



Assessing awareness, knowledge, and perceptions of hubbly bubbly smoking health risks among South African university students

Abstract

Globally, the smoking of hubbly bubbly tobacco pipes is a growing trend among young people. However, the promotion of health awareness about hubbly bubbly (HB) smoking risks does not appear to be common, especially in South Africa. This study intended to assess awareness of the HB smoking health risks among students; to determine the students' knowledge levels about its risks; to examine the students' perceptions of HB smoking and to determine whether their knowledge and perceptions on smoking health risks would influence their HB smoking behaviour intentions. The Extended Parallel Process Model was applied. A quantitative approach was applied with a sample of 350 students participating in the study: $n = 175$ HB users and $n = 175$ non-users. A 2x2 experimental design between and within participants was followed. Results indicate that most participants (75%) had not heard or seen any health communication awareness campaigns about HB risks and that knowledge about HB smoking health risks was inadequate. Most participants in the study, including both HB users 74% (129) and non-users 80% (140), were able to identify lung cancer as one of the health risks of HB smoking. This study is important to health promotion organisations including government departments to enable them to construct effective health communication messages.

Keywords

health risk warnings; hookah pipe; nicotine; second-hand smoke; tobacco smoking; toxic by-products

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INTRODUCTION

Hubbly bubbly (HB) smoking is becoming a regular and a trendy practice among young people, including high school and university students as well as young professionals. Several factors combine to create the allure of HB among young people, influencing its use. According to Naicker, Teare, and Mathee (2020), HB smoking is socially appealing, especially to the youth, because of its affordability, the novelty of the flavoured tobaccos, and the social atmosphere in which smoking usually occurs; also alluring is the mystic appeal associated with the HB (known globally as hookah, waterpipe, shisha, narghile, argihle, ghalyan, hubble bubble or goza, and in some parts of South Africa as an "oka pyp") (Senkubuge et al., 2012). However, promotion and advocacy around the health risks of the HB has not gained nearly as much attention. In fact, HB smoking has come to be considered a global threat and given the status of an epidemic by some public health authorities (Aslam et al., 2014).

The nominal health-related information on the HB coupled with the lack of research on its control and cessation efforts appear to be overshadowed by glamourised peer marketing. Kruger (2014) argues that most research on tobacco control and cessation efforts have focused on cigarette consumption, as it is the most common form of tobacco use, while research into other forms of tobacco smoking such as HB smoking has been neglected. According to Nyatsanza (2020), youth and young adults in South

Africa are increasingly using hookah pipes or shisha. Despite the colourful packaging and flavours, this is still tobacco, and its users are exposed to nicotine and other toxic chemicals. Studies in South Africa reveal that a high rate of HB use is reported among schoolchildren as young as 13, and among university students, including health sciences students. Most of the youth who participated in such studies had used HB (Combrink et al., 2010; Senkubuge et al., 2011; van der Merwe et al., 2013).

Globally, the use of HB is very popular. Mugenyi, Haberer and O'Neil (2018), focusing on two universities in the USA, revealed that the occurrence of any lifetime HB use was 25% to 28% among students at universities. UK studies showed that HB smoking was between 11% and 18% among students at universities and 8% among students at secondary school. The risks of HB smoking involve the harm caused to one's health. According to Qasim et al. (2019), HB smoking has a potential risk for transmission of communicable diseases such as hepatitis C when sharing the mouthpiece between users who may, for example, have bleeding gums. Long-term use of hookah tobacco increases risks for cancer, pulmonary and cardiovascular disease and other negative health outcomes (Phan et al., 2020). The American Lung Association (2020) states that short-term effects include increased heart rate and blood pressure, reduced pulmonary function, and carbon monoxide intoxication.

It is important to note that HB smoking also affects second-hand smokers. According to Repace, Kawachi, and Glantz (1999), second-hand smoke (SHS) is toxic waste produced by tobacco combustion, which is the combination of tobacco smoke from the burning ends of cigarettes, pipes, and cigars, and exhaled smoke from smokers. Hubby bubbly use exposes non-users to second-hand smoke containing nicotine, an addictive drug, which is present in all forms of tobacco products, including hookah tobacco (Kassem et al., 2018). Shearston et al. (2019) reveal an increased 3-hydroxypropylmercaptronic acid and benzene uptake in the urine of non-smokers after they attended an HB smoking event, suggesting that non-smoking individuals are also exposed to acrolein and benzene from HB smoke.

The 2018 implementation of a draft bill to control the use of tobacco products and electronic delivery systems by the South African Government (Department of Health, 2018) encourages standardised wrapping and tagging of electronic delivery systems products, including pipes, HB, and electronic devices known as "vapes". While this Act regulates smoking in public, it does not apply to HB smoking nor prohibit HB smoking in public and indoor places, nor increase taxation on HB (Daniels, 2012). Therefore, HB smoking, which has worse effects than cigarette smoking, continues unabated.

Cigarette smoking effects have been widely publicised; however, lack of information about the harmful effects of HB smoking encourages users to smoke for a longer time than when smoking cigarettes. According to CANSA (2015), one typical cigarette session takes 5 to 7 minutes – 8 to 12 puffs that result in 40 to 75 ml of smoke per puff. But one typical HB smoking session takes 20 to 80 minutes – 20 to 200 puffs that result in 0.15 to 1 litre of smoke per puff, which is equal to puffing the smoke of 100 or more cigarettes. It is from this stance that this study attempted to assess the knowledge and perceptions of HB smoking health risks among some South African youth.

