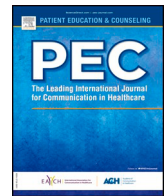




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Attitudes, knowledge and practice behaviours of oncology health care professionals towards lesbian, gay, bisexual, transgender, queer and intersex (LGBTQI) patients and their carers: A mixed-methods study



Jane M. Ussher^{a,*}, Janette Perz^a, Kimberley Allison^a, Rosalie Power^a, Alexandra Hawkey^a, Gary W. Dowsett^b, Martha Hickey^c, Chloe Parton^d, Fiona E.J. McDonald^e, Ian D. Davis^f, Gwendolyn P. Quinn^g, Katherine Boydell^h, Kerry H. Robinsonⁱ, Suzanne Chambers^j, Antoinette Anazodo^k

^a Translational Health Research Institute, School of Medicine, Western Sydney University, Sydney, Australia

^b Australian Research Centre in Sex, Health and Society, La Trobe University, Melbourne, Australia

^c Department of Obstetrics and Gynaecology, University of Melbourne and the Royal Women's Hospital, Melbourne, Australia

^d School of Health, Te Herenga Waka – Victoria University of Wellington, Wellington, New Zealand

^e Canteen and Faculty of Medicine and Health, The University of Sydney, Sydney, Australia

^f Eastern Health Clinical School, Monash University and Eastern Health, Melbourne, Australia

^g Departments of OB-GYN, Population Health, Grossman School of Medicine, New York University, NY, USA

^h Black Dog Institute, University of New South Wales, Sydney, Australia

ⁱ School of Social Sciences and Translational Health Research Institute, Western Sydney University, Sydney, Australia

^j Faculty of Health Sciences, Australian Catholic University, Brisbane, Australia

^k Kids Cancer Centre, Sydney Children's Hospital and School of Women's and Children's Health, University of New South Wales, Sydney, Australia

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ABSTRACT

Objective: There is growing recognition that health care professionals (HCPs) and policy makers are insufficiently equipped to provide culturally competent care to lesbian, gay, bisexual, transgender, queer and intersex (LGBTQI) cancer patients and their families. We examined HCP attitudes, knowledge, and practices regarding LGBTQI cancer care using a mixed-methods research design.

Method: Surveys were completed by 357 oncology HCPs in nursing (40%), medical (24%), allied health (19%), and clinical leadership roles (11%); 48 of the surveyed HCPs were interviewed.

Results: Most HCPs reported being comfortable treating LGBTQI patients, but reported low levels of confidence and knowledge and systemic barriers to LGBTQI cancer care. Most wanted more education and training, particularly on trans and gender-diverse people (TGD) and those born with intersex variations.

Conclusion: Education of HCPs and health system changes are required to overcome barriers to the provision of culturally competent cancer care for LGBTQI patients.

Practice implications: These findings reinforce the need for inclusion of LGBTQI content in HCP education and professional training curricula, and institutional support for LGBTQI-inclusive practice behaviours. This includes administrative and visual cues to signal safety of LGBTQI patients within cancer care, facilitating inclusive environments, and the provision of tailored patient-centred care.

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Abbreviations: LGBTQI, Lesbian, gay, bisexual, transgender, queer or intersex; HCP, Health care professional; TGD, Transgender or gender diverse; SOGI, Sexual orientation and gender identity

* Correspondence to: Translational Health Research Institute, School of Medicine, Western Sydney University, Locked Bag 1797, Penrith South 2751, Australia.

E-mail address: j.ussher@westernsydney.edu.au (J.M. Ussher).

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1. Introduction

The health disparities experienced by individuals who identify as lesbian, gay, bisexual, transgender, queer, or intersex (LGBTQI) have led to increasing attention being paid to this “growing and medically underserved population” within cancer care [1]. LGBTQI communities experience a disproportionate cancer burden [2–4], and they face unique psychosocial challenges such as higher rates of cancer

related distress and sexual concerns [5], lower quality of life [6], and less biological family support [7], in comparison with heterosexual and cisgender people. LGBTQI people report high levels of dissatisfaction with cancer healthcare [1,8] including difficulties in accessing cancer services [1], gaps in patient-provider communication [9], and an absence of LGBTQI-specific cancer information or support [3,10]. Anxiety associated with disclosure of sexual orientation or gender identity to healthcare professionals (HCPs) is also reported, driven by fear of HCP discrimination that may result in substandard care [3,9,11,12]. Conversely, non-disclosure is associated with feelings of patient invisibility, dissatisfaction with care and poor psychological wellbeing [3,9,13,14].

