HHS Public Access

Author manuscript

J Health Commun. Author manuscript; available in PMC 2019 March 09.

Published in final edited form as:

J Health Commun. 2018 ; 23(4): 329–339. doi:10.1080/10810730.2018.1443527.

Knowledge, Beliefs, and Communication Behavior of Oncology Health-care Providers (HCPs) regarding Lesbian, Gay, Bisexual, and Transgender (LGBT) Patient Health care

SMITA C BANERJEE[1], **CHASITY B WALTERS**[2], **JESSICA M STALEY**[1], **KOSHY ALEXANDER**[3], and **PATRICIA A PARKER**[1]

[1]Department of Psychiatry and Behavioral Sciences, Memorial Sloan-Kettering Cancer Center, New York, NY, USA

[2]Office of the Physician-in-Chief, Memorial Sloan-Kettering Cancer Center, New York, NY, USA

[3]Department of Medicine, Memorial Sloan-Kettering Cancer Center, New York, NY, USA

Abstract

Delivery of culturally competent care toward lesbian, gay, bisexual, and transgender (LGBT) patients depends on how health-care providers (HCPs) communicate with them; however, research about knowledge, attitude, and behavior of HCPs toward LGBT patients is scant. The objectives of our study were to describe oncology HCPs' knowledge and examine if beliefs about LGB and transgender patients mediate the effects of LGBT health-care knowledge on open communication behaviors with LGB and transgender patients, respectively. A total of 1253 HCPs (187 physicians, 153 advance practice professionals (APPs), 828 nurses, and 41 others) at a Comprehensive Cancer Center completed an online survey that included the following measures: LGBT health-care knowledge, beliefs, communication behaviors, willingness to treat LGBT patients, encouraging LGBT disclosure, and perceived importance of LGBT sensitivity training. Only 50 participants (5%) correctly answered all 7 knowledge items, and about half the respondents answered 3 (out of 7) items correctly. Favorable beliefs about LGBT health care mediated the effect of higher LGBT health-care knowledge on open communication behaviors with transgender patients, controlling for effects of type of profession, religious orientation, gender identity, sexual orientation, and having LGBT friends/family. The results of this study demonstrated an overall lack of medical knowledge and the need for more education about LGBT health care among oncology HCPs.

Lesbian, gay, bisexual, transgender (LGBT) is an umbrella term that refers to sexual minority (e.g., lesbian, gay, bisexual) and gender minority (e.g., transgender, nonbinary, genderqueer) populations. While estimates vary, population surveys suggest between 5.2 and 9.5 million adults in the United States identify as LGBT (Gates, 2014). Barriers to equitable health care are multifactorial and include the experiences of these populations with the health-care system (Institute of Medicine (IOM), 2011). Evidence suggests that LGBT populations are at greater risk for breast, prostate, anal, cervical, colorectal, endometrial, and lung cancers when compared to the general population (Quinn et al., 2015), due to higher

Address correspondence to Smita C Banerjee, Department of Psychiatry and Behavioral Sciences, Memorial Sloan-Kettering Cancer Center, 641 Lexington Avenue, 7th Floor, New York, 10022 NY, USA. banerjes@mskcc.org.

prevalence of certain cancer risk behaviors. For instance, lesbian and bisexual women are at a higher risk for breast cancer because of higher prevalence of risk factors such as nulliparity (a condition where the woman has never borne a child or given birth; Russo, Moral, Balogh, Mailo, & Russo, 2005), alcohol use, smoking, and obesity (IOM, 2011). As compared to heterosexual women, lesbian women are also at a higher risk for cervical cancer because of prevalence of risk factors such as higher body mass index scores and smoking history (Waterman & Voss, 2015). As well, because of sexual practices such as receptive anal intercourse, gay men are at greater risk of anal cancer as a consequence of HPV infection as compared with heterosexual men (Machalek et al., 2012). In addition, research indicates that approximately 30% of LGBT adults do not seek health-care services or lack a regular health-care provider (HCP) compared to 10% of age-matched heterosexual (Buchmueller & Carpenter, 2010; IOM, 2011; Kamen et al., 2014).

Multiple factors contribute to the underutilization of health-care service by LGBT populations, including the high cost of health care and lack of access to health insurance coverage, scarceness of health professionals competent in LGBT health (IOM, 2011; Qureshi et al., 2017; Snowden, 2013), fear of stigmatization based on sexual orientation or gender identity (Bradford, Reisner, Honnold, & Xavier, 2013; Facione & Facione, 2007; Whitehead, Shaver, & Stephenson, 2016), and lack of trust in the HCP because many HCPs lack knowledge of LGBT persons' health-care needs, and some have negative attitudes toward them (Westerståhl, Segesten, & Björkelund, 2002). The underutilization of health-care services is highest for transgender patients, who report notably higher rates of maltreatment in health-care encounters, including denial of care (James et al., 2016; Kosenko, Rintamaki, Raney, & Maness, 2013).

Understanding HCPs' attitudes, beliefs, knowledge, and communication behavior toward LGBT patients is integral to the delivery of culturally competent care (Carabez et al., 2015; Dorsen, 2012). According to Floyd, Pierce, and Geraci (2016), 'among the minorities underserved by today's health-care system, the LGB population may be the least studied, and the least understood by health-care providers' (p. 637). In a systematic review of cancer care for transgender patients, findings demonstrated that biomedical components of cancer care for transgender patients (such as diagnostic and treatment strategies) have been examined, but there is an overall paucity of literature pertaining to the psychosocial and spiritual domains of care for transgender cancer patients (Watters, Harsh, & Corbett, 2014). Medical education does not routinely encompass LGBT health issues (Brennan, Barnsteiner, Siantz, Cotter, & Everet, 2012; Corliss, Shankle, & Moyer, 2007; Obedin-Maliver et al., 2011). Research informs us that medical school and residency education for physicians rarely contains much information about LGBT issues beyond HIV/AIDS (Eliason, Dibble, & Robertson, 2011; Obedin-Maliver et al., 2011). Similarly, most nurses have not received training on the care of LGBT patients (Carabez et al., 2015), and an integrative review of practicing nurses' attitudes toward LGBT patients demonstrated negative attitudes (Dorsen, 2012). Even where nurses report they feel comfortable caring for LBGT patients, some suggest they 'treat all patients the same,' suggesting further training is necessary to provide culturally competent care (Beagan, Fredericks, & Goldberg, 2012).

In 2011, the Joint Commission released a field guide for HCPs regarding effective communication and inclusivity of the LGBT community to better serve their unique needs. These guidelines are suggested to be used as self-assessment tools to inform individuals and institutions on how to improve their efforts, as well as an educational resource for providers for best practice recommendations. They recommend that HCPs know and understand their patients' sexuality and handle this information sensitively. There are also special sections dedicated to transgender individuals, as they may face additional adversity in the field (The Joint Commission, 2011). Though the Joint Commission provides these guidelines, the adoption of these guidelines in LGBT patient care at health-care institutions is not entirely known.

