

From Tobacco to Herbal Smoking: Are Healthcare Professionals Ignoring a New Epidemic

Running title: KAP Regarding Herbal Smoking Products Among Healthcare Professionals

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Abstract

Tobacco use remains a significant public health challenge, contributing to millions of deaths annually and various chronic diseases. While global efforts are underway to reduce tobacco consumption through policy interventions, the popularity of alternative smoking products, particularly among youth, is on the rise. Herbal smoking products (HSPs) are increasingly marketed as safer, tobacco-free alternatives, yet evidence suggests that they may pose similar health risks to conventional tobacco. This study aims to assess the knowledge, attitudes, and practices (KAP) regarding HSPs among healthcare undergraduate students in Central India, focusing on Ayurvedic, dental, and medical disciplines. Utilizing a cross-sectional design, we distributed a structured questionnaire to 424 students across three institutions. Our findings reveal alarming gaps in knowledge: only 42.3% of Ayurvedic students recognized the contents of HSPs, with medical students showing limited awareness of their carcinogenic potential. Attitudes varied significantly, with many Ayurvedic students falsely believing HSPs reduce cancer risk, while support for banning these products was stronger among medical students. Although regular use of HSPs was low, a concerning proportion had experimented with them, highlighting the need for targeted education. This study underscores the critical role healthcare professionals play in public health advocacy and the urgent need for comprehensive educational strategies to combat the misconceptions surrounding herbal smoking products, particularly among youth.

Keywords: Alternative Tobacco Products, Dental Student, Health Professionals, Herbal Cigarettes, Tobacco, Tobacco Cessation,

Introduction

Tobacco use remains one of the most significant public health threats, responsible for millions of deaths annually and contributing to numerous chronic diseases, including cardiovascular disease, respiratory illness, and various forms of cancer¹. Where on one hand global efforts to curb tobacco use through policy interventions and awareness campaigns, are being carried out on another hand alternative smoking products are gaining popularity, particularly among chronic smokers and the younger demographic seeking less harmful alternatives. Among these alternatives are nicotine replacement therapies (NRTs), electronic cigarettes, and herbal smoking products (HSPs). HSPs are gaining more popularity as these products are often marketed as safer or healthier options due to their perceived "natural" or "organic" nature, thus appealing to users who are either trying to quit smoking or who perceive these products as less harmful².

Herbal smoking products (HSPs), in particular, have gained attention for being marketed as tobacco-free or nicotine-free cigarettes and herbal Hookahs, suggesting that they can reduce the hazards associated with conventional tobacco smoking. These products are typically composed of a mixture of various herbs, such as mint, rose petals, and other plant materials, and are often promoted as an aid in reducing the smoking habit or as a healthier option for smokers who wish to continue smoking without the risks associated with nicotine³. However, there is increasing evidence that HSPs may not be as safe as their marketing suggests. Studies indicate that while these products may not contain tobacco, they do contain other harmful substances, including carbon monoxide, nitrosamines, and polycyclic aromatic hydrocarbons, all of which are known to contribute to serious health risks⁴.

Furthermore, research has shown that the DNA damage response caused by smoking herbal products is similar to that observed with conventional smoking, indicating that HSPs may carry carcinogenic potential. The combustion of herbs in HSPs produces toxicants and carcinogens akin to those produced by burning tobacco, raising concerns that HSPs may be just as harmful as conventional smoking products⁵. Additionally, because herbal smoking products closely mimic the experience of smoking conventional cigarettes, they may act as a gateway to tobacco smoking, especially among adolescents and young adults who are susceptible to experimentation and peer pressure⁶. The resemblance in the sensory experience and the act of smoking between HSPs and conventional cigarettes may inadvertently reinforce the smoking habit rather than diminish it.

Adolescents and young adults, in particular, are highly vulnerable to the risks associated with herbal smoking products. The transition from adolescence to adulthood is often marked by experimentation, and peer influence plays a significant role in the adoption of behaviors such as smoking. Many young individuals, aware of the dangers of tobacco smoking, may turn to HSPs under the misconception that these products are a healthier or safer alternative. The appeal of HSPs is further compounded by their marketing, which often emphasizes natural, organic ingredients, leading to the false belief that these products are harmless⁷. Studies have shown that even educated youth, who are aware of the dangers of conventional smoking, may fall prey to the marketing tactics surrounding HSPs and begin using them as a supposedly healthier alternative⁸. These smoking products are being sold without any age restriction on the pretext of being nicotine free and a safer alternative to tobacco smoking thus imbibing habit of early smoking amongst youngsters⁹. According to the recent amendments in the Cigarettes and Other Tobacco Products Act (COTPA)—India (2015), 85% of the tobacco packaging should display the health hazards of smoking. By contrast, HSP packaging misguides customers by mentioning the 'herbal' nature and 'tobacco-free' content, and highlighting the self-proclaimed health benefits. The manufacturers even use deceptive brand names like 'Nirdosh' and 'Aarogyam', implying that these products are disease free and healthy, thereby sending a wrong message to their customers¹⁰. The manufacturers also attract customers by offering huge discounts, increasing the likelihood of sales. Additionally, the manufacturers do not display any age-related disclaimers or adverse health related warnings on their packages¹⁰.