There is increasing recognition that HCPs and policy makers are insufficiently equipped to provide culturally competent care to LGBTQI cancer patients and their families [1,2,15,16], the demonstration of cultural awareness, knowledge and skill when working with marginalised populations [17]. Cultural competence often includes concepts of cultural safety, creating an environment that is emotionally and physically safe, with no actions taken to diminish the identities of an individual [18,19], and cultural humility, the ongoing commitment of HCPs to self-reflection and addressing power imbalances in patient-HCP interactions [20,21]. Examination of the knowledge, beliefs and attitudes of oncology HCPs is central to identifying barriers and facilitators to the development of culturally competent LGBTQI cancer care. Greater knowledge of LGBTQI healthcare needs is associated with more positive attitudes, intentions and behaviours of oncology HCPs toward LGBTQI patients [22]. This includes acknowledgement of the importance of knowing patients' sexual orientation and gender identity (SOGI) information; HCPs not assuming all patients are heterosexual and cisgender (i.e. gender the same as sex assigned at birth); and willingness to be listed as a LGBTQI friendly provider [23–25].

Surveys of oncology physicians [24,26,27], radiation therapists [28], nurses and other advance care professionals [23,25] have consistently reported low levels of knowledge about LGBTQI patients. For example, when asked to identify cancer risk factors and psychosocial vulnerabilities specific to LGBTQI people, the percentage of oncology professionals answering all questions correctly ranged from 5% [25] to just under 50% [26,29]. Equally, a small proportion of oncology HCPs reported being informed about LGBTQI cancer patient needs, ranging from 8% to 43% [27,28,30]. This lack of knowledge has implications for HCP confidence in treating LGBTQI people with cancer, which ranges from 8% to 38% [24,27], with sexual health [31] and fertility [32] being areas of specific concern for HCPs. However, most HCPs who responded to surveys on LGBTQI cancer care reported being comfortable treating this population, with rates ranging from 84% [27] to over 90% [26,29,30]. The majority also report a desire for education and training to address the specific needs of LGBTQI people, with most agreeing that such training should be mandatory [23,24,26]. The need for such training is evident in the finding that the majority of oncology HCPs do not enquire about their patients' SOGI status, because it is seen as irrelevant, or because HCPs don't want to cause offence [22,25–27]. A minority of oncology HCPs admit open hostility towards LGBTQI patients, or report having witnessed discriminatory behaviour in their colleagues [33].

There are a number of gaps in existing research. Previous research has focused on the LGBTQI community in general, rather than oncology HCP knowledge, attitudes and practice in each sub-group. While there is some evidence that HCPs have lower levels of confidence and comfort in working with trans and gender diverse (TGD) individuals with cancer [22–24], there is an absence of research on HCP perspectives on people with variations in sex characteristics (intersex), an overlooked group in cancer care [34]. In addition, most published studies focus on USA-based oncology physicians [24,26,27,33], with a minority including oncology social workers

[30], advanced healthcare practitioners [23], or nurses [25]. There is an acknowledged need for research that compares the perspectives of medical, nursing and allied HCPs [24], reflecting the multi-disciplinary model of cancer care [35], requiring culturally competent practice across disciplines [18]. Similarly, those in clinical leadership, management and advocacy roles contribute to a culturally safe environment, through the development of medical records that facilitate disclosure of LGBTQI SOGI status, provision of LGBTQI training for staff, and visible indicators that signpost a health setting is LGBTQI culturally safe [3,24,33]. Finally, with the exception of a mixed-methods study that included open-ended survey responses [33], previous research has utilised quantitative survey methods. The use of qualitative measures facilitates interpretation of quantitative findings, in order to provide deeper insight into the perspectives of oncology HCPs on LGBTQI cancer care.