Due to HB's long smoking duration that results in greater nicotine exposure, HB smoking presents more harm to users than its much-publicised "cousin", cigarette smoking (Aslam et al., 2014; Busari, 2020). Yet there appears to be growing use of HB by secondary and tertiary students as well as young professionals for recreation (Daniels, 2012). Studies conducted in South Africa are limited to the urban areas of Pretoria, Johannesburg, and Cape Town (Senkubuge et al., 2011; van der Merwe et al., 2013). The glamourised marketing of the HB as cool, fun, and mature, among other things, may have eclipsed public awareness about its health risks (Cancer Association of South Africa, 2015). Internationally, there are widespread perceptions that smoking HB is relatively safe (Shihadeh & Saleh, 2005). This study attempts to contribute to scholarship on the subject by focusing on rural university students.

The study intended to:

- Assess awareness of the HB smoking health risks among students
- Determine the students' knowledge about HB smoking's health risks
- Examine the students' perceptions of HB smoking

- Determine whether their knowledge and perceptions of the health risks would influence their HB smoking behaviour intentions.

Study hypotheses

Hypothesis 1: If users are not exposed to health risk messages about HB smoking, they are unlikely to quit, while non-users will be initiated into smoking.

Hypothesis 2: If users are exposed to health risk messages about HB smoking, they are likely to quit, while non-users will not be initiated into smoking.

LITERATURE REVIEW

Awareness of hubbly bubbly smoking health risks

Hubbly bubbly smoking is increasing globally. Smoking cessation (quitting) campaigns targeted at users are few and far between. Campaigns should be used to create awareness of the health risks of HB smoking. Awareness raising about the potential health risks of HB smoking is a crucial first step. "Awareness raising is an important factor in primary prevention tactics" (European Institute for Gender Equality, 2017:1). Awareness raising is a reciprocal endeavour, nurturing communication and information exchange to improve mutual understanding and bring about the necessary changes in attitudes and behaviour. This can be achieved successfully through awareness-raising campaigns.

Pepper (2014) reports that HB tobacco is humidified with sweeteners and flavourings and will not burn on its own. It needs a heat source, typically charcoal positioned on top of a piece of pierced aluminium foil that covers the tobacco-filled pipe bowl. Thus, HB smoking includes the inhalation of both charcoal and tobacco smoke. Urkin, Ochaion & Peleg (2006) therefore concluded that public awareness is required to formulate primary and active means of reducing the spread of HB use, and action should take in the form of diverse interventions. The media should be used to disseminate the message that smoking HB is at least as risky as smoking cigarettes. A study by Kakodkar and Bansal (2013) found that many students were unaware of HB smoking's health effects. On the contrary, Al-Nomay and Ahmed (2015) found that most of the participants were aware that HB smoking is a risk factor for oral cancer, periodontal diseases, staining of teeth and oral tissues, bad taste and bad breath. Therefore, Obeidat et al. (2014) concluded from their study that dental students' awareness of the dangers of HB is not ideal, and initiatives are required to guarantee the delivery of such knowledge to medical students in particular.

Knowledge about hubbly bubbly smoking health risks

People tend to acquire knowledge on a subject when exposed to campaigns that address health concerns regarding a certain issue, in this case, HB smoking health risks. Knowledge levels of HB smoking risks play an important role in measuring the impact of campaigns designed to create awareness about the health risks of HB smoking. Knowledge is not a given phenomenon but something that is delineated by operating with a concept that is created as an answer to certain needs, or the pursuit of certain ideals (Vega-Encabo, 2016). In this way, exposure to messages about the health risks of HB smoking, with different interventions that are designed for different segments of society, may lead to people acquiring knowledge of its health risks.

A few studies have revealed that the knowledge of the participants increased after exposure to health awareness sessions, and knowledge scores were significantly higher in the young age group, higher qualifications, and higher income groups (Anjum, Ahmed & Ashfaq, 2008; Khalil et al., 2015). However, several studies found that the overall factual knowledge about the harm caused by HB smoking was poor, inaccurate, and unsatisfactory regarding health risks: people mainly knew that it causes cardiovascular disease, is more harmful than cigarette smoking, and causes infective hepatitis (Lipkus et al., 2014; Thabit, Mohsin & Niazy, 2015). An interesting finding revealed that females had better knowledge than males regarding the hazardous outcomes of smoking on health and as a risk factor for brain thrombosis, heart attack, and lung cancer (Al Qahtani, 2017; Chaaya et al., 2004).

Perceptions of hubbly bubbly smoking

Although people may acquire knowledge of the health risks of HB smoking, their perceptions play a vital role in the adoption of the desired behaviour. HB users view their practice very differently from cigarette smokers. HB users view the habit as enjoyable, sociable, and cultured, while cigarette smokers view the habit as addictive and mundane (Wright, Burrow & Hurst, 2016). These diverse views mean that diverse cessation interventions are likely to be needed. Treatment for all nicotine addiction is needed but the cultural and social aspects of HB smoking should also be seriously considered. As people belong to different segments of society and are culturally different so their perceptions and how they view their surroundings will differ. These perceptions will lead people to condone or condemn certain practices, for example, HB smoking. Perceptions play a crucial role in the behaviour of individuals in many situations and are closely associated with attitudes (Pickens, 2005).