Healthcare professional students may it be dental, medical Ayurveda all play a crucial role in public health advocacy and patient education. Their knowledge, attitudes, and practices regarding herbal smoking products directly influence their ability to provide accurate information, dispel myths, and guide patients toward healthier choices. Additionally, healthcare professionals are trusted sources for smoking cessation advice, so their awareness of herbal products and potential misconceptions is vital in shaping patient behavior and overall public health outcomes. A comprehensive understanding of their perceptions toward HSPs will not only help in educating future healthcare professionals but also aid in the design of targeted awareness campaigns to reduce the growing prevalence of HSP use among youth. Hence, we conducted this study to assess knowledge attitude and practice about herbal smoking products among undergraduate healthcare professionals in central India.

Materials and Methods

Study Design:

The present study employed a cross-sectional design aimed at evaluating the knowledge, attitude, and

practices (KAP) of herbal smoking products among healthcare undergraduates.

The study was conducted in Central India, encompassing undergraduate students from three major government healthcare institutions: Ayurvedic ,Dental ,Medical

These institutions were selected as they represent a broad spectrum of healthcare education in the region, allowing for a comparative analysis between students of traditional medicine (Ayurvedic) and those studying modern medical practices (Dental and Medical).

The primary data collection tool was a structured pre - validated questionnaire, designed to gather information on the students' knowledge, attitudes, and practices regarding herbal smoking products.

The questionnaire was divided into four sections:

Q1 to Q4 : Demographic Information: Including age, gender, year of study, and college.

Q5 to Q12: Knowledge Assessment: Comprising questions related to the awareness and understanding of herbal smoking products.

Q13 to Q18: Attitude Assessment: Designed to gauge students' perceptions and beliefs about the cultural acceptability and health effects of herbal smoking.

Q19 to Q21: Practice Assessment: Focused on whether students had used or tried herbal smoking products, how often, and under what circumstances.

Data Collection Process:

The questionnaire was circulated on WhatsApp to students of Government Dental, Medical and Ayurveda colleges. Reminder was sent weekly to fill the form. Data collection took place over a period of two months. After which we stopped accepting responses. A small message was attached with the questionnaire citing the importance of survey and that completing the questionnaire is giving consent. At the end of 2 months, we received A total of 424 responses.

Ethical clearance was obtained from the Institutional Ethical Committee (IEC) of the institute before the commencement of the study

Results

This study enrolled 424 healthcare professionals, with 258 (60.8%) females and 166 (32.9%) males. Among the students, 194 (45.8%) were Ayurvedic students and 167(39.4%) dental students 63 (14.9%) were medical students. A detailed demographic breakdown is presented in table1, revealing no significant differences between faculty of education.

Table 1

Item		Fr eq ue nc y	Percentage
G e n d	Fe mal es	25 8	60.8
	Mal es	16 6	39.2

	e r			
	F a c u l t y o f s t u d y	Den tal	16 7	39.4
		Ayu rve da	19 4	45.8
		Me dica l	63	14.9
	Y e a r o f s t u d y	Firs t year	10 1	23.8
		Sec ond year	71	16.7
		Thir d year	90	21.2
		Fin al year	65	15.3
		Inte rnsh ip	97	22.9

The **graph 1** displays the comparative knowledge about herbal smoking products (HSP) among Ayurveda, Dental, and medical students across several domain. Only 42.3% of Ayurveda students knew the contents of herbal smoking products, compared to 29.3% of Dental and 20.6% of medical students, indicating limited awareness across all groups. The difference in knowledge is statically significant ($p = 0.002$)

Knowledge about Flavors was higher among medical students (55.6%). Dental students showed greater awareness (50.9%) regarding the ill effects of herbal smoking products on the body. Dental students had the highest awareness of herbal smoking products containing tobacco (65.6%). The knowledge of whether herbal smoking products contain carcinogens was relatively low, with medical students at 39.7%. Awareness of health warning signs on herbal smoking products was higher among Medical (88.1%) students which was significantly ($p=0.001$). medical students had the highest awareness regarding compliance with COTPA (69.8%).

