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HPV-Associated Oropharyngeal Cancer: Knowledge and Attitude/Beliefs Among Non-Clinical Staff At Community-based HIV/AIDS Service Organizations (ASO) In The South United States (U.S.) Census Region.

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Abstract

This study describes knowledge and attitude/beliefs about HPV-associated oropharyngeal cancer among non-clinical staff, at community-based HIV/AIDS Service Organizations (ASOs) located in the Southern U.S. states of South Carolina and Texas. It also explores the difference in knowledge and attitude/beliefs between Texas-based (n=21) and South Carolina-based (n=30) ASO staff. The ASOs in our study provide comprehensive HIV prevention, supportive, and care services to individuals living with HIV/AIDS or at-risk for HIV/AIDS, through partnerships and collaborations. We collected data from the two Texas-based ASOs in 2018, and the three South Carolina-based ASOs in 2016, via a 118-item, self-administered needs assessment survey. Data were analyzed using Stata/SE 15.1. Over half the study participants were females (59%), black (78%), heterosexual (61%), mean age (years) 44.2 ± 12.8 SD. Most participants (73%) believed that quitting smoking positively impacts health. Alarming though, only 32% were aware about HPV as a risk factor for oropharyngeal cancer, and over half (53%) were unsure about the success of the HPV vaccine in preventing oropharyngeal cancer. In addition, there were no statistically significant differences observed in the oropharyngeal cancer-related knowledge and attitudes/beliefs, between ASOs in Texas and South Carolina. ASO staff work closely with People living with HIV (PLWH), who are disproportionately affected by HPV-associated cancers. The low/poor knowledge and attitudes/beliefs regarding the role of HPV in causing oropharyngeal cancer ascertains the need for equipping community health workers with adequate education/training, that improves their knowledge and attitudes/beliefs about the role of HPV in causing various forms of cancer.

Keywords

Human Papillomavirus (HPV); HIV/AIDS Service Organizations (ASO); Oropharyngeal cancer; knowledge; attitude/beliefs

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Introduction

Human papillomavirus (HPV) is the most common sexually transmitted infection in the United States (U.S.) (CDC: Genital HPV Infection, 2017). Annually, between 2012 and 2016, HPV was associated with 63% and 72% of oropharyngeal cancer cases in females and males, respectively (CDC: HPV and Cancer, 2019). Oropharyngeal cancer sites include the back of the throat, tonsils, and base of the tongue (Cleveland Clinic, 2019; Hammarstedt et al., 2006; Hong, Grulich, Jones, Lee, Garland, Dobbins, & Rose, 2010). According to an epidemiological modelling study, HPV-mediated oropharyngeal cancer cases will outnumber cervical cancers in the United States, by 2020 (Chaturvedi et al., 2011). Behavioral factors such as cigarette smoking exacerbate the risk of HPV-associated cancers. Smoking, particularly is reported as a major, possible risk factor for HPV-associated oropharyngeal cancer (Sinha, Logan & Mendenhall, 2012). A recent multicenter study reports that HPV-positive smokers have a higher prevalence of oropharyngeal cancer, and strongly emphasizes the need to promote smoking cessation for primary prevention of oropharyngeal cancers (Anantharaman et al., 2016).

In addition to behavioral risk factors, immunocompromised conditions are known to exponentially increase an individual's susceptibility to certain forms of cancer (Dubrow, Silverberg, Park, Crothers, & Justice, 2012). Specifically, human immunodeficiency virus (HIV)-induced immune activation is associated with chronic inflammation, and may subsequently cause carcinogenic effects (Speicher, Ramirez-Amador, Dittmer, Webster-Cyriaque, Goodman, & Moscicki, 2016). Therefore, immunosuppression in people living with HIV (PLWH), in conjunction with disproportionately high, risky sexual behaviors like unprotected sex (anal, vaginal, or oral sex) increases the risk for HPV-associated cancers among PLWH (Chaturvedi, Madeleine, Biggar, & Engels, 2009; Grulich, Van Leeuwen, Falster, & Vajdic, 2007; CDC: Genital HPV Infection - Fact Sheet, 2019).