A person's awareness and reception of stimuli play an important role in the perception process (Pickens, 2005). Receptiveness to stimuli is extremely selective and may be restricted by a person's prevailing beliefs, attitude, motivation, and personality. Concerning health, Zang and Fan (2013) state that the public's perception of risk is a vital consideration in public health and risk management decision-making. They note that the perception of risk varies with age, gender, education, and geographic region. Decision-makers need to consider how the public values risk matters.

There are numerous misconceptions about the health risks associated with HB smoking that might increase its rate of use. Akl et al. (2013) reported that participants perceived HB smoking to be harmless compared to cigarette smoking. A qualitative study by Roskin and Aveyard (2009) revealed that students perceived HB smoke as entering the lungs on a different path from that of cigarette smoke. The study by Jawad et al. (2015) concluded that a more thorough evaluation of the practice is required, particularly among adolescents. Evidence is lacking in terms of smoking cessation interventions specific to HB use. Wright, Burrow & Hurst (2016) concluded that the literature on HB cessation is scarce but proposed that there are opportunities to build on the huge experience of smoking cessation interventions among cigarette smokers.

THEORETICAL FRAMEWORK

Extended Parallel Process Model (EPPM)

The EPPM suggests that people tend to react to health risk warnings in various ways, be they positive or negative. One's fear of health risks such as the effects of smoking may lead to adjustable, self-shielding, dysfunctional or self-defeating actions (Health Communication Capacity Collaborative, 2014). The EPPM proposes four major constructs, with two of them related to threats, namely perceived severity, and perceived susceptibility, and two related to efficacy, namely response efficacy and self-efficacy (Allahverdipour et al. 2007). Perceived severity relates to beliefs about the degree or importance of the threat and the gravity of its outcomes, and has been defined in terms of emotions, for example, one's feelings regarding the gravity of a threatening event (Gore & Bracken, 2005). Perceived susceptibility relates to beliefs about the possibility of personally experiencing the threat. Perceived susceptibility is measured by items such as "I am at risk of [being under a] health threat" (Witte, 1996). Response efficacy relates to aspects of the message that underline the efficiency of response in preventing the threat, and self-efficacy is information about the ability of the intended audience to transmit the endorsed response. Fear appeals are emotional message strategies and are defined as, "influential messages constructed to frighten people by describing the awful things that will happen to them if they do not do what the message endorses" (Witte, 1992:329).

This article suggests that health communication messages that emphasise the detrimental effects of smoking HB may likely influence students to quit smoking HB. Perceived susceptibility would relate to the fact that the messages should inform smokers and non-smokers who are exposed to HB smoke that they have a high chance of experiencing the detrimental effects of HB smoking. Response efficacy refers to messages used to communicate how people can quit smoking to prevent these threats, which are

the harmful effects of HB smoking. Relevant fear appeals may present graphic messages that show the negative consequences of HB smoking.

METHODOLOGY

This article forms part of a larger study that followed a mixed methods research approach. However, this article only reports on the quantitative research approach employed by the study. The study used an experimental design, employing a 2×2 within and between-group design involving two groups of participants from the University of Limpopo. Ethics permission to conduct the study was granted by the School of Languages and Communications Ethics Committee as well as the Institutional Ethics Committee. One group had previously used a hubbly bubbly ($n = 175$) and the other group had never used one ($n = 175$). Additionally, one group of students was exposed to a poster message about HB health risks, while the other was not. The between-group design refers to between HB users ($n = 175$) and non-users (175) and within-group design refers to within HB users $n = 100$ and within HB non-users $n = 100$ who were exposed to health risks messages. Data were collected using structured questionnaires, and the questions asked were based on the demographics, tobacco experience, hubbly bubbly experience, hubbly bubbly smoking behaviour, awareness of the smoke and smokeless tobacco, knowledge of hubbly bubbly smoking health risks and perceptions about the hubbly bubbly. The experiment was conducted among participants to test existing health risk messages on the HB adapted from CANSA (2015) (see Appendix A). Exposure to a health risk message was the dependent variable, while independent variables consisted of intentions to quit or not to start smoking; knowledge of health risks; and perceptions towards health risks.

This study used the IBM Statistical Package for the Social Sciences (SPSS: version 25) to analyse data. Analyses of variance (repeated measures) were conducted to find out the possible effect of exposure to the message in terms of HB users quitting and whether non-users' intentions to start smoking before exposure changed after exposure to the health risk message.

RESULTS

Awareness of hubbly bubbly smoking health risks

The first objective of the study was to evaluate the awareness of the health risks of HB smoking among 350 University of Limpopo students. To evaluate the awareness of health risks incurred when smoking HB, the researcher asked the participants if they had ever seen campaigns that educate about HB smoking risks (see Table 2). The findings revealed that 260 (74.4%) had never encountered awareness campaigns about HB smoking health risks, whereas 87 (24.9%) had seen or heard such awareness campaigns.

