<b>0.00</b>
Kumasi	-0.05	0.95 [0.83,1.09]	0.48
Sunyani	0.00	0.910 [0.87, 1.14]	0.97
<b>Level of education</b>			
Up to Primary (RC)	0	1	
Middle/JHS*	0.51	1.67 [1.35, 2.06]	<b>0.00</b>
Secondary/SHS/Higher*	0.34	1.40 [1.18, 1.67]	<b>0.00</b>
<b>Religious affiliation</b>			
Others (RC)	0	1	
Catholic	0.11	1.19 [0.83, 1.51]	0.47
Protestant Christian	0.08	1.08 [0.85, 1.38]	0.52
Pentecostal/Charismatic	0.03	1.03 [0.82, 1.29]	0.81
Muslim	0.14	1.15 [0.90, 1.48]	0.26
<b>Wealth index</b>			
Poor (RC)	0	1	
Middle*	0.34	1.40[1.24, 1.58]	<b>0.00</b>
Rich*	0.21	1.23 [1.09, 1.39]	<b>0.00</b>
<b>Knowledge of Tobacco</b>			

Poor (RC)	0	1	
Good*	0.3	1.30 [1.14, 1.50]	<b>0.00</b>
Very Good	0.01	1.01 [0.89, 1.14]	0.93
<b>Tobacco use among friends</b>			
No (RC)	0	1	
Yes*	-0.13	0.87 [0.77, 0.99]	<b>0.03</b>
<b>Tobacco use among family members</b>			
No (RC)			
Yes	0.07	1.07 [0.95, 1.21]	0.29
<b>Peer influence</b>			
Low (RC)	0	1	
High	0.01	1.01 [0.92,1.11]	0.81
<b>Constant</b>	-0.87	0.4	<b>0.04</b>
<b>Nagelkerke R Square</b>			
	<b>0.036</b>		
<b>Hosmer and Lemeshow test</b>			
	<b>0.134</b>		

Source: Computed from the 2017 IASMG dataset.

Conversely, female adolescents were 29 percent less likely than male adolescents to have a favorable attitude toward tobacco use. A significant relationship was discovered between sex and having positive opinions concerning tobacco use ( $p=0.00$ ). Therefore, adolescents who utilized social media had a higher likelihood of holding positive opinions about tobacco use than adolescents who did not use social media. However, there was no significant relationship discovered between age and attitude toward tobacco use ( $p= 0.94$ ).

Another predictor variable was place of residence; there was a significant association between adolescent's place of residence and having a favorable attitude toward tobacco use ( $p=0.00$ ). Adolescent's place of residence is a predictor of having positive opinions on tobacco use. Using respondents from Accra as a reference group, adolescents who resided in Teshie

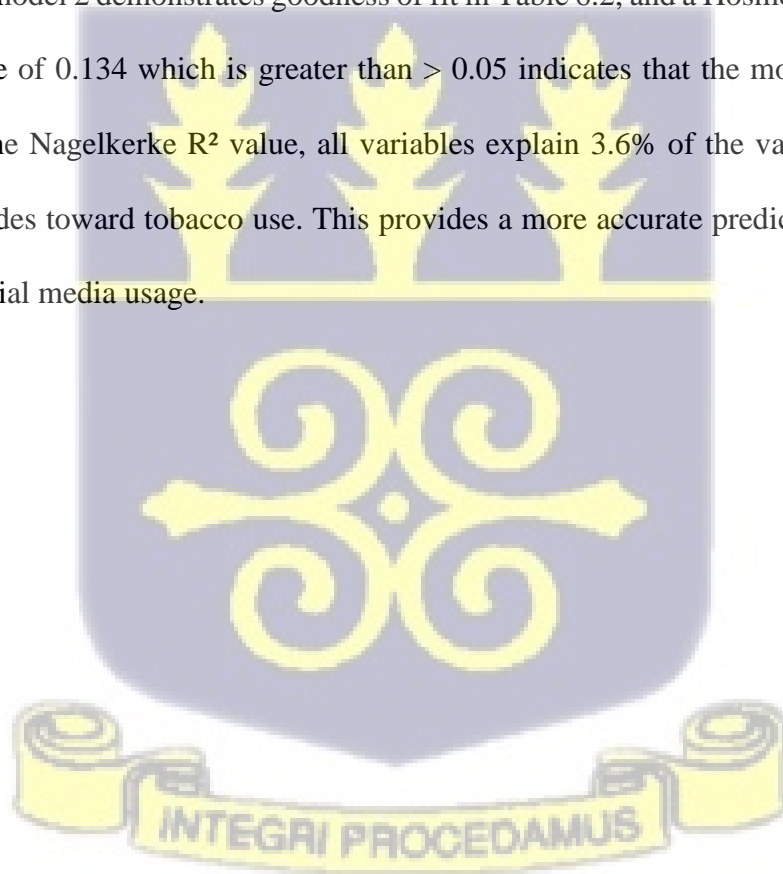
had a lower likelihood (26%) of having favorable attitudes. Respondents from Kumasi and Sunyani were less likely to have favorable attitudes.