PLWH have a 2–3-fold higher prevalence of smoking, than the general population, and a much lower likelihood of quitting smoking (Rahmanian, Wewers, Koletar, Reynolds, Ferketich, & Diaz, 2011). PLWH also have a higher odd of contracting oral HPV infection (Beachler, & D'Souza, 2013), as the prevalence of HPV DNA in PLWH is up to 31%, as compared to only 6% in the general population (Antonsson, Cornford, Perry, Davis, Dunne, & Whiteman, 2014; Beachler et al. 2012). Therefore, immunosuppression, combined with behavioral risk factors like smoking, and unprotected sex put PLWH at a much higher risk of developing HPV-associated oropharyngeal cancer.

HIV/AIDS Service Organizations (ASOs) are nongovernmental organizations providing services and care to PLWH (ASO, 2019). These organizations therefore, serve as a medium to educate PLWH about HIV/HPV-related illnesses. The setting for this particular study included two community-based HIV/AIDS service organizations (ASOs) in Texas, and three ASOs in South Carolina. Through partnerships and collaborations, the ASOs in our study provide comprehensive HIV/STD prevention and education, medical care, and social support services to individuals living with (or at-risk for) HIV/AIDS. Services provided at the study ASOs include HIV specialty and primary care, medical case management, referrals/payment for medical care, health insurance premiums and copayment costs, food pantry,

transportation, pharmaceutical assistance, mental health, addictions counseling, short-term rent, mortgage, utilities, long-term group housing, adherence and treatment education, and risk reduction counseling.

ASO staff work in close proximity with individuals living with (or at-risk for) HIV/AIDS, and therefore play an instrumental role in educating their clients about HIV/HPV-related illnesses. In a study (Bynum, Wigfall, Brandt, Richter, Glover, & Hébert, 2013), it was observed that higher health literacy in women living with HIV/AIDS may have a positive impact on their HPV-related screening knowledge and behaviors. Therefore, fostering evidence-based knowledge about HPV-associated oropharyngeal cancer among ASO staff may improve HPV-associated oropharyngeal cancer-related health outcomes related among PLWH.

The South U.S. Census region has the maximum HIV diagnoses rates (CDC: HIV in the United States by Region, 2019). While geographically, both South Carolina and Texas are located in the South, from a historic, cultural, and racial/ethnic standpoint, South Carolina is classified as a Deep South state (New World Encyclopedia, 2008; Kasymova, Harrison, Pascal, 2019). Specifically, racially/ethnically, South Carolina is composed of a much higher proportion of Black/African American population (26%), as compared to only 12 % in Texas (Kaiser Family Foundation, 2019). On the other hand, the Hispanic population is dramatically higher (40%) in Texas, compared to a mere 6% in South Carolina (Kaiser Family Foundation, 2019). These numbers suggest that ASO staff in South Carolina and Texas may serve clients from different sociocultural backgrounds.

This particular study assesses the knowledge and attitudes/beliefs of non-clinical ASO staff in South Carolina and Texas. At the same time, it seeks to compare whether there are any differences in knowledge and attitudes/beliefs about HPV-associated oropharyngeal cancers between ASO staff in South Carolina and ASO staff in Texas.

Methods

Study Sample

This study involved a purposive sample of ASO staff from two ASOs in Texas and three ASOs in South Carolina. In April/May 2016, the principal investigator (LTW) sent a recruitment email to four ASO leaders located in South Carolina, out of whom, three agreed to participate in the study. In September/October 2018, LTW sent a recruitment letter to two Texas based ASO leaders, and both agreed to participate in the study. Eligibility criteria included being an employee, volunteer, or community partner who provided HIV/sexually transmitted disease (STD) risk-reduction counseling to PLWH or high-risk HIV-negative men (including MSM) or women, at least 18 years old, and fluent in English. Data from the three South Carolina ASOs (N=30) was collected between May and June 2016. Data from the two Texas ASOs (N=21) was collected between November and December 2018.