Participants were specifically asked to name the sources of their information. Some named more than one type of medium whether mass media, interpersonal interaction, or online media where they had been exposed to the message. The results show that 87 participants had seen or heard messages about HB smoking health risks. From those participants who were exposed to such messages, 63 had seen or heard about these risks through mass communication (radio, television, newspapers, magazines or posters), 27 through interpersonal communication (friends, relatives, or nurse/doctor), and 7 through public communication (campaigns by the cancer organisation CANSA). Lastly, 26 participants had learned about the risks through online communications (internet and social media). This is important to this study because it helps to explain that the rapid growth of HB smoking is largely because of a lack of awareness of its health risks.

Knowledge of hubbly bubbly health risks

This section deals with the second objective of the study. The second objective addresses the knowledge levels of the students, while the third objective examines the relationship between knowledge and behavioural intentions. The second objective of the study was to determine the University of Limpopo students' knowledge levels about HB smoking health risks. To establish knowledge about health risks,

statements were presented to test knowledge levels. A four-point Likert scale was presented with Strongly Agree, Agree, Disagree, and Strongly Disagree options. The results are presented in Table 1 below for users ($n = 175$) and non-users ($n = 175$).

Table 1: Users and non-users' knowledge of health risks

	Strongly Agree		Agree		Disagree		Strongly Disagree		Did not indicate		Total
	Users (N = 175)	Non-users (N = 175)	Users (N = 175)	Non-users (N = 175)	Users (N = 175)	Non-users (N = 175)	Users (N = 175)	Non-users (N = 175)	Users (N = 175)	Non-users (N = 175)	
Hubbly bubbly smoking											N = 350 (n = 175, users and n = 175, non-users)
Is dangerous to health	n = 68 38.8%	n = 39 22.2%	n = 75 42.8%	n = 89 50.8%	n = 15 8.5%	n = 36 20.5%	n = 4 2.2%	n = 9 5.1%	n = 13 7.42%	n = 2 1.1%	n = 350 100%
Has a significant amount of tobacco	n = 40 22.8%	n = 24 13.7%	n = 93 53.1%	n = 89 50.8%	n = 19 10.8%	n = 47 26.8%	n = 9 5.1%	n = 11 6.2%	n = 14 8%	n = 4 2.2%	n = 350 100%
Can cause ulcers	n = 56 32%	n = 27 15.4%	n = 79 45.1%	n = 70 40%	n = 21 12%	n = 60 34.2%	n = 7 4%	n = 13 7.4%	n = 12 6.8%	n = 5 2.8%	n = 350 100%
Can cause lung cancer	n = 69 39.4%	n = 52 29.7%	n = 77 44%	n = 88 50.2%	n = 11 6.2%	n = 24 13.7%	n = 5 2.8%	n = 8 4.5%	n = 13 7.4%	n = 3 1.7%	n = 350 100%
Can cause heart disease	n = 61 34.8%	n = 29 16.5%	n = 70 40%	n = 75 42.8%	n = 23 13.1%	n = 53 30.2%	n = 9 5.1%	n = 12 6.8%	n = 12 6.8%	n = 6 3.4%	n = 350 100%
Can cause diabetes	n = 52 29.7%	n = 10 5.7%	n = 65 37.1%	n = 31 17.7%	n = 38 21.7%	n = 95 54.2%	n = 8 4.5%	n = 28 16%	n = 12 6.8%	n = 11 6.2%	n = 350 100%
Can cause communicable diseases	n = 56 32%	n = 48 27.4%	n = 76 43.4%	n = 68 38.8%	n = 18 10.2%	n = 43 24.5%	n = 10 5.7%	n = 9 5.1%	n = 15 8.5%	n = 7 4%	n = 350 100%

The study further attempted to examine whether the students' knowledge about the health risks would influence their HB smoking behaviour intentions. Independent sample tests are used to measure the effectiveness of an experiment. Descriptive statistics were therefore used to determine participants' knowledge about HB smoking health risks from both users and non-users. Reliant on the nature of the data, the study used independent sample tests to analyse the data from 100 participants exposed to health risk messages, both users, and non-users.

Independent sample tests were conducted with users and non-users to find out if exposure to health risk messages influenced their knowledge levels and therefore influenced their smoking behaviour intentions, and whether increasing their acquired knowledge increased their desire to quit smoking or prevent smoking initiation. (see Table 3). The independent sample test used reveals that there is a significant difference between knowledge scores before the participants were exposed to the message and no significant difference after they were exposed to the message. This means that there was a change in users' and non-users' knowledge after they were exposed to health risk messages. This is because the significance (2-tailed) was $< 0.5\%$ before and $> 0.5\%$ after, meaning that participant knowledge increased after message exposure (see Table 2).