To address these gaps in the literature, this study aims to examine HCP attitudes, knowledge and practices regarding LGBTQI cancer survivors and cancer care in a range of professional and LGBTQI patient groups, using a mixed-methods research design.

2. Methods

The study was part of a broader mixed-methods project 'Out with Cancer' that examined LGBTQI cancer care from the perspectives of LGBTQI people with cancer, their carers and HCPs. Following principles of integrated knowledge translation (iKT) [36], LGBTQI cancer survivors, cancer HCPs and representatives from LGBTQI health and cancer support organisations were involved in all stages of the project. Ethics approval was provided by Western Sydney University Human Research Ethics Committee (H12664). All participants provided written informed consent.

2.1. Participants and recruitment

HCPs providing services to people with cancer and their carers were eligible to participate in this study. Participants were recruited through targeted advertisements in social media (e.g. Facebook, Twitter), via professional networks (e.g. Clinical Oncology Society of Australia, Cancer Nursing Society of Australia) and through cancer-related community organisations. We specifically targeted oncology medical practitioners, nurses, allied health professionals (e.g. social workers, psychologists, occupational and physiotherapists), and individuals working in leadership roles in cancer care, health and preventative agencies, such as support group leaders, program/service managers and consumer representatives/advocates. Advertisements invited HCPs to complete a 10–15 min anonymous online survey, with participants also able to indicate interest in completing a 30–60 min telephone interview. Participation was open internationally, although recruitment primarily focused on Australian HCPs. The survey was open from May 2020 to March 2021, with interviews conducted between June 2020 and February 2021.

2.2. Online survey

The online survey was adapted with permission from a previous survey of US oncologists' attitudes, knowledge and practice behaviours regarding LGBTQ cancer care [24,26], with the scope broadened to include people born with intersex variations and carers from LGBTQI communities, five additional knowledge items, two items on carer inclusion and four open-ended questions.

2.2.1. Attitudes towards LGBTQI cancer care

Participants responded using a five-point Likert scale (*strongly disagree* – *strongly agree*) on the following items: attitudes to LGBTQ people, TGD people and people born with intersex variation (9

items); awareness of importance of SOGI status (4 items); hetero-normative and cisnormative assumptions (2 items); institutional inclusion and education (2 items); and carer inclusion (2 items).

2.2.2. Knowledge of LGBTQI health need

Ten knowledge items were used to assess knowledge of LGBTQI patients' cancer risk and screening behaviour and psychosocial vulnerabilities [24]. Participants responded using a five-point Likert scale (strongly disagree – strongly agree).

2.2.3. LGBTQI inclusive practice behaviours

Six items asked whether workplace intake forms collected information on LGBTQI status, LGBTQI-friendly referral pathways, visible indicators of LGBTQI inclusivity, and active steps taken by the workplace to be LGBTQI friendly. Participants responded using three options (yes, no, not sure).

2.2.4. Open ended survey items

Four open-ended survey items asked participants about their personal experiences working with LGBTQI patients and carers; any reservations in treating the LGBTQI population; suggestions for improving cancer care for the LGBTQI population; and any further comments.

2.3. Semi-structured interviews

A subset of 48 HCPs completed a semi-structured interview on their experiences and perspectives of LGBTQI cancer care, conducted via phone or online (using videoconferencing software). Sample size was determined by information power, calculation of number of participants needed, based on the information the sample holds relevant for the study [37]. During the interview, participants were asked about their reflections since completing the online survey, their experiences providing care for LGBTQI patients, how well their workplaces were meeting the needs of LGBTQI patients and carers, and what they saw as important issues for LGBTQI patients and carers. All interviews were audio recorded, professionally transcribed and verified for accuracy.

2.4. Data handling and analysis

Survey data were screened to remove participants who had completed only demographic and/or clinical characteristic questions; otherwise, partial responses were retained. Missing data were not imputed in any variable. For attitude questions that asked about different LGBTQI patient groups, a series of general linear models were run to examine differences in responses between HCP professional groups (between subjects) and across LGBTQI patient groups (within subjects), as well as to test for potential interactions between these variables. All other attitude, knowledge and practice behaviour questions were dichotomised for analysis. Chi-square analyses were used to examine differences in responses between HCP professional groups on these items.