Study description

This cross-sectional study is a sub-section of a larger study. The main, larger study aims at examining HPV-mediated cancer prevention knowledge, beliefs and screening behaviors,

and cancer health information seeking and sharing behaviors among non-clinical ASO staff. A 30-minute, self-administered, 118-item survey was used for data collection. The survey included questions related to participants' demographics, knowledge, information seeking, and attitude/beliefs regarding the HPV vaccine and different HPV-associated cancers, and is heavily drawn from the HINTS survey. HINTS collect nationally representative data routinely about the American public's use of cancer-related information, and includes awareness, knowledge, and beliefs questions about HPV and the HPV vaccine (National Cancer Institute, 2018; Wigfall, Bynum, Brandt, Sebastian & Or, 2018). Specific to our study, we limited our variables for data analysis strictly to participant demographics, and questions relevant to knowledge and attitude/belief questions related to HPV-associated oropharyngeal cancer.

Data Analysis

Data analysis was performed using Stata/SE 15.1 (College Station, TX, USA). Cross tabulation was used to calculate the percentages and frequencies for both demographic and knowledge, attitude/belief variables. Pearson's chi-square was used to determine whether the demographic, and knowledge, attitude/belief responses between Texas and South Carolina participants were statistically significant. The P value of < 0.05 was considered statistically significant in all cases.

Results

Sample characteristics (Table 1)

Table 1 illustrates the demographic characteristics of the participants. Results for combined responses of the two states, along with individual responses for Texas and South Carolina have been reported. Out of the total 51 participants, 78% were Black, 92% non-Hispanic and of mean age (years): 44.2 ± 12.8 SD. More than half (59%) participants were females, and 61% were heterosexual. Over two-thirds (67%) had at least an undergraduate degree, and 64% had at least five years of experience working with HIV-positive clients.

Significant differences in the demographic characteristics of age ($p=0.00$), ethnicity ($p=0.01$), sex ($p=0.03$), marital status ($p=0.01$), and number of years working with PLWH ($p=0.03$), were observed between ASO staff in Texas and ASO staff in South Carolina.

Oropharyngeal cancer related knowledge, information seeking, and attitudes/beliefs (Table 2)

Table 2 illustrates the knowledge, attitude/belief responses of the participants. Out of the total, only 32% were aware that HPV is a risk factor for oropharyngeal cancer, and even fewer (18%) had ever looked for information about oropharyngeal cancer. More than half (53%) were unsure of the HPV vaccine's success in preventing oropharyngeal cancer. 58% correctly thought smoking to cause/exacerbate certain HPV-associated health problems like genital warts and cancer, and almost three-fourth (73%) thought that quitting smoking can have a huge impact in lowering its harmful effects. An overwhelming majority of 88% somewhat-totally disagreed that a woman can't do much to reduce her chances of getting oropharyngeal cancer, and similarly, 92% believed the same for men. There were no

statistically significant differences ($p>0.05$) observed in the knowledge, information seeking, and attitudes/beliefs between ASO staff at Texas and ASO staff at South Carolina.

Discussion

The Southern United States region has disproportionately high HIV/AIDS rates (CDC: HIV in the United States by Region, 2019), and low male and female adolescent HPV vaccination coverage (Hurth, Rahman, Smith & Berenson, 2014). Community-based ASOs provide PLWH, MSM, and other vulnerable populations with valuable resources such as health education, patient navigation, and social support. In order that the burden of HPV-related cancers among PLWH is reduced it is necessary to determine, and address the existing gaps in knowledge and attitudes/beliefs related to HPV vaccination and HPV-related cancers, among ASO staff. It is also critical to assess whether ASO workers have an adequate understanding of the significantly high risk to HPV, PLWH pose.