Table 2: Mean difference of knowledge between users and non-users before and after HB message exposure

Group Statistics					
Use		N	Mean	Std. Deviation	Std. Error Mean
Knowledge before	User	100	16.47	4.09	0.441
	Non-user	100	14.78	6.701	0.670
Knowledge after	User	100	13.93	5.090	0.509
	Non-user	100	13.50	7.531	0.753

Table 3: Independent sample tests for knowledge before and after message exposure

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper	
Knowledge before	Equal variances assumed	7,688	0,006	2,107	198	0,036	1,690	0,082	0,108	3,272
	Equal variances not assumed			2,107	171,202	0,037	1,690	0,082	0,107	3,273
Knowledge after	Equal variances assumed	4,180	0,042	0,473	198	0,637	0,430	0,909	-1,362	2,222
	Equal variances not assumed			0,473	173,824	0,637	0,430	0,909	-1,364	2,224

Perceptions of hubbly bubbly smoking for both users and non-users

The third objective of this study was to examine the University of Limpopo students' perceptions of HB smoking. To find out how participants perceived HB smoking, users and non-users were presented with a 4-point Likert scale indicating items related to perceptions ranging from whether they Strongly Agree, Agree, Disagree to Strongly Disagree. The results are presented in Table 4.

Table 4: Hubbly bubbly users' and non-users' perceptions

	Strongly Agree		Agree		Disagree		Strongly Disagree		Did not indicate		Total
	Users (N = 175)	Non-users (N = 175)	Users (N = 175)	Non-users (N = 175)	Users (N = 175)	Non-users (N = 175)	Users (N = 175)	Non-users (N = 175)	Users (N = 175)	Non-users (N = 175)	
HB;											N = 350 (n = 175 HB users and n = 175 HB non- users)
Contains less nicotine than cigarettes	n = 54 (30.8%)	n = 41 (23.4%)	n = 81 (46.2%)	n = 87 (49.7%)	n = 27 (15.4%)	n = 26, (14.8%)	n = 7 (4%)	n = 10, (5.7%)	n = 6 (3.4%)	n = 11 (6.2%)	n = 350 (100%)
Addictive as cigarettes	n = 17 (9.7%)	n = 45 (25.7%)	n = 28 (16%)	n = 56, (32%)	n = 82 (46.8%)	n = 51 (29.1%)	n = 45 (25.7%)	n = 11 (6.2%)	n = 3 (1.7%)	n = 12 (6.8%)	n = 350 (100%)
Occasional cigarette is more harmful than HB	n = 56 (32%)	N = 57 (32.5%)	n = 61 (34.8%)	n = 72 (41.1%)	n = 38 (21.7%)	n = 24 (13.7%)	n = 14 (8%)	n = 8 (4.5%)	n = 6 (3.4%)	n = 14 (8%)	n = 350 (100%)
HB health risks are exaggerated	n = 32 (18.2%)	n = 16 (9.1%)	n = 76 (43.4%)	n = 32 (18.2%)	n = 54 (30.8%)	n = 34 (19.4%)	n = 10 (5.7%)	n = 12 (6.8%)	n = 3 (1.7%)	n = 81 (46.2%)	n = 350 (100%)
HB is harmless to one's health	n = 30 (17.1%)	n = 47 (26.8%)	n = 50 (28.5%)	n = 40 (22.8%)	n = 62 (35.4%)	n = 42 (24%)	n = 25 (14.2%)	n = 25 (14.2%)	n = 8 (4.5%)	n = 21 (12%)	n = 350 (100%)
HB is less addictive as cigarette	n = 68 (38.8%)	n = 28 (16%)	n = 76 (43.4%)	n = 72 (41.1%)	n = 16 (9.1%)	n = 41 (23.4%)	n = 11 (6.2%)	n = 19 (10.8%)	n = 4 (2.2%)	n = 15 (8.5%)	n = 350 (100%)
HB smoke contains harmful chemicals	n = 37 (21.1%)	n = 56 (32%)	n = 86 (49.1%)	n = 66 (37.7%)	n = 39 (22.2%)	n = 31 (17.7%)	n = 10 (5.7%)	n = 8 (4.5%)	n = 3 (1.7%)	n = 14 (8%)	n = 350 (100%)
HB smokers can quit easily	n = 82 (46.8%)	n = 34 (19.4%)	n = 49 (28%)	n = 65 (37.1%)	n = 24 (13.7%)	n = 39 (22.2%)	n = 13 (7.4%)	n = 21 (12%)	n = 7 (4%)	n = 16 (9.1%)	n = 350 (100%)
HB more dangerous as compared to cigarette	n = 26 (14.8%)	n = 24 (13.7%)	n = 33 (18.8%)	n = 43 (24.5%)	n = 58 (33.1%)	n = 66 (37.7%)	n = 54 (30.8%)	n = 23 (13.1%)	n = 4 (2.2%)	n = 19 (10.8%)	n = 350 (100%)
Water filters smoke by removing toxic chemicals	n = 38 (21.7%)	n = 10 (5.7%)	n = 78 (44.5%)	n = 72 (41.1%)	n = 53 (30.2%)	n = 46 (26.2%)	n = 3 (1.7%)	n = 29 (16.5%)	n = 3 (1.7%)	n = 18 (10.2%)	n = 350 (100%)
Burning coals create cancer causing agents	n = 6 (3.4%)	n = 13 (7.4%)	n = 31 (17.7%)	n = 41 (23.4%)	n = 92 (52.5%)	n = 57 (32.5%)	n = 39 (22.2%)	n = 45 (25.7%)	n = 7 (4%)	n = 19 (10.8%)	n = 350 (100%)
Fruity flavoured tobacco makes HB healthier	n = 15 (8.5%)	n = 27 (15.4%)	n = 36 (20.5%)	n = 43 (24.5%)	n = 93 (53.1%)	n = 58 (33.1%)	n = 27 (15.4%)	n = 30 (17.1%)	n = 4 (2.2%)	n = 17 (9.7%)	n = 350 (100%)
HB smoking helps one to relax	n = 40 (22.8%)	n = 18 (10.2%)	n = 88 (50.2%)	n = 62 (35.4%)	n = 30 (17.1%)	n = 48 (27.4%)	n = 13 (7.4%)	n = 27 (15.4%)	n = 4 (2.2%)	n = 20 (11.4%)	n = 350 (100%)
HB smoking helps one to stay thin	n = 7 (4%)	n = 12 (6.8%)	n = 19 (10.8%)	n = 37 (21.1%)	n = 103 (58.8%)	n = 78 (44.5%)	n = 43 (24.5%)	n = 29 (16.5%)	n = 3 (1.7%)	n = 19 (10.8%)	n = 350 (100%)
The government should put into place policies that regulate the public use of HB	n = 38 (21.7%)	n = 43 (24.5%)	n = 59 (33.7%)	n = 63 (36%)	n = 42 (24%)	n = 33 (18.8%)	n = 32 (18.2%)	n = 19 (10.8%)	n = 4 (2.2%)	n = 17 (9.7%)	n = 350 (100%)
Society approves of HB smoking	n = 30 (17.1%)	n = 14 (8%)	n = 63 (36%)	n = 42 (24%)	n = 55 (31.4%)	n = 57 (32.5%)	n = 23 (13.1%)	n = 46 (26.2%)	n = 4 (2.2%)	n = 16, (9.1%)	n = 350 (100%)