There was also a significant relationship between level of education and favorable attitude toward tobacco use ( $p=0.00$ ). Using respondents with up to primary level education as the reference, respondents with a middle/junior high school education were 67 percent more likely to have favorable attitudes toward tobacco use. When compared to adolescents with up to the primary level of education, adolescents with SHS/higher level education were 40% more likely to have a favorable attitude toward tobacco use. Religious affiliation, on the other hand, had no significant association with favorable attitudes toward tobacco use. With other religions as the reference group, adolescents who were Catholics were 19% more likely to have favorable attitudes, followed by Muslims who were 15% more likely to have favorable attitudes, compared to Protestant Christian and Pentecostal/Charismatic adolescents who were 8% and 3% more likely to have favorable attitudes toward tobacco use, respectively.

Furthermore, there was a significant association between having a favorable attitude towards tobacco use and wealth index ( $p=0.00$ ). Using adolescents from poor households as a reference category, adolescents from middle-class households were 40% more likely to have favorable attitudes toward tobacco use. Adolescents from rich households were 23% more likely to have favorable attitudes toward tobacco use compared to adolescents from poor households. This shows adolescents from poor and middle-class households had a greater likelihood of having positive opinions about tobacco use as compared to adolescents from rich households in this study. Consequently, adolescents' knowledge of tobacco was significantly associated with favorable attitudes toward tobacco use ( $p=0.00$ ). Compared to those with poor knowledge of tobacco, respondents with good knowledge of tobacco were 30% more likely to have favorable attitudes toward tobacco use while those with very good knowledge were 1%

more likely to have favorable attitudes compared to adolescents with poor knowledge. These findings can be simply interpreted as tobacco knowledge being a strong predictor of adolescents' attitudes because adolescents with very good knowledge had the lowest likelihood of having positive opinions about tobacco use. The results further show that tobacco use among friends was significantly associated with favorable attitudes toward tobacco use ( $p=0.03$ ). Adolescents with friends who used tobacco were 13 percent less likely to have favorable attitudes toward tobacco use compared to those who did not have friends who used tobacco. On the other hand, there was no significant relationship between tobacco use among family members, peer influence, and the odds of having a favorable attitude toward tobacco use.

Overall, model 2 demonstrates goodness of fit in Table 6.2, and a Hosmer and Lemeshow test significance of 0.134 which is greater than  $> 0.05$  indicates that the model fits the data. According to the Nagelkerke  $R^2$  value, all variables explain 3.6% of the variation in having favorable attitudes toward tobacco use. This provides a more accurate prediction than simply considering social media usage.



## CHAPTER FIVE

### DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

#### 5.0 Introduction

The key findings on the relationship between adolescent social media use and attitudes toward tobacco use in Ghana from the univariate, bivariate, and multivariate levels of analysis are first summarized in this chapter. This is followed by a discussion of the findings and concludes by making recommendations to inform further studies and policymaking.