In our study, most participants (ASO staff) were unaware about the role of HPV in causing oropharyngeal cancer, and less than one-third knew the correct proportion of oropharyngeal cancers caused by HPV. These two responses are suggestive of the ASO staff's limited knowledge/awareness about HPV's role in causing oropharyngeal cancer PLWH being at an increased risk. Given HPV is responsible for approximately 70% of oropharyngeal cancers, this ambiguity about the link between HPV and oropharyngeal cancers needs to be duly addressed. The HPV vaccine (Gardasil) offers protection against HPV16 and HPV 18, the HPV types most commonly associated with oropharyngeal cancer (CDC: HPV Vaccination & Cancer Prevention, 2016; You, Henry, Zeitouni, 2019). In addition, the vaccine is strongly recommended for prevention against HPV-mediated cancers. However, most ASO staff were unsure about the effectiveness of the HPV vaccine in preventing oropharyngeal cancer. On similar lines, a recent study conducted among non-clinical ASO staff in South United states (Wigfall, Bynum, Brandt, Sebastian & Ory, 2018) reported that only 67% participants were aware about HPV's role in causing anal cancer, and less than half (39–48%) thought that the HPV vaccine could prevent anal, oral, penile, vaginal, and vulvar cancers. The results from our study, and Wigfall et al. substantiate the ASO workers' limited understanding about the competence of HPV vaccine, in protecting against HPV-causing cancers. In addition, the two studies also reflect the poor understanding about the role of HPV in causing cancers, other than cervical.

Responses related to smoking-associated health risks were relatively promising, since a remarkable majority of ASO workers demonstrated positive beliefs about smoking-related health risks, and correctly perceived smoking cessation to be associated with positive health outcomes. This understanding about the health risks linked with smoking is particularly important among ASO staff, because their clients, PLWH, show an inordinately high prevalence of smoking, which is a reported risk factor for HPV-associated oropharyngeal cancer. Therefore, ASOs need to engage more emphatically towards promoting tobacco and smoking cessation.

A study by Rogers et al. reports that PLWH served by ASOs offering a wide array of services demonstrate better clinical outcomes like higher CD4 count and lower viral load,

compared to ASOs offering a narrow range of services (Rogers, Palomo, Little & Woldehanna, 2013). In collaborating with partners/communities, ASOs provide clients with access to multiple services that aim at improving their quality of life and health outcomes. The ASOs in our study, in coalition with other organizations offer referral, diagnostic and treatment facilities to individuals living with HIV/AIDS or at-risk for HIV/AIDS. Specific services offered at these organizations include HIV care and pre-exposure prophylaxis (PrEP), patient navigation to adult HPV vaccination, and referral to cancer care providers. Integrating an HPV-prevention education/ training program at these well-established organizations may reinforce the existing knowledge and attitude/beliefs about HPV-related illnesses among ASO staff. In turn, improved HPV education will allow ASO workers to link more clients to HPV screening and treatment services, and consequently reduce the burden of HPV-related illnesses in the Southern United States region. There were no significant differences observed in the responses pertaining to oropharyngeal cancer, between Texas and South Carolina ASO staff. However, this specific finding may not have any major implication (s).

Limitations

A major limitation of this study is the small sample size. However, our study was a sample of provider-level participants, and not a population-level sample. In addition, this study was a part of a larger effort, that aims at assessing HPV-mediated cancer prevention knowledge, beliefs, screening behaviors, and cancer health information seeking and sharing behaviors among non-clinical ASO staff, and there were very few questions related to oropharyngeal cancer. This gives us only a small picture of HPV-related oropharyngeal cancer knowledge and attitude/beliefs among ASO staff. Lastly, it must be noted that this study comprised a small, non-random, purposive sample, restricted to ASOs in the Southern U.S. states of Texas and South Carolina. Therefore, the study findings may not be applicable to ASOs located in other geographical regions.