Inductive thematic analysis was used to analyse open-ended survey and interview data [38]. Members of the research team and the stakeholder committee examined a subset of interviews, which were independently read and re-read to identify first-order codes and sub-codes for each participant group. Qualitative survey and interview data were then coded using NVIVO, a software program that facilitates organisation of data. The coded data were then summarised and re-organised through reading and rereading, allowing for a further refinement and development of themes through consensus discussion between the authors. Strategies used to ensure research rigour included the collaborative team approach to analysis, prolonged engagement with the subject matter, reflexive field notes

Table 1

Sociodemographic and professional characteristics of participating health care professionals.

Demographic/ Professional characteristic	Survey participants M (SD), range	Interview participants M (SD), range
Age (years) (n = 356)	47.29 (12.45),22–82	45.94 (13.04),24–68
Time working in cancer care (years) (n = 303)	14.31 (10.21),0.33–45 n (%)	13.15 (9.89),0.50–40 n (%)
Gender (n = 357)		
Female	278 (77.9%)	36 (75.0%)
Male	76 (21.3%)	12 (25.0%)
Non-binary	3 (0.8%)	0
Ethnicity (n = 352)		
Caucasian	305 (85.4%)	42 (87.5%)
Asian	22 (6.2%)	2 (4.2%)
Middle Eastern/African	6 (1.7%)	3 (6.3%)
Mixed background	8 (2.2%)	1 (2.1%)
Other/unclear background ¹	11 (3.1%)	0
LGBTQI + themselves (n = 328)		
Yes	60 (18.3%)	18 (37.5%)
No	264 (80.5%)	30 (62.5%)
Prefer not to answer	4 (1.2%)	0
Has LGBTQI + family (n = 328)		
Yes	135 (41.2%)	25 (52.1%)
No	191 (53.5%)	22 (45.8%)
Prefer not to answer	2 (0.6%)	1 (2.1%)
Has LGBTQI + friend/s (n = 328)		
Yes	300 (91.5%)	47 (97.9%)
No	28 (7.8%)	1 (2.1%)
Country (n = 357)		
Australia	315 (88.2%)	44 (91.7%)
United States of America	17 (4.8%)	0
United Kingdom	10 (2.8%)	3 (6.3%)
New Zealand	5 (1.4%)	0
Canada	3 (0.8%)	1 (2.1%)
Other	7 (2.0%)	0
Professional discipline (n = 356)		
Medical	87 (24.4%)	12 (25.0%)
Nursing	142 (39.9%)	15 (31.3%)
Allied health	69 (19.4%)	15 (31.3%)
Leadership	38 (10.7%)	4 (8.3%)
Other ²	20 (5.6%)	2 (4.2%)
Workplace location (n = 355)		
Urban	247 (69.2%)	38 (79.2%)
Regional	85 (26.6%)	9 (18.8%)
Rural	9 (2.5%)	1 (2.1%)
Remote	4 (1.1%)	0
Healthcare sector ⁴		
Public	230 (64.4%)	29 (60.4%)
Private	72 (20.2%)	10 (20.8%)
Primary healthcare	9 (2.5%)	0
Community-based	11 (3.1%)	2 (4.2%)
Not for profit	88 (24.6%)	16 (33.3%)
Something else	24 (6.7%)	2 (4.2%)
Number of patients seen per week (n = 318)		
0–25	189 (59.4%)	23 (48.9%)
26–50	75 (23.6%)	12 (25.5%)
51–75	29 (8.1%)	9 (19.1%)
76 +	25 (7.9%)	3 (6.4%)
Age groups seen ³ (n = 320)		
Paediatric	17 (5.3%)	1 (2.1%)
Adolescent and young adult	86 (26.9%)	18 (38.3%)
Adult	279 (87.2%)	39 (83.0%)
Older adult/elderly	177 (55.3%)	29 (61.7%)
Estimated proportion of patients who are LGBTQI + (n = 317)		
None	29 (9.1%)	0
< 5%	154 (48.6%)	24 (51.1%)
5–10%	58 (18.3%)	13 (27.7%)
10–15%	10 (3.2%)	1 (2.1%)
15–20%	4 (1.3%)	0
20–25%	2 (0.6%)	2 (4.3%)

