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Knowledge, attitude, and behavioral intention about oral cancer among public health students in Southeast Georgia

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ABSTRACT

Background: Oral cancer (OC) is a significant public health problem; however, the degree to which the future public health workforce is aware of this issue is not well researched. The purpose of this study is to explore the level of knowledge, attitudes, and behavioral intentions about OC among public health students.

Materials and Methods: A sequential exploratory mixed-method research design was employed for this study. Using quantitative and qualitative measures, a survey was administered to 129 public health students. Subsequently, to understand the quantitative findings, two follow-up focus groups were conducted with survey participants.

Results: We found that participants had some knowledge about OC risk factors, but they were not aware of survival rate of it. About 58.9% of the participants responded the survival rate for OC is 'more than 61%'. The majority of the respondents (67%) had never heard about OC exams. In the focus group, four major themes were identified: lack of knowledge, strategies to educate the community about OC, current public health practices around OC prevention, and role of public health professionals in this. Participants felt the need for collaboration between oral health and public health to raise awareness about OC in the community.

Conclusion: Participants' knowledge and awareness about OC was encouraging but at the same time, it raised a concern about their competency in OC prevention interventions. Ensuring holistic oral health education through the coordination of public health and oral healthcare services can play a critical role in preparing future public health workforce for OC prevention.

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1. Introduction

Oral Cancer (OC), also known as mouth cancer, falls under the category of head and neck cancers. According to the American Cancer Society, 54,000 people in the United States (U.S.) will have a positive diagnosis of OC with 11,230 deaths in 2022.¹ Overall, 5-years survival rate for this cancer is 68% with the highest survival among persons with the localized stage of cancer (86%). Nevertheless, only 28% of OC cases are at a local stage at the time of

diagnosis.² Like any other cancer, it has a diverse etiology that includes infectious agents and unhealthy behaviors. Historically, tobacco and alcohol consumption were two major risk factors for OC.¹ However, in the last two decades, Human Papilloma Virus (HPV), the most common sexually transmitted virus in the US, emerged as a novel risk factor for OC. The prevalence of HPV-associated OC has risen dramatically from less than 20% to more than 70% with an increased rate of 7.55% per year in the US.³ Unhealthy sexual behaviors can partially explain the phenomena, especially for the increased prevalence of disease in younger adults.⁴ Stock et al. (2012) reported that

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there is a higher level of willingness for oral sex among college students.⁵ Further, there is a significant association between oral HPV infection and oral sex partners or open-mouthed kissing partners.⁶ A similar study evaluated the additive effect of tobacco, alcohol, and HPV infection and found no significant synergistic effect.⁷ It demonstrates HPV infection as an independent risk factor for OC.

It has been more than four decades since researchers started underscoring the risk factors for OC and identifying preventive strategies.^{8–10} However, there continues to be a lack of awareness among the public regarding OC risk factors, and prevention factors such as screening for early detection.^{11,12} For instance, Williams et al. (2015) found that the majority of their study participants were aware of HPV-associated cervical cancer but not OC.¹³ Therefore, continued efforts for proactive screening and comprehensive educational interventions are necessary to improve OC awareness among high-risk groups.

Informing, educating, and empowering people about health issues is one of the 10 Essential Public Health Services mandatory for state and local public health departments.¹⁴ Health education and promotion can play a substantial role to increase awareness regarding the risk factors of OC and promote good oral health in communities. However, to organize an effective OC awareness program, the current and future public health workforce should have adequate knowledge regarding the risk factors for OC and a positive attitude toward its prevention. A rich body of research evidence exists about the knowledge, attitudes, and behaviors concerning OC among dental professionals, dental students,^{15–17} medical professionals,^{18,19} and nurses.²⁰ However, there is a lack of research, focused on public health workforce knowledge regarding the early detection and prevention of OC, given their vital role in raising awareness of different public health issues.

The purpose of this study is to explore the knowledge, attitudes, and behavioral intentions regarding OC among public health students in rural Georgia. The study findings will inform efforts aimed at preparing a public health workforce that is knowledgeable and motivated to organize effective OC prevention programs when they assume their roles as public health professionals.