In a recent study assessing knowledge, attitudes, and practice behaviors of oncology HCPs regarding LGBT health at a single institution, results indicated significant knowledge gaps with less than 50% HCPs answering knowledge questions correctly (Shetty et al., 2016). Whereas 94% stated they were comfortable treating LGBT population, only about a quarter actively inquired about a patient's sexual orientation when taking a history, and just over a third felt the need for mandatory education on LGBT cultural competency at their institutions (Shetty et al., 2016). Although Shetty and colleagues (2016) did not find significant differences in knowledge, attitudes, and practice behaviors regarding LGBT health by demographic characteristic of HCPs, other studies have demonstrated that some demographic characteristics (e.g., personal or professional contact with LGBT persons, female, self-identification as LGBT) are associated with more positive attitudes about LGBT patient health care (e.g., Banwari, Mistry, Soni, Parikh, & Gandhi, 2015; Dorsen, 2012; Grabovac, Abramović, Komlenović, Milosević, & Mustajbegović, 2014; Lapinski, Sexton, & Baker, 2014). As well, HCPs with more knowledge about LGBT health care needs have more positive attitudes, intentions, and behaviors toward LGBT patients (Banwari et al., 2015; Dorsen, 2012; Lapinski et al., 2014).

Thus, in the present study, we extended prior studies by examining HCPs' knowledge, beliefs, and communication behaviors regarding LGBT patient health care while also assessing willingness to treat, encouraging LGBT disclosure, and perceived importance of LGBT sensitivity training for oncology HCPs. The objectives of our study were to (a) provide descriptive statistics regarding HCPs' knowledge responses, (b) explore differences in the survey measures by demographic characteristics of HCPs, (c) examine associations between study measures, and (d) to examine if beliefs about LGB and transgender patients mediate the effect of LGBT health-care knowledge on open communication behaviors with LGB and transgender patients, respectively.

Methods

Participants and Procedure

This study was a part of a larger project on LGBT patient health care and was deemed exempt (Category 2) by the Institutional Review Board. The study was conducted at a National Cancer Institute – designated Comprehensive Cancer Center in New York. Oncology HCPs (physicians, psychiatrists and psychologists, physician assistants, nurse practitioners, and registered nurses) received an email with a web link to complete a 40-item

survey that assessed participants' knowledge, beliefs, and communication behavior regarding LGBT populations and also requested demographic information. After the initial email, two additional reminders were sent to the HCPs to complete the survey and the survey remained open for 6 weeks. To incentivize participation, $50 gift cards were offered to every 50th respondent if they provided their email address. The survey was anonymous and the participants were informed that their email address would not be linked to their survey results.

Of the 3627 participants who received the web link, 1253 (N = 1253; 35%) completed the survey. Participants included physicians (e.g., oncologists, cardiologists, geriatricians, and other physicians at the cancer center; n = 187; 15%), advanced practice professionals or APPs (i.e., physician assistants and nurse practitioners [n = 153; 12%]), registered nurses [n = 828, 66%], and others [n = 41, 3%]). A majority of the participants self-identified as White (n = 842; 80%) female (n = 927; 74%), Christian (n = 730, 58%) and had friends/family members that identified as LGBT (n = 1018, 81%). Table 1 presents the demographic information of all participants.

Measurement Instruments

The survey was constructed based on prior studies (Arseneau, Grzanka, Miles, & Fassinger, 2013; Crisp, 2006; Shetty et al., 2016; Walch, Ngamake, Francisco, Stitt, & Shingler, 2012) and included the following measures: LGBT health-care knowledge, beliefs, communication behaviors, willingness to treat, encouraging LGBT disclosure, and perceived importance of LGBT sensitivity training for oncology HCPs.

LGBT Health-Care Knowledge

LGBT health-care knowledge measure was an adapted version of the knowledge measure used by Shetty and colleagues (2016), and consisted of 7 items assessing HCP knowledge about avoidance of health care (2 items), lesbians and HPV (1 item), lesbians and breast cancer (1 item), gay/bisexual men and anal cancer (1 item), LGBT adolescents and suicide risk (1 item), and transmen and breast cancer (1 item). Items were scored on a 5-point Likert type scale with 1 (strongly disagree) to 5 (strongly agree). All statements were true, so the 'agree' and 'strongly agree' responses were scored as 1 and all other responses were scored as 0.

Beliefs about LGBT Oncology Patients

The beliefs measure was adapted from the Sexual Orientation Beliefs Scale (Arseneau et al., 2013), the Attitudes Toward Transgendered Individuals Scale (Walch et al., 2012), and attitudes regarding LGBT health (Shetty et al., 2016) and consisted of 12 statements addressing beliefs about sexual orientation, sex, and gender, comfort in treating LGBT populations, belief of unique health risks, belief in more medical education, and belief that the LGBT population is more difficult to treat. All items were scored on a 5-point Likert type scale with 1 (strongly disagree) to 5 (strongly agree).

Exploratory factor analysis indicated a two-factor structure, explaining 44.26% variance: Subscale 1: beliefs about sexual orientation and gender identity (5 items; eigenvalue = 4.22,

30.13% variance; Cronbach's alpha = .78) with all items loading greater than .5, and Subscale 2: beliefs about LGBT health care (5 items; eigenvalue = 1.98, 14.13% variance; Cronbach's alpha = .80) with all items loading greater than .5 (2 items did not load on any of the two scales and were deleted). The respective items on the two subscales were averaged to form composite scores with higher scores indicating more favorable beliefs about sexual orientation and gender identity (M = 4.09, SD = .71) and more favorable beliefs about LGBT health care (M = 4.25, SD = .62).

Open Communication Behaviors

We asked HCPs if they had ever taken care of an LGB or transgender patient in their role. An affirmative response on each of the two items (79.6% HCPs had taken care of an LGB patient, 28.1% of HCPs had taken care of a transgender patient) prompted the participants to complete additional questions regarding open communication behaviors with their respective LGBT patients.

Two subscales were used to examine open communication behaviors with LGBT patients in oncology settings. We distinguished the measures by specifically focusing on open communication with LGB patients and with transgender patients. The open communication behaviors measure was an adapted version of the Gay Affirmative Practice Scale (Crisp, 2006) that assesses oncology HCPs' communication behaviors in practice with LGBT patients. The measure included nine statements, scored on a 5-point Likert type scale with 1 (strongly disagree) to 5 (strongly agree). Exploratory factor analysis indicated a single-factor structure (eigenvalue = 4.07, 45.23% variance; Cronbach's alpha = .84), with all items loading greater than .5 (1 item did not load and was deleted). The items were averaged to form a composite score with higher score indicating more open communication behaviors with LGB patients (M = 3.98, SD = .52).

Similarly, nine statements scored on a 5-point Likert-type scale with 1 (strongly disagree) to 5 (strongly agree) were used to assess open communication with transgender oncology patients. Exploratory factor analysis indicated a single-factor structure (eigenvalue = 5.05, 56.05% variance; Cronbach's alpha = .90), with all items loading greater than .6 (1 item did not load and was deleted). The items were averaged to form a composite score with higher score indicating more open communication behaviors with transgender patients (M = 4.04, SD = .59).