Conclusion

This study highlights the critical need to foster the current understanding regarding the severity of HPV illnesses among PLWH and other high-risk vulnerable populations, among ASO staff in the Southern United States region. ASOs link their clients, individuals living with HIV/AIDS or at-risk for HIV AIDS, to referral resources and support groups, and play an important role in improving the health outcomes of their clients (Paterson, Ross & Gaudet, 2014). Therefore, workforce at the ASOs in must be adequately trained and educated about the high risk PLWH pose to HPV-related illnesses. Augmenting the current HPV-related knowledge and attitude/beliefs among ASO staff, may lead to a decline in the rates of HPV-associated cancers among PLWH.

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What is known about this topic

- People living with HIV (PLWH) are disproportionately affected by HPV-associated cancers and HPV is known to cause approximately 70% of oropharyngeal cancers.
- PLWH have a higher prevalence of practices like sexual risk behaviors and smoking and therefore, pose a much higher risk of developing oropharyngeal cancer.
- ASO staff play an important role in educating their clients (PLWH) about HIV/AIDS-related health topics.

What this paper adds

- This paper describes the limited awareness about HPV-related oropharyngeal cancer among ASO staff in the Southern United States region.
- Since ASO staff work closely with PLWH, fostering their knowledge and attitudes/beliefs about the high risk PLWH pose to HPV-related illnesses cancer may improve health outcomes related to HPV-associated oropharyngeal cancers among PLWH.

Table 1

Sample Characteristics

Characteristic	Total N=51 N (%)	SC n=30 n (%)	TX n= 21 n (%)	P value
Age				0.00
Mean: 44.2 ± 12.8 SD	49 (44.20 ± 12.84 SD)	28 (49.04 ± 12.87)	21 (37.80 ± 9.81)	
Race				0.17
Black	40 (78.4)	26 (86.7)	14 (66.7)	
White	10 (19.6)	4 (13.3)	6 (28.6)	
Other	1 (2.0)	0(0.0)	1 (4.7)	
Ethnicity				0.01
Hispanic/ Latino	4 (7.8)	0 (0.0)	4 (19.1)	
Non- Hispanic/ Latino	47 (92.2)	30 (100.0)	17 (80.9)	
Annual household income				0.92
Less than \$35000	8 (16.0)	4 (13.8)	4 (19.1)	
\$350000 to 49999	18 (36.0)	11 (37.8)	7 (33.3)	
\$50000 to 74999	9 (18.0)	5 (17.3)	4 (19.1)	
\$750000 to 99999	9 (18.0)	6 (20.6)	3 (14.3)	
\$100000 or more	3 (6.0)	1 (3.6)	2 (9.4)	
Not sure/refused	3 (6.0)	2 (6.9)	1 (4.8)	
Sex				.03
Females	30 (58.8)	14 (46.7)	16 (76.2)	
Males	21 (41.2)	16 (53.3)	5 (23.8)	
Marital status				0.01
Married/Living as married	21 (41.2)	11 (36.7)	10 (47.6)	
Divorced/Separated	4 (7.8)	0 (0.0)	4 (19.1)	
Single/Never married	26 (51.0)	19 (63.3)	7 (33.3)	
Sexual orientation				0.06
Heterosexual	31 (60.8)	18 (60.00)	13 (61.9)	
Lesbian/gay	16 (31.3)	12 (40.00)	4 (19.1)	
Bisexual	3 (5.9)	0 (0.00)	3 (14.3)	
Something else/not sure	1 (2)	0 (0.00)	1 (4.7)	
Education				0.26
Less than undergraduate degree	17 (33.3)	7 (23.3)	10 (47.6)	
Undergraduate degree	22 (43.1)	14 (46.7)	8 (38.1)	
Masters/Graduate degree	11 (21.6)	8 (26.7)	3 (14.3)	
Other	1 (2.0)	1 (3.3)	0 (0.0)	
Number of years working with PLWH				.03
Less than 5 years	18 (36.0)	7 (23.3)	11 (52.4)	
At least 5 years	33 (64.0)	23 (76.7)	10 (47.6)	