Table 2 shows the attitude of healthcare protectional regarding HSPs. The responses reveal that most

Ayurveda students (68%) believe herbal cigarettes reduce cancer risk. Ayurveda students (65.5%) also considered e-cigarettes more helpful for cessation than Dental (41.9%) and Medical (54%) students. A large majority from all groups agreed that herbal smoking products should carry health warnings. Support for banning herbal smoking products was strongest among Medical (63.5%) and Ayurveda (60.8%) students, with Dental students (52.7%) slightly less supportive. Most students believed they had enough knowledge about herbal smoking products and agreed they should be fully informed about them.

The survey shows that very few students regularly smoke herbal products, however A slightly higher percentage has tried herbal smoking products. When it comes to recommending herbal smoking products as an alternative to tobacco, 52.1% of Ayurveda students and 55.6% of medical students were in favor, while Dental students were more hesitant, with only 36.5% recommending them.

Graph 1 : knowledge regarding HSPs

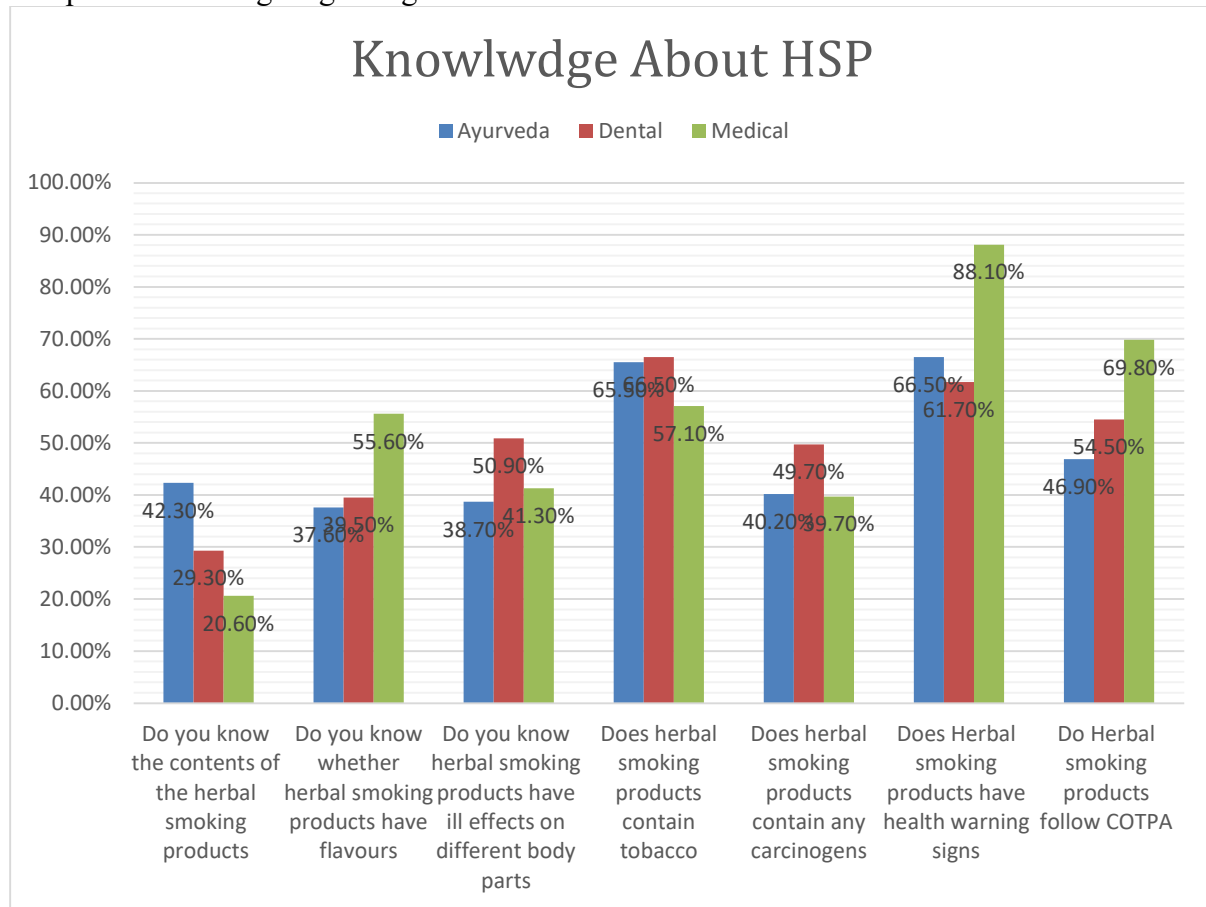


Table 2 Attitude

Question	Ayurveda	Dental	Medical
Do you believe that Herbal cigarettes lower the risk of cancer for			

	patients who use them instead of smoking traditional cigarettes.							
	Do you believe e-cigarettes are a helpful aid for smoking cessation							
	Should herbal smoking products be sold with health warning							
	Should herbal smoking products be banned							
	As a health care Professional do you think you have enough knowledge about HSP							
	As a healthcare professional do you feel you should							

	have all the knowledge about herbal smoking products							
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Table 3 Practice