Willingness to Be Listed as an LGBT-Friendly Provider

Willingness to be listed as an LGBT-friendly provider was adapted from the attitude measure used by Shetty and colleagues (2016) and included two items measuring willingness to be listed as an LGBT-provider now (M = 3.97, SD = 1.08) or after more training (M = 4.28, SD = .91), scored on a 5-point Likert-type scale with 1 (strongly disagree) to 5 (strongly agree). A higher score indicated greater willingness to be listed.

When dichotomized (by grouping agree and strongly agree as 1 and disagree and strongly disagree as 0), results indicated that 555 (44.29%) of the HCPs were willing to be listed as an LGBT-friendly provider now (n = 589 or 47% of the HCPs did not respond to this item). Similarly, results indicated that 761 (60.73%) of the HCPs were willing to be listed as an

LGBT-friendly provider after more training (n = 424 or 33.8% of the HCPs did not respond to this item).

Encouraging LGBT Disclosure

Encouraging LGBT disclosure was a one-item measure, adapted from Chapman, Watkins, Zappia, Combs, and Shields (2012). The item asked, 'When taking a family social history, do you specifically encourage disclosure of possible lesbian, gay, bisexual and transgender (LGBT) status?' with responses ranging from 1 (never) to 5 (almost always). A higher score on the item indicated greater encouragement from the HCP regarding LGBT status disclosure (M = 3.43, SD = 1.29).

Perceived Importance

Perceived importance of LGBT sensitivity training for oncology HCPs was a one-item measure developed by the authors. The item asked, 'Do you feel an LGBT sensitivity and communication skills training will be helpful to improve oncology healthcare providers' communication with LGBT patients?' with responses ranging from 1 (no; n = 30, 2.4%), to 2 (not sure; n = 140, 11.2%), to 3 (yes; n = 827; 66%; n = 256 or 20.4% participants did not respond to this question). A higher score on the item indicated greater perceived importance of LGBT sensitivity and communication skills training (M = 2.80, SD = .47).

Data Analysis

First, descriptive statistics (frequencies and percentages) were used to quantify the knowledge response. Second, stratified analyses were performed to explore differences in the survey measures by demographic characteristics (profession, age, gender, religious affiliation, sexual orientation, and LGBT family/friends) using independent sample t tests (with the exception of age, analysis of variance or ANOVA was performed). Third, correlations were performed to explore the relations among variables (a zero-order correlation matrix is presented in Table 2).

Finally, in order to examine if beliefs about sexual orientation and gender identity and beliefs about LGBT health care will mediate the effect of LGBT health-care knowledge on open communication behaviors with LGB and transgender patients, respectively, controlling for effects of type of profession, religious orientation, gender identity, sexual orientation, and LGBT friends/family, we utilized Hayes PROCESS macro (Hayes & Rockwood, 2017). The mediation analyses consisted of the following steps: (a) investigating the total indirect effect of LGBT health-care knowledge on open communication behaviors with LGB patients through two mediators, that is, beliefs about sexual orientation and gender identity and beliefs about LGBT health care; and (b) testing individual mediators in the context of a multiple mediator model, controlling for type of profession, religious orientation, gender identity, sexual orientation, and LGBT friends/family. The same model was run twice, substituting open communication behavior with LGB patients with open communication with transgender patients. For all analyses, level of significance was set at $p < .01$, to protect against type I error.

Results

Knowledge

The distribution of responses on the knowledge items varied (Table 2), with over a quarter of responses on each item (except one item) in the 'don't know' category. Only 50 participants (4.6%) got all 7 items correct, 110 participants (10.1%) got 6 items correct, 167 participants (15.4%) got 5 items correct, 221 participants (20.3%) got 4 items correct, 215 participants (19.8%) got 3 items correct, 171 participants (15.7%) got 2 items correct, 94 participants (8.6%) got 1 item correct, and 59 participants (5.4%) did not get any correct items.

Differences in Survey Measures by Demographics

Six independent sample *t* tests were performed to examine differences in study measures by demographic factors (for profession, religion, sex at birth, gender identity, sexual orientation, and having LGBT friends/family; see Tables 3 and 4). Results indicated that physicians had more favorable beliefs about sexual orientation and gender identity, greater willingness to be listed as an LGBT-friendly provider now, greater encouragement regarding LGBT status disclosure, and lower perceived importance of LGBT sensitivity and communication skills training compared with the other HCPs. Non-Christian religious affiliation was associated with higher knowledge score, more favorable beliefs about sexual orientation and gender identity, more favorable beliefs about LGBT health care, greater willingness to be listed as an LGBT-friendly provider now and after more training, and greater encouragement regarding LGBT status disclosure. Male participants (male at birth) had more favorable beliefs about LGBT health care, greater willingness to be listed as an LGBT-friendly provider now. Similarly, male gender identity of participants was associated with more favorable beliefs about LGBT health care, greater willingness to be listed as an LGBT-friendly provider now, more open communication behaviors with LGB patients, and lower perceived importance of LGBT sensitivity and communication skills training. With regards to sexual orientation, LGBT participants had higher knowledge score, more favorable beliefs about sexual orientation and gender identity, more favorable beliefs about LGBT health care, greater willingness to be listed as an LGBT-friendly provider now, more open communication behaviors with LGBT and transgender patients, respectively, and greater encouragement regarding LGBT status disclosure. Finally, HCPs with LGBT friends/family were more likely than those without to have a higher knowledge score, more favorable beliefs about sexual orientation and gender identity, more favorable beliefs about LGBT health care, greater willingness to be listed as an LGBT-friendly provider now and later, and more open communication behaviors with LGB patients.

Association between Study Measures

The associations between study measures were tested with bivariate correlations and yielded generally positive association between all study measures (Table 5). A higher knowledge score was significantly associated with favorable beliefs about sexual orientation and gender identity, favorable beliefs about LGBT health care, willingness to be listed as an LGBT-friendly provider now and later, more open communication behaviors with LGB and transgender patients, respectively, greater encouragement regarding LGBT status disclosure, and greater perceived importance of LGBT sensitivity and communication skills training.

Mediation Models

Two mediation analyses were conducted to explore the hypothesis that beliefs about sexual orientation and gender identity and beliefs about LGBT health care mediated the effect of LGBT health-care knowledge on open communication behaviors with LGB and transgender patients, respectively, controlling for effects of type of profession, religious orientation, gender identity [gender identity and sex at birth were highly correlated ($r = .92$, $p < .001$), so only gender identity was used in the regression analyses)], sexual orientation, and LGBT friends/family. For open communication behaviors with LGB and transgender patients, the bootstrapped estimates for the total and specific indirect effects obtained from the main analysis are presented in Table 6.