2. Materials and Methods

The study used a mixed method, sequential explanatory design as it included the collection and analysis of quantitative survey data, followed by the collection and analysis of qualitative data through focus group discussions.²¹ The authors adopted and modified a survey instrument from another study focused on healthcare professionals.²² The study participants were public health students enrolled at a school of public health in rural Georgia. With the assumption that first-semester

undergraduate students would have lower knowledge regarding public health, they were excluded from the study. A convenience sampling technique was implemented to recruit the study sample. Instructors agreeing to have their classes participate in the survey after a class session were asked to allow permission to communicate with students for obtaining their consent and distributing a paper-pencil self-administered survey instrument. Participation was voluntary and all students were informed about the anonymity of the survey. No identifiable information was collected. To understand the meaning of quantitative findings, two focus groups were conducted. The purpose of the focus group was to explore the strategies that can be implemented to engage public health students and colleges to increase OC awareness in the communities. Each focus group had eight individuals. The number was considered sufficient based on the theoretical saturation. In addition, one didactic interview (two participants) was conducted with two participants who were originally scheduled for the focus group, but could not participate on the day of the discussion.

2.1. Measures

The survey instrument consisted of 27 items under five different sections. Each section had a specific focus such as demographic characteristics of participants, general knowledge about the prevalence and symptoms of OC, risk factors, attitude towards OC prevention, and role of public health professionals in early detection as well as prevention of OC. Five variables were used to measure participants' general knowledge concerning OC are presented in Table 1. Participants' knowledge about symptoms of OC was measured through 7 statements, with response categories yes, no, and don't know (Table 2). Six variables were presented in Table 3 used to capture study participants' knowledge about the degree to which certain activities and actions contribute to the risk of cancer. The responses were recorded on a Likert scale—definitely increases, probably increases, probably does not increase, definitely does not increase, and don't know/no opinion. To measure the attitudes and behavioral intentions of participants relative to OC prevention we used six variables measured on the Likert scale of strongly agree, agree, disagree, strongly disagree, and don't know, as outlined in the Table 4.

2.2. Analysis

The quantitative data were analyzed using Statistical Package for Social Science (SPSS) version 23. Quantitative analyses were primarily descriptive. MAXQDA was used to analyze the qualitative data. All audio-recorded focus group was transcribed verbatim. A number was assigned to each participant during transcription. Field notes were transcribed into a Microsoft Word document. A codebook was developed based on the focus group guide, which

was modified during the open-code phase. After the initial thematic coding, the text was sorted to identify themes and sub-themes. To establish the reliability of coding, a second coder coded over 20% of the interviews, and discrepancies were discussed and addressed. Finally, the findings were elaborated on and examined.

3. Results

A total of 129 students participated in the study. Among participants, about 83% were female and 17% male. The majority of the respondents identified as Black or African American (49%) followed by White (45%). The mean age of the participants was 22.7 years. About 93% of the students were either in the second semester or higher in their degree program.

3.1. Knowledge, attitude, and behavioral intention about OC prevention

The majority of the participants believed that males were at much greater risk of OC than females; 58.9% thought this type of cancer is more common among males compared to 6.2% that reported it was more common among females whereas a substantial proportion (16.3%) did not know in which gender category it was more common. Similarly, for the age category, 14.1% did not know in which age category the OC is more frequent. Most of the participants responded gum (60.2%) and cheek (21.1%) are the most common sites for OC. About 25% of the participants responded the survival rate for OC is 'more than 80%' and the majority of the respondents (67%) had never heard about OC exams (Table 1). More than 80% of the participants responded following as symptoms of OC: persistent white or red spot (93%), abscess/boil/infection (84.5%), mouth ulcer that does not heal (90.7%), lump/tissue overgrowth (91.5%), and bleeding from mouth (80.6%). About 62% of the participants recognized 'difficulty in mouth opening' as a symptom of OC with 20.2% stating it as 'Don't know' (Table 2). More than 80% of the participants believed that 'tobacco use' and 'oral sex associated HPV' definitely or probably increased the risk of OC (Table 3). About 33% reported regular alcohol consumption 'definitely increases' the risk for OC. For eating hot spicy food, about 33.4% responded as 'definitely increases' or 'probably increases' risk for OC. More than 90% of the participants mentioned they 'strongly agree' or 'agree' to the statements that 'early discovery can increase the success of OC treatment' and 'public health professionals can contribute to OC risk reduction'. About 65% either 'strongly agree' or 'agree' that they intend to discuss OC prevention in any tobacco cessation program in my future career (Table 4).