To find out how HB appeals to users, participants were asked closed questions meant to solicit answers regarding its appeal. This question was solely answered by HB users to solicit responses about their experiences N = 175. Results show that more than half of the participants who used HB, 94 out of 175, perceived smoking to be fun. In addition, 41 participants found the use of HB is appealing because it allows people of different genders to share, others (33) found it a sweet way to socialise with their friends, while yet another group of participants (25) found it a safe and relaxing way to socialise with friends. The least number of participants, 4 found it appealing because of its ability to boost a user's ego. Of interest is that a small number of users (12) found it appealing to use because of the lack of health warnings. The results are presented below in Table 5.

Table 5: Hubbly bubbly appeal to users (N = 175)

HB appeals	Variables	Frequen cy
	It's fun	n = 94
	Attracts people of a different gender to share	n = 41
	It's a sweet way to socialise with friends	n = 33
	It's cool	n = 30
	It's a safe and relaxing way to socialise with friends	n = 25
	It's a new experience	n = 23
	It's tasty	n = 18
	It's fashionable	n = 18
	Doesn't have health warnings	n = 12
	It's sophisticated	n = 8
	Improves concentration	n = 7
	It's mature	n = 5
	Boosts ego	n = 4

The fourth objective was to determine whether exposure to HB health risk messages will influence the participants' perceptions of harm caused by HB. The results show that there is a significant mean difference between the perceptions of users and non-users. It shows that non-users perceived HB to be harmful to human health more than users. The results in Table 6 show that there is a significant difference between before message exposure and after message exposure. This means that perceptions changed after exposure to health risk messages. It shows that non-users perceive HB to be more harmful. This is shown by the significance (2-tailed) score which is 0.001% before message exposure for both groups and 0.007% for users and 0.008% for non-users after message exposure.

Table 6: Mean difference of perceptions between users and non-users before and after message exposure

Group Statistics					
Use		N	Mean	Std. deviation	Std. Error Mean
Perception before	User	100	35.94	6.198	0.620
	Non-user	100	39.91	9.504	0.950
Perception after	User	100	42.79	7.167	0.717
	Non-user	100	47.10	14.248	1.425

Table 7: Independent sample test for significance in difference of perceptions before and after the message exposure

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Knowledge before	Equal variances assumed	7,688	0,006	2,107	198	0,036	1,690	0,082	0,108	3,272
	Equal variances not assumed			2,107	171,202	0,037	1,690	0,082	0,107	3,273
Knowledge after	Equal variances assumed	4,180	0,042	0,473	198	0,637	0,430	0,909	-1,362	2,222
	Equal variances not assumed			0,473	173,824	0,637	0,430	0,909	-1,364	2,224

Hypotheses

Hypothesis 1: If users are not exposed to health risk messages about HB smoking, they are unlikely to quit, while non-users will be initiated into smoking.

A custom table using SPSS was used to show the users' intentions to quit and non-users' intentions to start smoking before exposure to health risk messages. The results show that before exposure to messaging 26 users were not willing to quit smoking, while 57 were willing to quit and 17 were not sure if they will quit smoking HB or not. For non-users, the results show that 3 intended to start smoking HB, while 69 did not intend to start smoking HB, and 28 were not sure if they will start smoking or not.