#### 5.1 Summary of key findings

The objective of the study was to investigate the relationship between social media use and adolescents' attitudes towards tobacco use in Ghana. The study utilized data from the 2017 Impact Assessment of Social Marketing in Ghana (IASMG) initiative. The sample was restricted to adolescents between the ages of 13 and 16 with 3,767 females and 3,287 males. Three levels of analyses were conducted, univariate, bivariate, and multivariate.

At the univariate level, among 7,054 adolescents, nearly half (49%) of adolescent social media users at the time of the study had a favorable attitude toward cigarette smoking. This implies that adolescents' positive opinions about tobacco are cause for concern, as they are increasing among adolescents. At the bivariate level, a chi-square test was employed to assess the link between chosen demographic and psychological variables, while a t-test was utilized to examine the relationship between continuous variables. At the 0.05 level of significance, a significant association was found between social media use, exposure to harmful messages about tobacco on social media, respondent age, gender, level of education, place of residence, wealth index, tobacco knowledge, peer influence, and attitudes toward tobacco use. No

association was however found with religion, tobacco use among friends, and tobacco use among family members.

Among people who used social media, 49% had favorable attitudes towards tobacco use while more than half of respondents 50.9% who used social media had unfavorable attitudes toward tobacco use. Also, more than half of the respondents (53.8%) who were not exposed to harmful messages of tobacco had favorable attitudes towards tobacco use. This suggests that harmful related content on tobacco which adolescents view on social media is likely to give them a negative opinion about tobacco (van Hoof et al.,2014). It was also observed that 56.9% of females and 48.8% of male adolescents had favorable attitudes towards tobacco use at the time of the survey.

This indicates that the majority of adolescents who had positive opinions concerning tobacco use at the time of the study were females. This is relevant since adolescent' girls' tobacco use has been associated with several mental health risk factors, including increased mortality and morbidity (Haglund & Amos, 2011). The incidence of favorable attitudes among adolescents was associated with older ages. This implies that older adolescents possess greater availability of social media platforms, leading to their exposure to tobacco-related content and subsequently developing positive views towards cigarette consumption.

Interestingly, having favorable attitudes was higher (57.5%) among adolescents with up to primary education compared to adolescents with secondary/higher education. More than half of the adolescents who were up to the primary level of education had positive opinions toward tobacco use. In addition, Kumasi recorded the highest incidence (55.5%) of favorable attitudes. Concerning the age of respondents, there was a significant association between age and adolescent attitudes towards tobacco use. Interestingly, adolescent's knowledge of tobacco

revealed more than half (58.4%) of respondents with poor knowledge of tobacco compared with those with good knowledge of tobacco.

Moreover, adolescents with low peer influence (53.4%) had favorable attitudes, slightly higher than those with high peer influence. Additionally, it was observed that adolescents who exhibited a small amount of peer influence (53.4%) displayed more positive attitudes towards tobacco use, albeit somewhat bigger than their counterparts with high levels of peer influence. Also, more than half (57.9%) of respondents from poor households had favorable attitudes towards tobacco use compared to those from rich households.

At the multivariate level, two different models were analyzed separately. This was done in order to demonstrate the degree of influence that the socio-demographic variables had on the dependent variable that was being studied (adolescent attitude towards tobacco use). Model 1 investigated adolescents' use of social media and their attitudes toward tobacco use, whereas Model 2 included adolescents' usage of social media and their attitudes toward tobacco use while controlling for a selection of demographic and psychological characteristics.

The findings of Model 1 revealed that there is a substantial link between using social media and attitudes toward tobacco use, whereas the findings of Model 2 showed that there is no significant association between using social media and attitudes toward tobacco use. The finding from model 1 lends credence to the hypothesis that adolescents who make use of social media are more likely to have positive attitudes toward the use of tobacco products. In addition, the results of Model 2 supported the hypothesis that males are more likely than females to have positive attitudes toward the use of tobacco products. The sex of the adolescents, degree of education, place of residence, wealth index, tobacco knowledge, and tobacco use among peers were the psychosocial and demographic variables that were found to be significant in model 2.