The total indirect effect of LGBT health-care knowledge on open communication behaviors with LGB patients through beliefs about sexual orientation and gender identity and beliefs about LGBT health care was statistically significant, as the confidence intervals (CIs) did not contain a zero. Next, we investigated the significance of the specific indirect effects associated with the mediators. The results indicated that LGBT health-care knowledge was a significant predictor of beliefs about sexual orientation and gender identity, $b = .08$, SE = .01, $p < .001$, and of beliefs about LGBT health care, $b = .07$, SE = .01, $p < .001$. Both beliefs about sexual orientation and gender identity ($b = .05$, SE = .02, $p < .05$) and beliefs about LGBT health care ($b = .40$, SE = .03, $p < .001$) were significant predictors of open communication behaviors with LGB patients. However, LGBT health-care knowledge remained a significant predictor of open communication behaviors with LGB patients, $b = .04$, SE = .01, $p < .001$, ruling out mediation (see Figure 1a). Thus, beliefs about sexual orientation and gender identity and beliefs about LGBT health care did not mediate the effect of LGBT health-care knowledge on open communication behaviors with LGBT patients, controlling for effects of type of profession, religious orientation, gender identity, sexual orientation, and LGBT friends/family (see Figure 1a).

The total indirect effect of LGBT health-care knowledge on open communication behaviors with transgender patients through beliefs about sexual orientation and gender identity and beliefs about LGBT health care was statistically significant. The results indicated that LGBT health-care knowledge was a significant predictor of beliefs about sexual orientation and gender identity, $b = .09$, SE = .02, $p < .001$, and of beliefs about LGBT health care, $b = .08$, SE = .02, $p < .001$. Beliefs about LGBT health care ($b = .62$, SE = .06, $p < .001$) were significant predictors of open communication behaviors with transgender patients (not beliefs about sexual orientation and gender identity). LGBT health-care knowledge was no longer a significant predictor of open communication behaviors with transgender patients when beliefs about sexual orientation and gender identity and beliefs about LGBT health care were included in the model, $b = .03$, SE = .02, $p = .06$, consistent with full mediation (see Figure 1b). The indirect effect was tested using a bootstrap estimation approach with 5000 samples (Hayes & Rockwood, 2017). These results indicated the indirect coefficient (i.e., beliefs about LGBT health care) was significant, $b = .05$, SE = .02, 95% CI = .0224, .0839. Beliefs about sexual orientation and gender identity was not significant, $b = -.00$, SE = .01, 95% CI = −.0149, .0050. Thus, results indicated that favorable beliefs about LGBT health care mediated the effect of higher LGBT health-care knowledge on open

communication behaviors with transgender patients, controlling for effects of type of profession, religious orientation, gender identity, sexual orientation, and LGBT friends/family (see Figure 1b).

Discussion

Given a paucity of research on the delivery of culturally competent care to LGBT oncology patients, we conducted an online survey at a Comprehensive Cancer Center to assess HCPs' knowledge, beliefs, and communication behavior toward LGBT patients care. Overall, our study indicated that significant gaps exist in LGBT health-care knowledge among HCPs as only 4.6% of the HCPs were able to answer all knowledge items correctly, and about half of the respondents correctly answered up to 3 (out of 7) questions. This finding is consistent with prior research that shows that HCPs across different medical specialties lack sufficient knowledge about LGBT health care (e.g., Abdessamad, Yudin, Tarasoff, Radford, & Ross, 2013; Kitts, 2010; Shetty et al., 2016). Our findings also demonstrated that demographic differences in HCP respondents – non-Christian religious affiliation (compared with Christian religious affiliation), self-identification as LGBT (compared with heterosexual sexual orientation), and having (compared with not having) LGBT friends/family – were associated with higher knowledge scores. In addition, there were two knowledge items that focused specifically on transgender patient issues: transgender individuals avoid accessing health care due to difficulty communicating with HCPs; and transmen (people born as female who identify as men) who have had a mastectomy are at risk for breast cancer; and 46.4% and 36% of the HCPs were able to answer these questions correctly. These findings clearly delineate the need for more education provided to HCPs on specific aspects of LGBT health care.

The importance of LGBT health-care knowledge was evident; higher knowledge scores were associated with all study variables, such as with favorable beliefs about sexual orientation and gender identity, favorable beliefs about LGBT health care, willingness to be listed as an LGBT-friendly provider now and later, more open communication behaviors with LGB and transgender patients, respectively, greater encouragement regarding LGBT status disclosure, and greater perceived importance of LGBT sensitivity and communication skills training. Additionally, mediation analyses employed in the current study indicated that higher LGBT health-care knowledge was significantly associated with open communication behaviors with transgender patients via favorable beliefs about LGBT health care, controlling for effects of type of profession, religious orientation, gender identity, sexual orientation, and LGBT friends/family. These findings consistently place a massive emphasis on LGBT health-care knowledge as being a key driver in increasing HCPs awareness and sensitivity toward LGBT oncology patients.

We asked HCPs if they had ever taken care of an LGB or transgender patients in their role. Results indicated that the majority (80%) HCPs had knowingly taken care of an LGB patient and 28% of HCPs had taken care of a transgender patient. Though often combined in the same demographic category, transgender patients may be at a more disadvantage than LGB patients because of lack of experience that HCPs have had with transgender patients. In our study, only 48% of HCPs explicitly encouraged LGBT status disclosure (combining

response options – sometimes, often, and almost always), highlighting that a more concerted effort to encourage such disclosure might help create an open and safe environment for LGBT patients to share their sexual orientation and gender identity. Although some recent research indicates that in many instances, patient sexual orientation disclosure may be patient initiated and may occur early in the medical visit during introductions, during small talk with the provider, and during the history-taking phase of the visit (Venetis et al., 2017), a systems-based approach that calls for HCPs to inquire about patient sexual orientation and gender identity during history-taking phases of the first/initial meeting will ensure that no LGBT patient feels excluded and uncomfortable with sharing about themselves.

Most providers in our study acknowledged that an LGBT sensitivity and communication skills training will be helpful to improve oncology HCPs' communication with LGBT patients. As well, a majority of HCPs were willing to be listed as an LGBT-friendly provider, but after more training. Healthy People 2020 identified increasing access to quality health care for LGBT populations as a priority for further research and intervention (U.S. Department of Health and Human Services, 2017). A number of national resources are available to HCPs regarding LGBT patent health care. For instance, recognized organizations such as the Fenway Institute (https://www.lgbthealtheducation.org/), Gay and Lesbian Medical Association Health Professionals Advancing LGBT Equality (http://www.glma.org/), and the World Professional Association for Transgender Health (http://www.wpath.org/) provide numerous resources for LGBT health education. Additionally, the American Medical Association maintains an LGBT health resource page for practitioners seeking information about LGBT health and training (Association of American Medical Colleges, 2014). The National LGBT Cancer Network (https://cancer-network.org/) specifically addresses the concerns of LGBT people with cancer and trains HCPs on LGBTculturally competent care. Thus, there are numerous opportunities for practitioners to share best practices in the care of LGBT patients and learn about educational advancements in the training of HCPs (Sanchez, 2016).