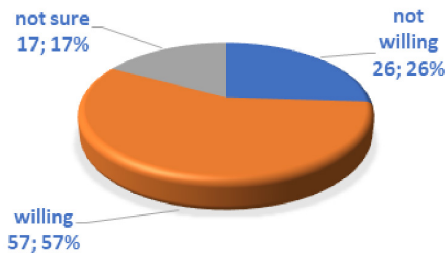


Figure 1: HB users' willingness to quit before message exposure

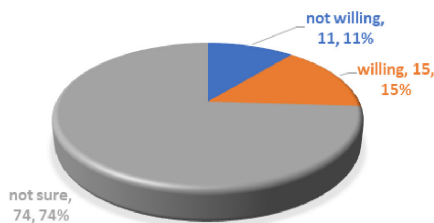


Figure 2: Non-users' intention to start smoking before message exposure

Hypothesis 2: If users are exposed to health risk messages about HB smoking, they are likely to quit, while non-users will not be initiated into smoking.

A custom table was used to show users' intentions to quit and non-users' intentions to start smoking HB after health risk message exposure. The results for users after exposure to the message show that 15 were willing to quit smoking HB, while 11 were not willing to quit and 74 were not sure if they will quit or not. For non-users, the results after exposure to health risks messages show that 5 intended to start smoking, while 71 did not intend to start smoking HB and 24 were not sure if they will start smoking or not.

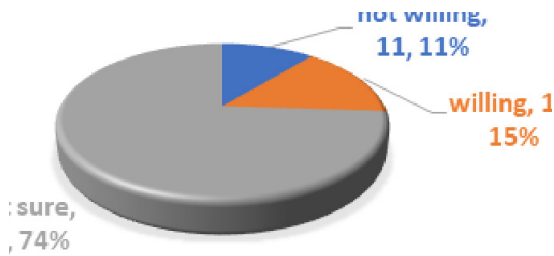


Figure 3: HB users' willingness to quit after message exposure

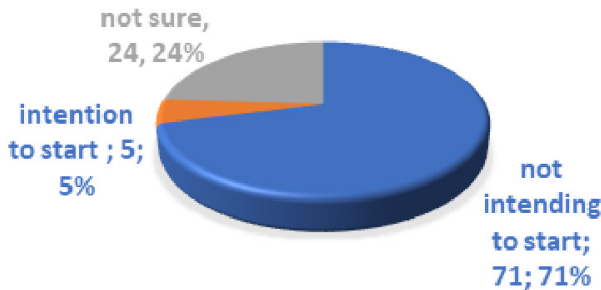


Figure 4: Non-users' intention to start smoking after message exposure

DISCUSSION

This study found that a large number of participants were unaware of the health risks of hubbly bubbly smoking. This finding is in line with results of studies that found that a great number of participants were unaware of the HB health risks (Kakodkar & Bansal, 2013; Obeidat et al., 2014). This scarcity of knowledge may be because, in most health communication campaigns about smoking in South Africa, cigarette smoking health risks have received more emphasis compared to HB smoking health risks. The neglect of publicising HB smoking health risks to the public may have been driven by a lack of emphasis on regulations and policies on HB smoking. Given the fact that this study was done at an institution of higher learning and that participants were university students, it can be assumed that they should at least be aware of the health risks, but that was not the case.

The study found a substantial knowledge gap where the majority of participants had inadequate knowledge in terms of HB health risks. Even though most of the participants agreed that lung cancer is an HB health risk, they showed a lack of knowledge about other health effects. This finding is compatible with the findings of Awan et al. (2016) that one-sixth of participants failed to identify a single detrimental effect, and that most non-user participants did not know that HB can cause diabetes. The lack of knowledge of HB health risks identified in that study agrees with results from other studies such as that by Thabit et al. (2015), who found that some participants identified that HB causes cardiovascular diseases. Although this study did not demonstrate a link between knowledge and HB use, it found that users were more knowledgeable than non-users when it comes to HB health risks. The fact is that both users and non-users may not necessarily be keen to know the health risks of HB smoking or that there are extremely detrimental consequences to smoking a hubbly bubbly.

The present study found that many users and non-users perceived HB to have fewer health risks than cigarettes. This finding is compatible with previous studies where it was found that most participants perceived HB to be less harmful than cigarettes (Akl et al., 2013; Alvur et al., 2014; Al-Naggar & Saghir, 2011; Kakodhar & Bansal, 2013; Singh et al., 2017). The results of this study show that public health education programmes and interventions are urgently needed to address the misperceptions that HB could be less harmful than cigarettes, in order to curb the rise of HB smoking, especially among the youth. This common positive association of tobacco in HBs highlights the need to assess the patterns of

use of other tobacco products apart from cigarettes. This may assist in the formulation of messages that will encompass tobacco products, inclusive of HB smoking. Therefore, examination of the health effects related to the dual-use or multi-use of tobacco products is also imperative. Experimentally, within the exposed groups this study found that among users the knowledge mean difference decreased, which means that they increased their intention to quit smoking.