	Question		A y u r v e d a		D e n t a l		M e d i c a l	
	Do you smoke any herbal products regularly (cigarettes or hukkahs)							
	Have you ever tried any herbal smoking products (cigarettes or hukkahs)							
	Will you recommend herbal smoking products as alternative to tobacco smoking							

	products for your patients.							
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Discussion

HSPs marketed as harm reduction strategies is creating a deceptive allure among youngsters. And to decode these strategies it is important for the future healthcare professional to be completely aware of these strategies. This study examined the knowledge, attitudes, and practices (KAP) of Ayurveda, Dental, and Medical students regarding herbal smoking products (HSPs). Our results reveal important insights into how healthcare students perceive HSPs, highlighting both misconceptions and areas where further education is needed.

Majority of our participants (45.8%) belong to ayurved faculty, this may be because the word “Herbal” was more associated with their curriculum. This also indicates that most youngsters may be attracted towards HSP because of the word Herbal.

Regarding knowledge, majority of students were unaware about the content of HSPs. Many were not aware that HSPs can also cause cancer This is consistent with prior studies showing that healthcare professionals, even in training, often lack comprehensive knowledge about alternative smoking products^{1,2}. In pretext of being Herbal these HSPs find loopholes in the COTPA law and only 46.90% ayurveda students were aware about it³.

The students’ perceptions of the health risks associated with HSPs varied. A significant proportion of students believed herbal cigarettes lower cancer risks compared to traditional cigarettes, with 68% of Ayurveda students, 61.1% of Dental students, and 55.6% of Medical students endorsing this belief. This misconception aligns with findings from other research, where healthcare students exhibited limited knowledge about the actual harms of alternative smoking products. This highlights a critical gap in education, as herbal smoking products still generate harmful toxins, including carbon monoxide and tar, which are linked to cancer and respiratory diseases¹⁴.

Majority of students in all groups did not regularly smoke herbal products, with. These findings align with previous studies that show healthcare students tend to avoid smoking themselves, reflecting an understanding of the health risks involved¹⁵. However, a significant portion had experimented with HSPs, with 18.6% of both Ayurveda and Dental students, and 34.9% of medical students having tried these products. Previous studies have also proven that healthcare professional have tried tobacco¹⁶. This highlights a potential area of concern, as curiosity and experimentation with these products remain prevalent, despite their known risks.

Additionally, most students (80.9% of Ayurveda, 76.6% of Dental, and 76.2% of Medical students) agreed that herbal products should carry health warnings. However, fewer supported a complete ban on these products, with 39.2% of Ayurveda, 47.3% of Dental, and 36.5% of Medical students favoring a ban. This hesitancy may stem from the belief that herbal smoking products offer a safer alternative, despite increasing evidence suggesting otherwise¹⁷. Interestingly, when asked if they would recommend herbal smoking products as an alternative to tobacco, Ayurveda students were the most likely to do so (52.1%), followed by Medical students (55.6%), while only 36.5% of Dental students would support such recommendations. This difference may reflect varying levels of exposure to

smoking cessation training across these disciplines¹⁸. Previous studies have reported similar findings, where medical students were more likely to recommend e-cigarettes or herbal products as harm reduction tools, despite evidence questioning their efficacy and safety.

As healthcare providers play a pivotal role in guiding patients toward healthier choices, this knowledge gap could hinder effective counseling on smoking cessation. Furthermore, 90.2% of Ayurveda students, 83.2% of Dental students, and 87.3% of medical students expressed that they should have more knowledge about HSPs, indicating a willingness to learn and an opportunity for targeted educational interventions.

In comparison with global data, our findings echo similar trends seen in studies conducted in other countries, where healthcare students demonstrate varying levels of understanding regarding herbal and alternative smoking products¹⁸. For instance, studies in Europe and North America also report that while students are aware of the risks of traditional tobacco, there remains a persistent belief in the safety of alternatives such as herbal cigarettes and e-cigarettes.

Conclusion

The study reveals that healthcare undergraduate students possess limited knowledge about herbal smoking products. Alarmingly, many students express a willingness to prescribe herbal cigarettes as alternatives to traditional cigarettes without fully understanding their harmful effects. Therefore, it is crucial to educate students about these products so they can effectively raise awareness in the general public. While changes in policy are necessary, they alone are insufficient; comprehensive education for healthcare professionals is essential as herbs may too cause cancer.

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