Table 1: Descriptive statistics about study participants' general knowledge concerning oral cancer

Variable	Frequency	% Yes
Oral cancer is more common in:	129	
Males	76	58.9
Females	8	6.2
Both equally	24	18.6
Don't know	21	16.3
Oral cancer is more frequent in:	128	
Young adults to 25 years	15	11.7
Adults up to 45 years	41	32.0
Adults older than 45 years	54	42.2
Don't know	18	14.1
The common site for oral cancer:	128	
Gum	77	60.2
Palate/top of mouth	9	7.0
Tongue	10	7.8
Floor of mouth	5	3.9
Cheek	27	21.1
Survival rate for oral cancer:	129	
20% or less	3	2.3
21-40%	21	16.3
41% - 60%	29	22.5
61%-80%	44	34.1
More than 80%	32	24.8
Have you ever heard of an exam for oral cancer?	129	
Yes	39	30.2
No	86	66.7
Refused	2	1.6
Don't know	2	1.6

3.2. Qualitative findings

Among the focus group participants, 16 students were female and two were male. First, open codes were generated from the focus group transcripts. Then, the following major themes were identified based on relationships among the codes: lack of knowledge, strategies to educate the community about OC, current public health practices around OC prevention, and the role of public health professionals in OC prevention.

3.3. Lack of knowledge

The lack of knowledge regarding OC was identified as a major concern in the group discussion. A majority of the participants were familiar with the term OC and common risk factors. Tobacco and cigarette smoking were highly recognized risk factors in the discussion. Other responses included HPV infection, chemicals, chronic drinking of alcohol, poor oral hygiene, lifestyle, genetics, and age. But they had a lack of knowledge regarding the prevalence of the disease. Participants also reported OC is not one of the

Table 2: Knowledge about symptoms of oral cancer among respondents

Symptoms of oral cancer	Yes N (%)	No N (%)	Don't know N (%)
Persistent white or red spot	120 (93)	3 (2.3)	6 (4.7)
Abscess, boil or infection	109 (84.5)	11 (8.5)	6 (4.7)
Mouth sore (ulcer) that does not heal	117 (90.7)	5 (3.9)	5 (3.9)
Difficulty in mouth opening	80 (62)	23 (17.8)	26 (20.2)
Lump or tissue overgrowth	118 (91.5)	2 (1.6)	8 (6.2)
Bleeding from mouth	104 (80.6)	13 (10.1)	12 (9.3)
Difficulty in swallowing	92 (71.3)	24 (18.6)	13 (10.1)

Table 3: Knowledge about risk factors of oral cancer among respondents, by the degree to which certain activities and actions contribute to the risk of cancer

	Definitely increases	Probably increases	Probably does not increase	Definitely does not increase	Don't know/no opinion
Eating hot spicy foods	10 (7.8)	33 (25.6)	44 (34.1)	23 (17.8)	19 (14.7)
Regular alcohol drinking	43 (33.3)	59 (45.7)	17 (13.2)	1 (0.8)	9 (7.0)
Tobacco use in any form	114 (88.4)	14 (10.9)	1 (0.8)	0	0
Frequently biting the cheek or lip	17 (13.2)	42 (32.6)	41 (31.8)	14 (10.9)	15 (11.6)
Oral sex-associated HPV (Human Papilloma Virus) infection	78 (60.5)	33 (25.6)	6 (4.7)	1 (0.8)	11 (8.5)
Less consumption of fruits and vegetables	22 (17.1)	49 (38.0)	28 (21.7)	13 (10.1)	17 (13.2)

Table 4: Assessing attitude and behavioral intention of participants toward oral cancer prevention

	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
Getting mouth cancer is a matter of luck and we cannot do anything to prevent this.	0	4 (3.1)	41 (31.8)	79 (61.2)	5 (3.9)
The early discovery of this cancer can increase the success of oral cancer treatment.	99 (76.7)	27 (20.9)	1 (0.8)	0	2 (1.6)
Public health professionals can contribute to reduce the risk of cancer of the mouth.	89 (69.0)	36 (27.9)	0	0	4 (3.1)
I intend to discuss oral cancer prevention in any tobacco cessation program in my future career.	45 (34.9)	39 (30.2)	6 (4.7)	2 (1.6)	37 (28.7)

major cancers like lung cancer, or cervical cancer. Overall, they did not consider OC as life-threatening. One of the participants mentioned,

“I don't know the statistics; I can't really say it is a big deal. I am not sure about the prevalence. How serious it is.”

Participants also said that for diseases like OC, community members think that it is individual's fault because they might have not taken care of their mouth. Few participants expressed it as a controversial subject as oral sex is a risk factor for HPV-associated OC, which generates a stigma in community to discuss OC. A participant stated,

“If OC is related to HPV which is being discussed in media then it will become stigma and people may not talk about it.”

Strategies to educate community about OC: Participants discussed different strategies that can be considered to raise awareness about OC in community. They identified the need of discussing OC in community and health fairs. Participants highlighted the role of marketing in public health education and promotion and discussed how commercial posters and flyers can be used in health education. They suggested that dentists should provide OC education flyers in their patient waiting rooms. In addition, disturbing videos or commercials can be used to garner attention. Participants expressed the importance of data and evidence to demonstrate the severity and susceptibility of the disease. They also stated that celebrities or influential people can be involved to raise awareness.