Limitations

This study had several limitations. First, the study was conducted at a single institution and results may not be generalizable to other oncology care settings. Second, as noted by Yanovitzky (2005), utilization of survey data to examine pathways of effects limits the clarification of temporal precedence (for instance, survey data do clarify if in fact HCPs' beliefs about sexual orientation and gender identity precedes their LGBT health-care knowledge or open communication behaviors with LGBT patients act as precursors for beliefs about LGBT health care). Also, this study utilized cross-sectional survey data to examine pathways of association, which limits the causal interpretation of results. Finally, all responses were self-reports from HCPs and there may have been a response bias in selecting a socially desirable response. Future research could employ more naturalistic approaches to examining HCP-LGBT patient communication such as audio recording of consultations or patient interviews or focus groups to understand their perspectives and get a more descriptive data on communication interactions with HCPs.

Conclusions

The results of this study demonstrated an overall lack of medical knowledge regarding LGBT health care among oncology HCPs in our study. However, the importance of LGBT health-care knowledge was underscored in multiple findings that indicated positive associations between HCPs' higher knowledge score with all study variables such as favorable beliefs about sexual orientation and gender identity, favorable beliefs about LGBT health care, and greater encouragement regarding LGBT status disclosure. These findings clearly emphasize that emphasis on LGBT health-care knowledge in HCP education and training is important to increase HCP awareness and sensitivity toward LGBT oncology patients. As such, a needs assessment survey to understand oncology HCPs' specific challenges of communication with LGBT patients will be an important next step to identify specific gaps in LGBT patient– oncology HCP interaction and will aid in the development of an LGBT sensitivity training for HCPs to address gaps in knowledge, beliefs, and communication behaviors. The overall conclusion from the current is further echoed by the Association of American Medical Colleges (2014) outlining the implementation of curricular and institutional climate changes to improve the health care of LGBT patients.

References

Abdessamad HM, Yudin MH, Tarasoff LA, Radford KD, Ross LE. 2013; Attitudes and knowledge among obstetrician-gynecologists regarding lesbian patients and their health. Journal of Women's Health. 22:85–93. DOI: 10.1089/jwh.2012.3718

Arseneau JR, Grzanka PR, Miles JR, Fassinger RE. 2013; Development and initial validation of The Sexual Orientation Beliefs Scale (SOBS). Journal of Counseling Psychology. 60:407–420. DOI: 10.1037/a0032799 [PubMed: 23668729]

Association of American Medical Colleges Advisory Committee on Sexual Orientation, Gender Identity, and Sex Development. Implementing curricular and institutional climate changes to improve health care for individuals who are LGBT, gender nonconforming, or born with DSD: A resource for medical educators. Washington, DC: Association of American Medical Colleges; 2014. Retrieved from https://members.aamc.org/eweb/upload/Executive%20LGBT%20FINAL.pdf

Banwari G, Mistry K, Soni A, Parikh N, Gandhi H. 2015; Medical students and interns' knowledge about and attitude towards homosexuality. Journal of Postgraduate Medicine. 61:95–100. DOI: 10.4103/0022-3859.153103 [PubMed: 25766341]

Beagan BL, Fredericks E, Goldberg L. 2012; Canadian Journal of Nursing Research. 44(3):44–63.

Bradford J, Reisner SL, Honnold JA, Xavier J. 2013; Experiences of transgender-related discrimination and implications for health: Results from the Virginia Transgender Health Initiative Study. American Journal of Public Health. 103:1820–1829. DOI: 10.2105/AJPH.2012.300796 [PubMed: 23153142]

Brennan AM, Barnsteiner J, Siantz ML, Cotter VT, Everett J. 2012; Lesbian, gay, bisexual, transgendered, or intersexed content for nursing curricula. Journal of Professional Nursing. 28(2): 96–104. DOI: 10.1016/j.profnurs.2011.11.004 [PubMed: 22459139]

Buchmueller T, Carpenter CS. 2010; Disparities in health insurance coverage, access, and outcomes for individuals in same-sex versus different-sex relationships, 2000–2007. American Journal of Public Health. 100:489–495. DOI: 10.2105/AJPH.2009.160804 [PubMed: 20075319]

Carabez R, Pellegrini M, Mankovitz A, Eiason M, Ciano M, Scott M. 2015; "Never in all my years…": Nurses' education about LGBT health. Journal of Professional Nursing. 31:323–329. DOI: 10.1016/j.profnurs.2015.01.003 [PubMed: 26194964]

Chapman R, Watkins R, Zappia T, Combs S, Shields L. 2012; Second-level hospital health professionals' attitudes to lesbian, gay, bisexual and transgender parents seeking health for their

children. Journal of Clinical Nursing. 21:880–887. DOI: 10.1111/j.1365-2702.2011.03938.x [PubMed: 22324540]

Corliss HL, Shankle MD, Moyer MB. 2007; Research, curricula, and resources related to lesbian, gay, bisexual, and transgender health in US schools of public health. American Journal of Public Health. 97:1023–1027. DOI: 10.2105/AJPH.2006.086157 [PubMed: 17463373]

Crisp C. 2006; The Gay Affirmative Practice Scale (GAP): A new measure for assessing cultural competence with gay and lesbian clients. Social Work. 51:115–126. DOI: 10.1093/sw/51.2.115 [PubMed: 16858917]

Dorsen C. 2012; An integrative review of nurse attitudes towards lesbian, gay, bisexual, and transgender patients. Canadian Journal of Nursing Research. 44(3):18–43.

Eliason MJ, Dibble SL, Robertson PA. 2011; Lesbian, gay, bisexual, and transgender (LGBT) physicians' experiences in the workplace. Journal of Homosexuality. 58:1355–1371. DOI: 10.1080/00918369.2011.614902 [PubMed: 22029561]

Facione NC, Facione PA. 2007; Perceived prejudice in healthcare and women's health protective behavior. Nursing Research. 56:175–184. DOI: 10.1097/01.NNR.0000270026.90359.4c [PubMed: 17495573]

Floyd SR, Pierce DM, Geraci SA. 2016; Preventive and primary care for lesbian, gay and bisexual patients. American Journal of Medical Sciences. 352:637–643. DOI: 10.1016/j.amjms.2016.05.008

Gates, GJ. LGBT Demographics: Comparisons among population-based surveys. Williams Institute, UCLA School of Law; 2014. Retrieved from http://escholarship.org/uc/item/0kr784fx

Grabovac I, Abramović M, Komlenović G, Milosević M, Mustajbegović J. 2014; Attitudes towards and knowledge about homosexuality among medical students in Zagreb. Collegium Antropologicum. 38:39–45. [PubMed: 24851595]

Hayes AF, Rockwood NJ. 2017; Regression-based statistical mediation and moderation analysis in clinical research: Observations, recommendations, and implementation. Behavior Research and Therapy. 98:39–57. DOI: 10.1016/j.brat.2016.11.001

Institute of Medicine. The health of lesbian, gay bisexual and transgender people: Building a foundation for better understanding. 2011. Retrieved from https://www.nap.edu/read/13128/chapter/1#iii

James, SE, Herman, JL, Rankin, S, Keisling, M, Mottet, L, Anafi, M. The report of the 2015 transgender survey. Vol. 2016. Washington DC: 2016. Retrieved from http://www.transequality.org/sites/default/files/docs/usts/USTS%20Full%20Report%20-%20FINAL%201.6.17.pdf