## 5.2 Discussion of the results

This study investigated the association between adolescent social media use, their socio-demographic variables, and attitudes toward tobacco use. It also emphasizes how social media use influences attitudes toward tobacco use by exposing users to messages about the harmfulness of tobacco use. Furthermore, the study assesses the contribution of controlled independent factors as well as their level of association with attitudes toward tobacco usage. According to the bivariate findings, a statistically significant relationship exists between the selected socio-demographic characteristics in Ghana, including age, sex, place of residence, wealth index, tobacco use among friends, tobacco awareness, and adolescent attitudes toward tobacco use. This reflects Bandura's (1977;1986) social learning theory, which concluded that people learn through observation.

The result of the multivariate analysis suggests that the respondent's likelihood of having a favorable attitude toward tobacco use is influenced by behavioral, demographic, and socioeconomic characteristics. Social media use, exposure to messages on the harmfulness of tobacco on social media, respondent's gender, place of residence, level of education, wealth index, tobacco knowledge, and tobacco use among friends significantly increases the likelihood of having a favorable attitude towards tobacco use. According to the first model, adolescent use of social media increases the likelihood of having a favorable attitude toward tobacco use. This finding confirms Madden et al. (2013) conclusion that adolescents' health attitudes can be influenced by social media as a psychosocial determinant of health. The conclusion of this investigation is consistent with findings from other studies (Krauss et al., 2017; Neighbours et al., 2008). However, in the second model, adolescent social media users were not significantly associated with favorable attitudes toward tobacco use. This indicates that after adjusting for the effects of individual characteristics and psychosocial factors, social media use did not influence attitudes toward tobacco use among adolescents in Ghana. The first hypothesis was

therefore rejected, as there is no significant association between social media use and attitudes toward tobacco use.

Moreover, exposure to messages about the harmfulness of tobacco on social media was not significantly associated with favorable attitudes. Adolescents who were exposed to messages about the harmfulness of tobacco on social media were 7% more likely to have favorable attitudes compared to those who were not exposed. The results of this finding can be attributed to the scarcity of tobacco control campaigns on social media (Moreno et al., 2010). This lends credence to the notion that exposure to tobacco throughout adolescence is an indicator of the initiation of a range of health-related processes and the emergence of habits at an earlier age (WHO, 2015). To prevent adolescent tobacco usage, it is necessary to promote tobacco control campaigns through sharing and posting about the negative consequences of tobacco content on social media to influence unfavorable attitudes toward tobacco use among adolescents in Ghana.

The second model shows a significant relationship between the sex of the adolescent and having favorable attitudes toward tobacco use. Compared to male adolescents, female adolescents were less likely to have favorable attitudes toward tobacco use in this study. This finding supports the second hypothesis of the study which says that male adolescents are more likely to have favorable attitudes compared to female adolescents, therefore we fail to reject the second hypothesis. This outcome corroborates findings by Jalilian et al. (2015) and Hu et al. (2007), who found that gender identity is significantly associated with tobacco use attitudes. However, it contradicts findings from Chang and Seo (2020) and Pampel and Denney (2011) which revealed that female adolescents had more favorable attitudes compared to adolescent males. The previously mentioned disparities can be attributed to the empirical evidence indicating that adolescents are more likely to indulge in smoking when they develop a sense of gender identification within particular geographical areas.

These results may be due to educational, socio-economic, and other factors (Pampel & Denney, 2011; Graham, 2009; Mackenbach et al., 2008). This demonstrates how gender-specific socio-cultural and economic factors moderate the consequences of tobacco attitudes and consumption (Pampel & Denney, 2011). According to the second model, there was a strong association between the gender of respondents and having a favorable attitude toward tobacco use. This result is also consistent with findings that females are less likely to hold favorable attitudes toward tobacco use (Chang & Seo 2020; Pitel et al., 2011). According to research by Nichter et al. (2006) on adolescent tobacco attitudes and use, the gendered connotations that adolescents attach to tobacco use suggest that it serves as a symbol of both gender and identity.