Further, they suggested that there should be a collaboration between dental hygiene students and public health students to increase community members' understanding of OC. Following quotes support it:

"Just because it is due to a lot of those population that at least participate in those life style choices that cause OC. I don't think people are quite aware that what is going to happen?"

"If we encourage dentist to put flyers in every room, while people waiting."

"More marketing, commercials, posters that talk about oral health."

One participant said that the risk of OC should be more prominently displayed on cigarette packets. The participant stated, "Should increase the size of the written structure on cigarette smoking pack. Even they write, no one read it." But other participants disagree while stating that "it does not matter."

Current public health practices around OC prevention: Participants agreed that there is gap between dentistry and public health. They shared that OC is not being discussed in their classes. Only one participant said that it was discussed in their intern class and that was also not about OC. It was about oral health in general. In classes, they have heard about other cancers but not OC. Participants explained that they have heard about risk factors of OC but never discussed their association with OC. Participants stated,

"We work a lot with doctors and hospital settings or general practitioners; I don't hear much about working with dentists."

"We heard about dipping or tobacco but never tied to OC. They tie it to lung cancer."

Participants stated that in public health practice, it is a custom to discuss certain set of things. They agreed that OC is not evident in public health professionals' priorities because they do not consider it a life-threatening disease. Limited resources such as funding for oral health promotion were mentioned as another reason to rank it low. They also agreed that it is not in the public health curriculum. One participant articulate.

"It can sound bad. But sometimes, it is a kind of fashion. There is one set of things, people talk about, and people care about. Someone can come and do one big campaign. I feel like it is not the thing to do, to talk about."

3.4. Another participant added

"You don't look at OC as life-threatening as some other cancer or other things that hurt you. So you are kind off juggling two balls. You focus on something which is more life-threatening. That's what people do."

Role of public health professionals in OC prevention: Participants described that public health is a field of prevention and any cancer, if it is preventable, should be considered a public health issue.

"We are in the business of prevention and when it is preventable cancer then it is definitely a public health issue."

They stated that public health professionals can educate community members and can also organize awareness campaigns at the college level. They also identified the need for collaboration between public health practice and dental practice as both complement each other. In addition, they suggested that in order to increase awareness of OC, it should be included with other public health issues such as cervical cancer and breast cancer. The quote below speaks to the argument:

"Because you know each side make each other better. Public health educators are greater in awareness while dentist are the one who actually find and diagnose. So they should work together and help each other. That would be the best course of action to take to follow on."

From the focus group discussion, the following strategies were highlighted to engage public health professionals and/or students in OC prevention:

Public health professionals should be informed about OC. They need more education to increase their awareness and knowledge. A participant explained, "If they will be aware, they can take steps to educate others. How can we educate rest, if we don't know anything?"

Public health professors should talk about OC in their classes. It should be added to the list of class assignment or research topics, which will raise the importance of this topic. A participant said, "If we don't hear about it, we may not apply when we will be working with population." Another participant quoted:

"Because if you (are) not gonna talk in class you really don't find it interesting or may not look into it without hearing first in class room because for me I don't or hardly study anything that I don't hear in class."

All participants agreed that it should also be included in public health curriculum. They expressed their interest in hearing from professors passionate and/or have research experience about oral health/OC. All participants agreed with one who stated.

"They need to bring the research here. I don't know if professor here are specialize in this. Like we have one professor, expert in prostate cancer. Now it is being discussed. Was that discussed last year? They need to have some research here to increase that knowledge evidence based for preventive services."

4. Discussion

This study explored the level of knowledge, attitude and behavioral intentions about OC prevention among public health students in southeast Georgia. This is the first study, to our knowledge, to initiate the conversation with potential public health workforce, i.e. public health students, to engage them in OC prevention. Existing studies in the literature have focused on dentists,¹⁷ dental students^{15,16}

nurses²⁰ and medical professionals,^{18,19} but not public health professionals. We found that public health students, the future public health workforce, have basic knowledge about OC risk factors. However, they have lower knowledge about the survival rate and an exam for OC. About 41.1% of the respondents reported survival rate less than 61%. Less than one third of the participants (30.2%) have ever heard of an exam for OC. The findings are consistent with previous studies where non-dental health professionals have limited knowledge about OC.^{23,24} Öhrn et al. also found in their study that nurses with lower knowledge of oral care were most uncomfortable discussing oral hygiene with their patients.²⁵ It implies that knowledge about OC among public health students must be improved to engage them in the early detection and prevention of OC.