Concerning these results, Anjum et al. (2008) found that the participants' HB health risk knowledge improved after a health awareness session. Along with Essa-Hadad, Linn & Rafaeli (2015) and Lipkus et al. (2015), it was found that knowledge was linked to wanting to quit and that web-based programs may be a promising tool to reduce HB smoking because they increased the participants' intention to quit smoking cigarettes. However, smoking cessation may be difficult because of people's reasons for HB smoking. These may include peer pressure and its social acceptability in terms of availability and access. Therefore, it is important to implement campaigns to disseminate information regarding HB health risks as well as motivate those who are not sure if they will quit HB smoking and those with no interest in quitting. Interest in HB smoking also decreased among non-users, which means that they reduced their intentions to start smoking. Although these results may show that prevention may be more successful than cessation, this study provided evidence of HB being used at home and social gatherings and users mostly using it with friends. This may play a huge role in HB initiation among non-users.

It was also found in this study that many users and non-users think that the water in the HB pipe filters the smoke, thus removing toxic chemicals. A previous study by Omole, Ogunbanjo and Ayo-Yusuf (2011) found that the participants believed that the water filters the smoke and removes dangerous particles during HB smoking. This study found that a greater number of users and a lesser number of non-users perceived HB as less addictive and health risks as being exaggerated. These results are supported by Daniels and Roman (2013), who found that more HB users than non-users thought the health risks of HB use to be overstated and that HB is less addictive.

RECOMMENDATIONS

South African health promoters should develop prevention and cessation programmes to address the health hazards of HB smoking. Health communication campaigns that will raise awareness and de-glamourise HB smoking might assist in decreasing the social tolerability of HB among the youth and avert the desire for HB use by non-users. Given that many youths spend most of their time on the internet, campaign messages should be developed and circulated on the internet, especially social media platforms, to increase knowledge on the health risks of HB. Furthermore, verbo-visual fear appeal messages should be aggressively used in health communication campaigns in order to influence youth perceptions regarding changes in the perceived severity of smoking HB towards outweighing the perceived benefits. The public should constantly be exposed to messages regarding the dangers of HB to increase their intentions to quit as well as lowering the desire to start smoking by non-users, meaning that the frequency of health communication messages should increase. It should be noted that the study was conducted in a rural area, and that results from an urban area may differ, depending on student experiences and exposure. Given the relative scarcity of literature about the knowledge and perceptions of HB health risks in rural areas in South Africa, in this study, the literature was compared with studies done in urban areas and other countries.

CONCLUSION

This study confirmed findings by many researchers regarding the prevailing paucity of knowledge among university students about the health risks of HB smoking, including the detrimental effects of second-hand smoking. It highlighted the potential effectiveness of exposing university students to HB smoking health risk messages through the improvement of participant knowledge after message exposure. Specifically, after message exposure participant perceptions of the harm presented by HB smoking increased. This study has greater implications for young people not only in South Africa but also in other developing countries who are increasingly engaging in HB smoking, yet who may not be conversant with

related health risks. The research potential for HB is large, and future studies by researchers in South Africa should study discourse areas such as growing trends of HB smoking and how these can influence smoking prevention and cessation interventions. Furthermore, such studies should explore different ways of using digital and social media for messaging about the consequences of smoking HB in line with young people's behaviour of frequently accessing these platforms given that many young people are frequently online.

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APPENDIX A: HB HEALTH RISK POSTER BY CANSA (2015)

HARMLESS HUBBLY BUBBLY OR DEADLY DRUG? THE TRUTH ABOUT HOOKAHS

(Hubbly Bubbly | Water Pipe | Narghile | Shisha | Goza | Hookah | Hub)



WHAT "HARMLESS" HOOKAH CAN DO

It's been proven that smoking hubbly bubbly on a regular basis can lead to...

- **CANCER**
- **LUNG DAMAGE**
- **HEART DISEASE**
- **TUBERCULOSIS**
- **HERPES**
- **EARLY DEATH**



Did you know?

- Using a water pipe to smoke tobacco poses a serious potential health hazard
- It is not a safe alternative to cigarette smoking
- After it has passed through water, the smoke still contains high levels of toxic compounds
- Commonly used heat sources such as charcoal are likely to increase health risk - when combusted, it also produces toxins
- Second-hand smoke of hookahs is a mixture of tobacco smoke and the smoke from the charcoal
- Sharing a water pipe poses a serious risk of transmission of communicable diseases such as herpes and TB
- The sweet smell and taste of some of the tobacco used encourages more people to smoke - many who wouldn't have otherwise
- Smoking a hookah during pregnancy can stunt an unborn baby's growth
- Hookah is especially bad for young children as their lungs are still developing. Smoking can cause permanent damage

Do you think that smoking hubbly bubbly is less harmful than smoking cigarettes? **Think again!**

ONE TYPICAL CIGARETTE SESSION

- 5 to 7 minutes
- 8 to 12 puffs
- 40-75ml of smoke per puff



VS

ONE TYPICAL HUBBLY BUBBLY SESSION

- 20 to 80 minutes
- 20 to 200 puffs
- 0.15 to 1litre of smoke per puff (equivalent to inhaling the smoke of 100 or more cigarettes)



SECOND HAND SMOKE It's just as bad

Whatever you smoke, whether it's a hookah, pipes, cigarettes or cigars you are exposing those around you to the same toxins that you are inhaling. You need to keep the health of others top of mind.

Make it your business

Visit the CANSA website for info on our e-Kick Butt programme or call us toll-free

Kick Butt



Toll-free 0800 22 66 22 www.cansa.org.za