Notes: SC (South Carolina), TX (Texas)

Table 2

Knowledge, Information Seeking, and Attitude/beliefs

Characteristic	Total N=51 N (%)	SC n=30 n (%)	TX n=30 n (%)	P-value
Knowledge				
Do you think HPV can cause oropharyngeal cancer?				0.19
Yes (correct)	16 (32.0)	12 (41.40)	4 (19.0)	
No	10 (20.0)	4 (13.80)	6 (28.6)	
Not sure	24 (48.0)	13 (44.80)	11 (52.4)	
Information Seeking				
Have you ever looked for information about oropharyngeal cancer?				0.82
Yes	9 (17.6)	5 (16.7)	4 (19.0)	
No	42 (82.4)	25 (83.3)	17 (81.0)	
Attitudes/Beliefs				
There's not much a man can do to lower his chances of getting oropharyngeal cancer:				0.40
Strongly agree	1 (2.0)	0 (0.0)	1 (4.8)	
Somewhat agree	3 (5.9)	1 (3.3)	2 (9.5)	
Somewhat disagree	16 (31.3)	11 (36.7)	5 (23.8)	
Strongly disagree	31 (60.8)	18 (60.00)	13 (61.9)	
There's not much a woman can do to lower her chances of getting oropharyngeal cancer:				0.22
Strongly agree	0 (0.0)	0 (0.0)	0 (0.0)	
Somewhat agree	6 (11.8)	2 (6.7)	4 (19.1)	
Somewhat disagree	18 (35.3)	13 (43.3)	5 (23.8)	
Strongly disagree	27 (52.9)	15 (50.0)	12 (57.1)	
How much do you think smoking determines whether a person will develop health problems caused by genital warts/cancer?				0.79
Not at all	8 (16.0)	6 (20.0)	2 (10.0)	
A little	13 (26.0)	8 (26.7)	5 (25.0)	
Some	16 (32.0)	9 (30.0)	7 (35.0)	
A lot	13 (26.0)	7 (23.3)	6 (30.0)	
How much do you think quitting cigarette smoking can reduce harmful effects of smoking?				0.97
Not at all	0 (0.0)	0 (0.0)	0 (0.0)	
A little	2 (3.9)	1 (3.3)	1 (4.8)	
Some	12 (23.5)	7 (23.3)	5 (23.8)	
A lot	37 (72.6)	22 (73.3)	15 (71.4)	
In your opinion, how successful is the HPV vaccine at preventing oropharyngeal cancer?				0.68
Not at all successful	0 (0.0)	0 (0.0)	0 (0.0)	
A little successful	2 (5.3)	2 (8.7)	0 (0.0)	
Pretty successful	4 (10.5)	2 (8.7)	2 (13.3)	
Very successful	12 (31.6)	7 (30.4)	5 (33.3)	
Not sure	20 (52.6)	12 (52.2)	8 (53.3)	
What percentage of male oropharyngeal cancer cases do you think are caused by HPV?				0.85
More than 90%	4 (7.8)	3 (10.0)	1 (4.8)	

Characteristic	Total N=51 N (%)	SC n=30 n (%)	TX n=30 n (%)	P-value
More than 50%	14 (27.5)	7 (23.3)	7 (33.3)	0.99
Less than 50%	16 (31.4)	9 (30.0)	7 (33.3)	
None	2 (3.9)	1 (3.3)	1 (4.8)	
Not sure	15 (29.4)	10 (33.3)	5 (23.8)	
What percentage of female oropharyngeal cancer cases do you think are caused by HPV?				
More than 90%	3 (5.9)	2 (6.6)	1 (4.8)	
More than 50%	11 (21.6)	6 (20.0)	5 (23.8)	
Less than 50%	19 (37.2)	11 (36.7)	8 (38.1)	
None	3 (5.9)	2 (6.7)	1 (4.7)	
Not sure	15 (29.4)	9 (30.0)	6 (28.6)	