Adolescent place of residence was revealed to be a significant predictor of favorable attitudes toward tobacco use. Adolescents who resided in Teshie were less likely to have a favorable attitude toward tobacco usage compared to their adolescents who resided in Accra. This finding is supported by Noland et al. (2018) findings which revealed a significant interaction between locality and tobacco use. In the case of Accra, Ghana's capital city, the findings of this study could be linked to the modernization and adoption of Western culture. Adolescents are introduced to tobacco-related behaviors and attitudes as a result of the information they see on social media and because they have better access to the internet than those who reside in rural households.

Furthermore, adolescent's level of education was also found to have a significant association with favorable attitudes toward tobacco use. Findings from Xu et al. (2015), corresponds to the results of this study, that adolescents with higher education was more likely to have favorable attitudes toward tobacco use. This was expected as highly educated adolescents are presumed to be well informed and understand the negative health consequences of tobacco use and the need to prevent its usage better than adolescents with up to primary

education. Religious affiliation was however not significantly associated with attitudes toward tobacco use among adolescents in Ghana. Although findings by Garrusi and Nakhaee (2012) and Bonelli and Koenig (2013) found that religious affiliation is a powerful indicator of health attitudes and behaviors of tobacco use (Behere et al., 2013), religion does not correlate with having favorable attitudes towards tobacco use, according to a study by Wang et al. (2015), which supports the study's findings..

Results from this study showed a statistically significant association between the wealth index and adolescent attitudes toward tobacco use. The results of this study corroborate the findings of Shailja et al. (2010), who found that adolescent socioeconomic status is a significant predictor of tobacco smoking. In contrast to the findings of Manfredi et al. (2012), this study found that adolescents from rich households were less likely to have favorable attitudes toward tobacco use. This was to be anticipated, as affluent adolescent populations will likely be more aware of the hazards of tobacco use as a result of their access to resources compared to those from poor households.

Tobacco use among friends was found to have a significant association with favorable attitudes toward tobacco use among adolescents. According to the social learning theory by Bandura, people learn behavior and develop attitudes based on their immediate environment, thus peer networks. Therefore, if adolescents find their friends engaging in risky behaviors such as smoking, they might develop a favorable attitude toward that behavior, as well as engage in such behaviors since that is what is considered modern and trendy among peer networks or groups (Finkenauer et al., 2002; Harter, 1998; Steinberg & Morris, 2011). Again, this result concurs with a study conducted by Trucco et al. (2011) among school-aged adolescents which indicated that adolescents can directly imitate their deviant friends' favorable attitudes towards tobacco use and gain social reward for it.

Furthermore, it was discovered that adolescents' favorable attitudes toward tobacco use were significantly connected with their level of tobacco knowledge. Adolescents with good knowledge were 30 % percent more likely to have favorable attitudes toward tobacco use compared to those with poor knowledge of tobacco. This study discovered that adolescents' positive opinions about tobacco use were predicted by their knowledge of tobacco which is in line with the findings of Horn et al. (2000). Consistent with these findings the results of Pinyerd et al. (2014) revealed that adolescent tobacco use was pervasive despite good knowledge of the dangers of tobacco use. Adolescents can be influenced due to peer pressure and trends in online communities (Huang et al., 2014).

In this study, peer influence was not significantly associated with attitudes toward tobacco use. Moreover, results from the study revealed that tobacco use among family members was not significantly associated with favorable attitudes toward tobacco use in this study. Contrary to findings from Bailey et al. (2016) and Skenderian et al. (2008), adolescents whose family members use tobacco, did not have positive opinions about tobacco use. Therefore, the use of tobacco among family members was not a significant predictor of having favorable attitudes toward tobacco use in adolescents.