The Joint Commission. Advancing effective communication, cultural competence, and patient- and family- centered care for the lesbian, gay, bisexual, and transgender (LGBT) community: A field guide. 2011. Retrieved from https://www.jointcommission.org/assets/1/18/LGBTFieldGuide.pdf

Kamen C, Palesh O, Gerry AA, Andrykowski MA, Heckler C, Mohile S, Karen M. 2014; Disparities in health risk behavior and psychological distress among gay versus heterosexual male cancer survivors. LGBT Health. 1(2):86–92. DOI: 10.1089/lgbt.2013.0022 [PubMed: 26789618]

Kitts RL. 2010; Barriers to optimal care between physicians and lesbian, gay, bisexual, transgender, and questioning adolescent patients. Journal of Homosexuality. 57:730–747. DOI: 10.1080/00918369.2010.485872 [PubMed: 20582799]

Kosenko K, Rintamaki L, Raney S, Maness K. 2013; Transgender patient perceptions of stigma in health care contexts. Medical Care. 51:819–822. DOI: 10.1097/MLR.0b013e31829fa90d [PubMed: 23929399]

Lapinski J, Sexton P, Baker L. 2014; Acceptance of lesbian, gay, bisexual, and transgender patients, attitudes about their treatment, and related medical knowledge among osteopathic medical students. Journal of the American Osteopathic Association. 114:788–796. DOI: 10.7556/jaoa.2014.153 [PubMed: 25288714]

Machalek DA, Poynten M, Jin F, Fairley CK, Farnsworth A, Garland SM, Grulich AE. 2012; Anal human papillomavirus infection and associated neoplastic lesions in men who have sex with men: A systematic review and meta-analysis. Lancet Oncology. 13:487–500. DOI: 10.1016/S1470-2045(12)70080-3 [PubMed: 22445259]

Obedin-Maliver J, Goldsmith ES, Stewart L, White W, Tran E, Brenman S, Lunn MR. 2011; Lesbian, gay, bisexual, and transgender-related content in undergraduate medical education. Journal of the American Medical Association. 306:971–977. DOI: 10.1001/jama.2011.1255 [PubMed: 21900137]

Quinn GP, Sanchez JA, Sutton SK, Vadaparampil ST, Nguyen GT, Green BL, Schabath MB. 2015; Cancer and lesbian, gay, bisexual, transgender/transsexual,and queer/questioning populations (LGBTQ). CA: A Cancer Journal for Clincians. 65:384–400. DOI: 10.3322/caac.21288

Qureshi RI, Zha P, Kim S, Hindin P, Naqvi Z, Holly C, Ritch W. 2017; Health care needs and care utilization among lesbian, gay, bisexual, and transgender populations in New Jersey. Journal of Homosexuality. doi: 10.1080/00918369.2017.1311555

Russo J, Moral R, Balogh GA, Mailo D, Russo IH. 2005; The protective role of pregnancy in breast cancer. Breast Cancer Research. 7:131–142. DOI: 10.1186/bcr1029 [PubMed: 15987443]

Sanchez, N. Coming out for better care: Improving cancer treatment for LGBT patients. HemOnc Today; 2016. Oct, Retrieved from https://www.healio.com/hematology-oncology/practice-management/news/print/hemonc-today/%7B695cf15d-059d-4935-b06a-dc63f41a3e58%7D/coming-out-for-better-care-improving-cancer-treatment-for-lgbt-patients

Shetty G, Sanchez JA, Lancaster JM, Wilson LE, Quinn GP, Schabath MB. 2016; Oncology healthcare providers' knowledge, attitudes, and practice behaviors regarding LGBT health. Patient Education & Counseling. 99:1676–1684. DOI: 10.1016/j.pec.2016.05.004 [PubMed: 27161166]

Snowden, S. Healthcare equality index 2013: Promoting equitable & inclusive care for lesbian, gay, bisexual, and transgender patients and their families. Washington, DC: Human Rights Campaign; 2013. Retrieved from https://www.wichita.va.gov/documents/HEI_2013_final.pdf

United States Department of Health and Human Services [USDHHS]. Healthy People 2020: Lesbian, gay, bisexual and transgender health. 2017. Retrieved from http://www.healthypeople.gov/2020/topics-objectives/topic/lesbian-gay-bisexual-and-transgender-health

Venetis MK, Meyerson BE, Friley LB, Gillespie A, Ohmit A, Shields CG. 2017; Characterizing sexual orientation disclosure to healthcare providers: Lesbian, gay, and bisexual perspectives. Health Communication. 32:578–586. DOI: 10.1080/10410236.2016.1144147 [PubMed: 27327038]

Walch SE, Ngamake ST, Francisco J, Stitt RL, Shingler KA. 2012; The attitudes toward transgendered individuals scale: Psychometric properties. Archives of Sexual Behavior. 41:1283–1291. DOI: 10.1007/s10508-012-9995-6 [PubMed: 22810996]

Waterman L, Voss J. 2015; HPV, cervical cancer risks, and barriers to care for lesbian women. Nurse Practitioner. 40:46–53. DOI: 10.1097/01.NPR.0000457431.20036.5c

Watters Y, Harsh J, Corbett C. 2014; Cancer care for transgender patients: Systematic literature review. International Journal of Transgenderism. 15(3–4):136–145. DOI: 10.1080/15532739.2014.960638

Westerståhl A, Segesten K, Björkelund C. 2002; GPs and lesbian women in the consultation: Issues of awareness and knowledge. Scandinavian Journal of Primary Health Care. 20:203–207. DOI: 10.1080/028134302321004845 [PubMed: 12564570]

Whitehead J, Shaver J, Stephenson R. 2016; Outness, stigma, and primary health care utilization among rural LGBT Populations. PLoS ONE. 11(1):e0146139.doi: 10.1371/journal.pone.0146139 [PubMed: 26731405]

Yanovitzky I. 2005; Sensation seeking and adolescent drug use: The mediating role of association with deviant peers and pro-drug discussions. Health Communication. 17:67–89. DOI: 10.1207/s15327027hc1701_5 [PubMed: 15590343]