The five-year survival rate for OC is 68%, which is significantly low as compared to other common cancers such as breast cancer (91%) and prostate cancer (97%).² The survival for OC can be improved with early detection of cancer.¹ However, routine OC screening is not recommended by the U.S. Preventive Services Task Force,²⁶ thus the diagnosis of disease depends heavily on patient's knowledge about its symptoms and self-referral.²⁷ Luryi et al. (2014) explored public awareness about head and neck cancers including OC and discussed that participated adults have lower awareness about head and neck cancers risk factors particularly an association of HPV with OC.²⁷ In addition, when it comes to HPV, people are more likely to relate it with cervical cancer than OC, attributing higher awareness of HPV vaccine among women. The qualitative findings of our study indicated that public health students perceived low knowledge about OC and associated risk factors among public. They discussed that it is one of the least discussed cancer and suggested awareness campaigns at patients and community level.

We also found a gap between public health and oral health in focus group discussion of this study. Participants acknowledged the role of dentists in OC prevention, however, they agreed that the role of public health professionals in raising awareness about public health issues cannot be underestimated.^{28,29} Public health professionals play a key role in health promotion and disease prevention. It is a nonclinical pillar of health care system, which focuses on social, environmental, and behavioral determinants of health problem. The mounting body of literature demonstrated the success of community-based, cancer awareness interventions.^{30–32} About two decades ago, Jenkins et al. (1999) conducted a study to evaluate the effectiveness of media-led community outreach intervention designed to promote breast and cervical cancer screening.³³ There was significant increase in knowledge, recognition, and intention towards cancer screening. Jenkins et al. suggested culturally sensitive community based programs as an appropriate strategy for early detection of

cancer.³³ Stewart et al. (2018) summarized the National Comprehensive Cancer Control Program (NCCCP) efforts in combating cancer and highlighted the importance of multilevel collaboration to address barriers across cancer control continuum.²⁹ It implies that for an effective OC awareness intervention, public health professionals led multilevel efforts are necessary. Participants in the current study also suggested collaboration between dentists and public health professionals to raise awareness about OC in the community.

Oral health has an integral role in overall health; however, there is a historical separation between oral and general health in the U.S. The segregation of oral health from other health care starts very early in the education system and moves across the field from service delivery to payment/insurance coverage. This separation is more critical for underserved communities with low access to oral health care and higher burden of oral health problems. The U.S. Department of Health and Human Services emphasized the need of integration between oral and general health care in their report of 'Oral Health in America- Advances and Challenges'. To address OC, this integration is needed more than ever given increasing rate of HPV associated OC and increasing migration of people from countries with higher burden of OC. In the current study also, students proposed strategies to initiate conversation regarding OC and/or other oral health issues by 1) having faculties with oral health research, and 2) adding oral health problems in list of course assignments. It can potentially motivate public health students to explore community oral health promotion as a career and/or research track and raise awareness about oral health problems including OC in the communities.

Our findings are helpful to understand the public health students' knowledge and their perceived role in OC prevention, and thus have several implications for public health education system and practice. While future research is needed to explore the attitude and perception of public health leadership in OC prevention, however, these findings can be implemented to open a dialogue in public health institutes to build a collaboration between oral health and public health professionals to advance community oral health by raising awareness about OC. Further, public health instructors can utilize these findings to explore the opportunities of adding oral health related topics in their courses to promote oral health discussion in public health colleges.

The primary strength of the study was the mixed-method research design. The most significant limitation of the study was the convenience sampling technique. Secondly, the findings cannot be generalized to public health practitioners because the participants were future public health workforce and not the current workforce. Students with public health degrees do not always work in public health practice. Third, social desirability may have introduced a bias in

students' underlying enthusiasm relative to their reported enthusiasm toward addressing OC. Future studies should be conducted among public health professionals as well as oral healthcare providers, to explore their attitudes toward oral-public health collaboration.

5. Conclusion

Ensuring holistic oral health education and oral healthcare through the coordination of public health and oral healthcare services can play a substantial role in the awareness of OC risk factors and promote good oral health across communities. In order to organize an effective OC awareness program, public health curricula should consider adequate emphasis on oral health as a public health issue, including knowledge of risk factors and disease prevention strategies as well as health equity issues in oral health. Further, public health students should be sensitized about the role of oral health in determining the general health of people. By placing a greater importance on the provision of oral health promotion and cancer-prevention competencies to public health students, the schools and programs of public health can play a key part in shaping the attitude of the future public health workforce toward better oral health in the communities they will serve. It can be considered as a first step towards preparing public health professionals in making oral health a centerpiece of population health.

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None.

7. Conflict of Interest


None.


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