Ultimately, the results of the study show that the findings of some studies concur with the findings of this study whereas, similarly, parts of this study's findings diverge from findings of other studies conducted elsewhere. Therefore, the dynamics of social media use and adolescents' attitudes toward tobacco use are worthy of attention in the Ghanaian context. A harmonization of the findings and recommendations from this study and that of other available ones could lead to concerted global efforts in managing the influence that social media use has on adolescents' attitudes toward tobacco use.

### 5.3 Conclusion

The results of this study indicate that a higher proportion (58%) of adolescent boys engage in social media usage compared to adolescent females (41%). This conclusion addresses the study's fourth objective, which intended to analyze gender differences in social media usage among adolescents. Moreover, the study's second objective, which aimed to identify gender-specific knowledge of tobacco, found that female adolescents exhibited a higher level of knowledge (51.5%) compared to their male counterparts (48.5%). There was a significant association between favorable attitudes towards tobacco use and social media usage among adolescents in Ghana (Krauss et al., 2017; Madden et al., 2013). Moreover, 56.9% of sampled adolescents who were females had favorable attitudes toward tobacco use. However, the study further established the association between adolescent females and attitudes towards tobacco use where females were less likely to have favorable attitudes towards tobacco use than male adolescents. This result conforms to several research findings from the literature and may be attributed to existing programs, policies, and interventions from non-governmental organizations (NGOs) to develop tobacco control programs targeted at female adolescents (Hutchinson et al., 2020).

Social media use can therefore influence adolescents' attitudes toward tobacco use in Ghana, however, to fully explain the variations in attitudes toward tobacco use among adolescents in Ghana, the inclusion of factors such as sex, level of education, place of residence, wealth index, peer influence, exposure to harm messages on tobacco use and tobacco use among friends, exposure to harm messages on tobacco helps to adequately explain the variations in adolescent attitudes towards tobacco use within the Ghanaian context. The study's finding reveals the associations that exist between social media use, demographics, psychosocial factors, and attitudes toward tobacco use among adolescents in Ghana. It is therefore

essential that the phenomenon of social media use be examined in depth to manage its influence on adolescent attitudes toward tobacco use.

#### **5.4 Limitations and recommendations of the study**

While important results have been identified in this study, there are a few limitations that must be noted. This study was conducted using secondary data, which may have been subject to the influence of time-varying confounding factors such as the socio-economic status of respondents, and level of exposure to existing anti-smoking programs (SKY Girls Ghana). Another limitation pertains to the use of self-reported exposure data, which is susceptible to several biases, including social desirability and interviewer influences. These biases pose challenges to conducting a rigorous statistical analysis. Moreover, the data reported only a small percentage of adolescents who ever use social media. This was because, at the time, a majority of the participants were enrolled in boarding schools where cell phones were not permitted. This most likely accounted for the reported low use of social media. For an all-encompassing perspective on the influence of social media use and attitudes towards tobacco use, future studies employing the same variables should be conducted in conditions where social media use among adolescents exists, such as when they are on school vacation to get a fuller picture of the phenomenon of social media's influence on attitudes toward tobacco use. Only then can real progress be made in understanding the influence of social media use on attitudes toward tobacco use at the global level.

In addition, advertisement messages about tobacco on social media were not identified in the study. In future studies, deepening our understanding of the types of social media content adolescents may be exposed to including, pro-tobacco peer-generated posts and advertisements of tobacco on social media will help to identify the main sources of information influencing attitudes.