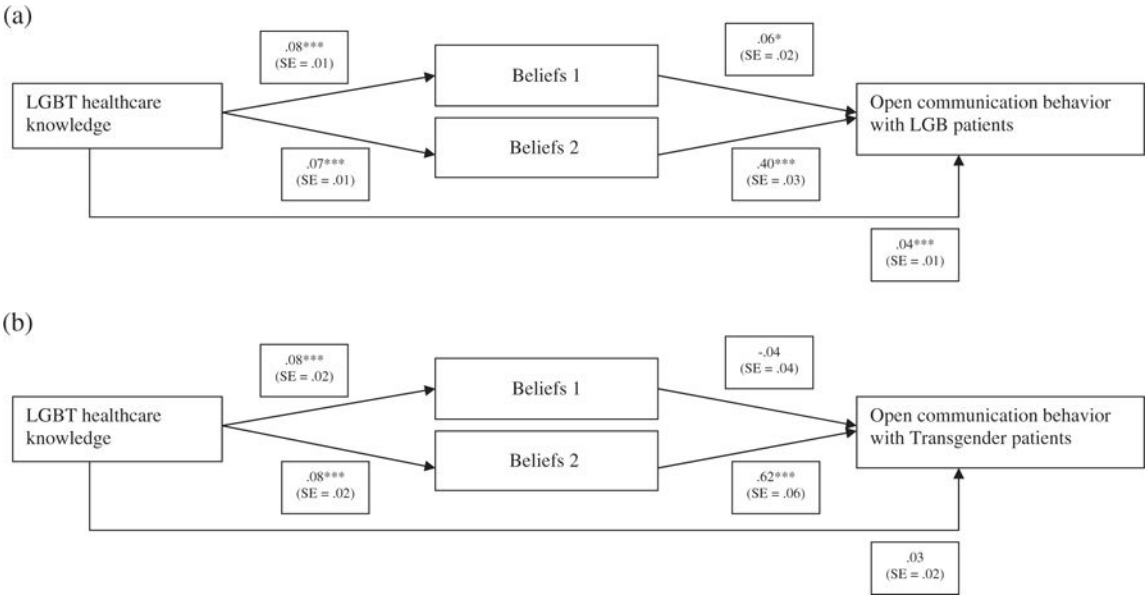

Fig. 1.

(a) The estimated multiple mediation model (unstandardized B and SE) for open communication behavior with LGB patients. (b) The estimated multiple mediation model (unstandardized B and SE) for open communication behavior with transgender patients. Note: Belief 1 (beliefs about sexual orientation and gender identity); Belief 2 (beliefs about LGBT health care). *$p < .05$; **$p < .01$; ***$p < .001$.

Table 1

Demographic characteristics of all participants ($N = 1253$).

Characteristic	*N*	%
Age group		
18–24	26	2.1
25–34	326	26.0
35–44	358	28.6
45–54	234	18.7
55–64	136	10.9
65 and older	30	2.4
Missing	44	3.5
Gender		
Female	927	74.0
Male	172	13.7
Transgender (transsexual man or transsexual woman)	4	0.4
Gender nonconforming/Gender queer/Non-binary	3	0.2
Missing	147	11.7
Sex assigned at birth		
Female	947	75.6
Male	176	14.0
Intersex	1	0.1
Missing	129	10.3
Race		
American Indian or Alaskan Native	4	0.4
Asian	123	11.7
Black or African-American	73	6.9
Native Hawaiian or Other Pacific Islander	9	0.9
White	842	80.1
Missing	202	16.1
Ethnicity		
Hispanic or Latino	82	6.5
Not Hispanic or Latino	948	75.7
Missing	223	17.8
Sexual orientation		
Lesbian	25	2.0
Gay	55	4.4
Bisexual	30	2.4
Heterosexual	991	79.1
Other	3	0.2
Missing	149	11.9
Profession		
Physicians	187	14.9

Characteristic	*N*	%
APPs	153	12.2
Registered nurses	828	66.1
Other	41	3.3
Missing	44	3.5
Religious orientation		
Atheist/Agnostic	213	17.0
Buddhist	14	1.1
Christian	730	58.2
Hindu	8	0.6
Jewish	103	8.2
Muslim	11	0.9
Other	19	1.5
Missing	155	12.4
Friend or family member who identifies at LGBT		
Yes	1018	81.2
No	92	7.3
Not sure	16	1.3
Missing	127	10.1

Table 2

Distribution of participant scores on knowledge items.

	Missing *N* (%)	Strongly disagree *N* (%)	Disagree *N* (%)	Don't know *N* (%)	Agree *N* (%)	Strongly agree *N* (%)	Correct score* *N* (%)
(1) Lesbian/Gay/Bisexual people avoid accessing health care due to difficulty communicating with health-care providers	166 (13.2%)	63 (5.0%)	284 (22.7%)	336 (26.8%)	352 (28.1%)	52 (4.2%)	404 (32.2%)
(2) Trans people avoid accessing health care due to difficulty communicating with health-care providers	166 (13.2%)	37 (3.0%)	98 (7.8%)	371 (29.6%)	419 (33.4%)	162 (12.9%)	581 (46.4%)
(3) HPV-associated cervical dysplasia can be found in lesbians with no history of heterosexual intercourse	166 (13.2%)	22 (1.8%)	56 (4.5%)	335 (26.7%)	513 (40.9%)	161 (12.8%)	674 (53.8%)
(4) There is a higher risk of breast cancer among lesbian women when compared to heterosexual women	166 (13.2%)	145 (11.6%)	289 (23.1%)	497 (39.7%)	127 (10.1%)	29 (2.3%)	156 (12.5%)
(5) Regularly screening gay and bisexual men for anal cancer through anal Pap testing can increase life expectancy	166 (13.2%)	18 (1.4%)	51 (4.1%)	399 (31.8%)	472 (37.7%)	147 (11.7%)	619 (49.4%)
(6) Among adolescents, there is an association between being LGBT and suicide/suicidal ideation/suicidal tendencies	166 (13.2%)	14 (1.1%)	29 (2.3%)	119 (9.5%)	596 (47.6%)	329 (26.3%)	925 (73.8%)
(7) Trans men (people born as women who identify as men) who have had a mastectomy are at risk for breast cancer	166 (13.2%)	44 (3.5%)	159 (12.7%)	433 (34.6%)	372 (29.7%)	79 (6.3%)	451 (36%)

*Correct score was calculated by summing up 'agree' and 'strongly agree' responses.

Table 3

Overview of differences in study measures by demographic factors.

	Profession	Age	Religion	Sex at birth	Gender identity	Sexual orientation	LGBT friends/family
Knowledge score	$t(1077) = -1.35$	$F(3, 168) = .75$	$t(1085) = -4.77^{**}$	$t(1072) = -1.83$	$t(1050) = -1.63$	$t(1055) = -7.89^{**}$	$t(1061) = -3.74^{**}$
Belief 1	$t(1052) = -2.76^{*}$	$F(3, 168) = .10$	$t(1060) = -5.20^{**}$	$t(1047) = -2.46$	$t(1025) = -2.30$	$t(1032) = -6.12^{**}$	$t(1036) = -4.87^{**}$
Belief 2	$t(1052) = -1.68$	$F(3, 168) = 2.32$	$t(1060) = -5.19^{**}$	$t(1047) = -3.49^{**}$	$t(1025) = -2.67^{*}$	$t(1032) = -4.77^{**}$	$t(1036) = -4.25^{**}$
Willingness (now)	$t(655) = -3.39^{**}$	$F(3, 168) = .63$	$t(662) = -4.30^{**}$	$t(655) = -3.91^{**}$	$t(641) = -3.49^{**}$	$t(649) = -4.87^{**}$	$t(653) = -4.07^{**}$
Willingness (later)	$t(819) = -.11$	$F(3, 168) = 1.33$	$t(827) = -3.95^{**}$	$t(823) = -1.53$	$t(807) = -1.05$	$t(813) = -1.03$	$t(813) = -3.93^{**}$
LGB communication openness	$t(941) = 1.49$	$F(3, 168) = 1.79$	$t(948) = -3.81^{**}$	$t(939) = -2.50$	$t(922) = -2.55^{*}$	$t(927) = -8.43^{**}$	$t(928) = -3.03^{*}$
Trans communication openness	$t(328) = -1.14$	$F(3, 168) = .64$	$t(330) = -1.62$	$t(324) = -2.15$	$t(314) = -2.06$	$t(321) = -3.36^{**}$	$t(320) = -2.53$
Encourage LGBT status disclosure	$t(982) = -3.60^{**}$	$F(3, 168) = .91$	$t(990) = -2.55^{*}$	$t(978) = -2.46$	$t(960) = -2.30$	$t(966) = -4.98^{**}$	$t(968) = -1.76$
Importance of LGBT sensitivity training	$t(987) = 5.95^{**}$	$F(3, 168) = 1.09$	$t(995) = -1.42$	$t(983) = 2.50$	$t(964) = 2.59^{*}$	$t(971) = -.32$	$t(973) = -2.22$

$^{*}p < .01$;

$^{**}p < .001$. Independent *t* tests were performed to test the difference in study measures by demographic factors with one exception (age; used analysis of variance or ANOVA test due to more than two relevant categories).

Demographic factors: profession (1 = APP, 2 = physicians); age (1 = less than 34 years, 2 = 35–44 years, 3 = 45–54 years, 4 = 55 years, and older); religion (1 = Christian, 2 = other); sex at birth (1 = female, 2 = male); gender identity (1 = female, 2 = male); sexual orientation (1 = heterosexual, 2 = LGBT); LGBT friends/family (0 = no, 1 = yes).

Study measures: Belief 1 (beliefs about sexual orientation and gender identity); Belief 2 (beliefs about LGBT health care).

Table 4

Means and standard deviations of study measures by demographic factors.

	Profession *M* (SD)		Religion *M* (SD)		Sex at birth *M* (SD)		Gender identity *M* (SD)		Sexual orientation *M* (SD)		LGBT friends/family *M* (SD)	
	APP	**Physicians**	**Christian**	**Others**	**Female**	**Male**	**Female**	**Male**	**Heterosexual**	**LGBT**	**No**	**Yes**
Knowledge score	3.47 (1.80)	3.67 (1.72)	3.32 (1.73)	3.85 (1.84)	3.45 (1.79)	3.73 (1.74)	3.47 (1.78)	3.72 (1.78)	3.36 (1.74)	4.76 (1.70)	2.84 (1.80)	3.58 (1.78)
Belief 1*	4.06 (.72)	4.22 (.66)	4.00 (.72)	4.24 (.67)	4.07 (.70)	4.21 (.75)	4.07 (.70)	4.20 (.76)	4.05 (.71)	4.48 (.58)	3.75 (.79)	4.13 (.69)
Belief 2*	4.24 (.61)	4.32 (.58)	4.18 (.60)	4.38 (.62)	4.23 (.59)	4.41 (.64)	4.24 (.58)	4.38 (.69)	4.23 (.57)	4.52 (.81)	4.00 (.76)	4.28 (.59)
Willingness (now)	3.91 (1.09)	4.28 (.95)	3.83 (1.10)	4.2 (1.00)	3.90 (1.09)	4.31 (.94)	3.90 (1.08)	4.27 (.99)	3.90 (1.07)	4.51 (.92)	3.36 (1.24)	4.02 (1.05)
Willingness (later)	4.28 (.88)	4.29 (1.02)	4.19 (.92)	4.45 (.87)	4.27 (.90)	4.40 (.94)	4.28 (.87)	4.37 (.99)	4.28 (.86)	4.39 (1.10)	3.86 (1.15)	4.32 (.88)
LGB communication openness	3.99 (.52)	3.92 (.54)	3.93 (.52)	4.07 (.53)	3.96 (.51)	4.08 (.56)	3.96 (.51)	4.08 (.55)	3.93 (.51)	4.38 (.44)	3.81 (.48)	4.00 (.60)
Trans communication openness	4.03 (.56)	4.13 (.59)	4.00 (.555)	4.10 (.63)	4.02 (.55)	4.19 (.61)	4.01 (.55)	4.17 (.62)	4.00 (.55)	4.32 (.69)	3.77 (.47)	4.06 (.59)
Encourage LGBT status disclosure	2.50 (1.26)	2.91 (1.36)	2.50 (1.30)	2.71 (1.27)	2.53 (1.29)	2.81 (1.30)	2.53 (1.28)	2.79 (1.30)	2.50 (1.26)	3.17 (1.39)	2.34 (1.26)	2.60 (1.30)
Importance of LGBT sensitivity training	2.84 (.43)	2.59 (.61)	2.78 (.49)	2.83 (.42)	2.82 (.44)	2.71 (.59)	2.82 (.44)	2.71 (.60)	2.80 (.47)	2.82 (.46)	2.69 (.52)	2.81 (.46)

Belief 1 (beliefs about sexual orientation and gender identity); Belief 2 (beliefs about LGBT health care).

Table 5

Zero-order correlation matrix between study measures.

	1	2	3	4	5	6	7	8	9
Knowledge score	1.00	.27*	.29*	.25*	.18*	.30*	.27*	.18*	.13*
Belief 1		1.00	.40*	.34*	.29	.32*	.28*	.09	.14*
Belief 2			1.00	.50*	.46*	.54*	.61*	.15*	.29*
Willingness (now)				1.00	.55*	.48*	.50*	.14*	.15*
Willingness (later)					1.00	.27*	.24*	.10	.25*
LGB communication openness						1.00	.86*	.31*	.19*
Trans communication openness							1.00	.24*	.23*
Encourage LGBT status disclosure								1.00	.09
Importance of LGBT sensitivity training									1.00

* $p < .001$.

J Health Commun. Author manuscript; available in PMC 2019 March 09.

Table 6

Indirect effects of LGBT health-care knowledge on open communication behaviors with LGB patients and transgender patients, respectively, through beliefs about sexual orientation and gender identity (Beliefs 1) and beliefs about LGBT health care (Beliefs 2), controlling for effects of type of profession, religious orientation, gender identity, sexual orientation, and LGBT friends/family.

Mediator	Bootstrap estimate	SE	BCa 95% CI (lower)	BCa 95% CI (upper)
Overall open communication behaviors with LGB patients				
Beliefs about sexual orientation and gender identity (Beliefs 1)	.0044	.0025	−.0001	.0099
Beliefs about LGBT health care (Beliefs 2)	.0268	.0054	.0174	.0387
Total indirect effect	.0313	.0054	.0214	.0427
Overall open communication behaviors with transgender patients				
Beliefs about sexual orientation and gender identity (Beliefs 1)	−.0034	.0049	−.0143	.0055
Beliefs about LGBT health care (Beliefs 2)	.0480	.0149	.0232	.0834
Total indirect effect	.0447	.0139	.0212	.0770

Notes: Based on 5000 bootstrap samples.

BCa: Bias corrected and accelerated; CI: confidence interval.