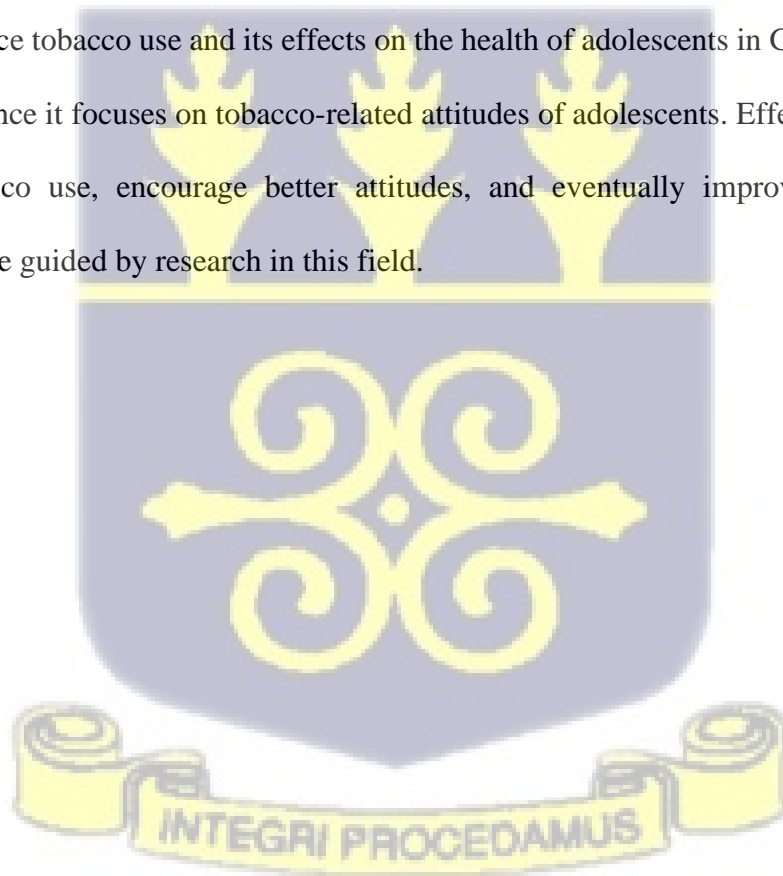
Moreover, the intensity of social media frequency of adolescents may not be known, especially if they visit social media for hours in a day and the data obtained in that respect may likely be the inaccurate measurement of social media use. Also, it was difficult to obtain data that account for attitudes toward alcohol use in the dataset, thus my literature provided information on attitudes towards alcohol use and did not extend to analyse data on alcohol. Moreover, the study did not set out to evaluate regional or geographical differences in attitudes toward tobacco use, the recommendations based on place (urban, peri-urban, and rural) are more generic.

In future studies, public education on preventing adolescent tobacco use in Ghana should not only centre on offline influence such as real-life situations but also include online platforms such as social media. Promoting the prevention of favorable attitudes towards tobacco use among adolescent Ghanaians is crucial for safeguarding the well-being of this demographic group. By doing so, the adverse health ramifications associated with smoking, including cancer, cardiovascular diseases, and coronary heart diseases, can be effectively mitigated.

Companies should be discouraged from sharing posts and promotional messages about tobacco use on social media by placing bans and restrictions. Doing this will reduce the exposure to tobacco-related content on social media. Furthermore, it is recommended that enhanced tobacco control education be targeted towards adolescent females as they stand a higher risk of the health effects of smoking tobacco. This objective can be accomplished through the enhanced integration of educational, community-based, and social media initiatives facilitated by the Ministry of Education, Ministry of Health, relevant regulatory entities, non-governmental organizations, and various initiatives aimed at fostering healthier behaviors and attitudes among adolescents in Ghana.

Adolescent girls should be encouraged on how to be assertive and empowered especially amongst peer networks on social media. Adolescent boys' education should also be promoted to persuade males against using tobacco. Awareness of the harms of using tobacco should be promoted through tobacco control campaigns on social media. This will better inform adolescents about the negative repercussions of using tobacco.

Moreover, tobacco control programs in Ghana should be targeted by the Ministry of Health and other organizations of interest, in peri-urban areas as well, due to the strong social mores and norms prevailing in certain peri-urban areas as compared to urban areas. This will serve as a check on adolescent attitudes towards tobacco use in these areas. Consequently, urban, peri-urban, and rural dwellers should be educated on the consequences of smoking tobacco to reduce tobacco use and its effects on the health of adolescents in Ghana. This study is significant since it focuses on tobacco-related attitudes of adolescents. Effective methods to eradicate tobacco use, encourage better attitudes, and eventually improve public health outcomes can be guided by research in this field.



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