(continued on next page)

Table 1 (continued)

Demographic/ Professional characteristic	Survey participants M (SD), range	Interview participants M (SD), range
> 20% Unsure N/A	57 (18.0%) 3 (0.9%)	7 (14.9%) 0
Had formal education about healthcare needs of... ^a (n = 355)	96 (27.0%) 74 (20.8%)	23 (47.9%) 18 (37.5%)
Sexuality diverse people	52 (14.6%)	11 (22.9%)
Trans and gender diverse people		
People born with an intersex variation		

^a Participants could select multiple options for questions about healthcare sector, age groups seen, and LGBTQI healthcare training.

¹ Ethnicity - Other/unclear background: Latin American (n = 4), Jewish (n = 3), Aboriginal (n = 1), not clearly described (n = 3)[1] Latin American (n = 4), Jewish (n = 3), Aboriginal (n = 1), not clearly described (n = 3).

² Country - Other: Research (n = 7), administration (n = 3), dentistry (n = 1), paralegal (n = 1), education/training (n = 1), none/retired (n = 7)[2] Research (n = 7), administration (n = 3), dentistry (n = 1), paralegal (n = 1), education/training (n = 1), none/retired (n = 7).

kept by interviewers and coders, and transparency in our analysis process.

3. Results

3.1. Participant characteristics

Table 1 summarises the sociodemographic and clinical characteristics of 357 survey participants, in nursing (40%), medical (24%), allied health (19%) and leadership (11%) positions. Participants were representative of the Australian medical, nursing and allied health workforce in gender, age and regionality [39].

3.2. Attitudes, knowledge and inclusive practice behaviour related to LGBTQI cancer care

Tables 2–5 present the means, standard deviations, and results of tests of significance for items asking about HCP attitudes, knowledge and inclusive practice behaviours in relation to LGBTQI patient groups and across professional disciplines. Figs. 1–4 contain details of responses ranging from strongly agree to strongly disagree for the whole sample.

3.2.1. Attitudes to sexuality diverse (LGBQ), TGD people, and people born with an intersex variation

Most participants agreed that they were comfortable treating LGBTQI patient groups and did not agree that LGBTQI patients were more difficult to treat (Table 2, Fig. 1). However, they reported lower levels of confidence in their knowledge of the health needs of LGBTQI people. Attitudes differed significantly in relation to different LGBTQI patient groups. HCPs reported the highest comfort and confidence when working with LGBQ people, followed by TGD people, and people born with intersex variations. Similarly, HCPs regarded LGBQ people as less difficult to treat than TGD people and those born with intersex variations. Most HCPs agreed that they were interested in education/training on the health needs of LGBTQI patients, with significantly greater interest in TGD people and those born with intersex variations than LGBQ people. Interest in education/training differed significantly between HCP professions, with greatest interest reported amongst allied health and nursing professionals compared with medical and leadership professions.

	By professional discipline			Test for differences					
	Overall	Medical (n = 87)	Nursing (n = 142)	Allied health (n = 69)	Leadership (n = 38)	Other (n = 20)	Between HCP professions ³	Between LGBTQI patient groups ²	Interaction
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	F (df)	F (df)	F (df)
I am comfortable treating: Sexuality diverse people	4.54 (.72)	4.52 (.78)	4.60 (.66)	4.54 (.82)	4.37 (.71)	4.03 (.51)	1.897 (.111)	49.095 (1.75, 610.61)	.524 (7.00, 610.61)
Trans and gender diverse people	4.24 (.80)	4.12 (.93)	4.38 (.70)	4.28 (.86)	.75)3.84 (1.08)	4.11 (.66)	(4, 349)		
People born with an intersex variation	3.98 (.93)	3.81 (.91)	4.07 (.86)	4.03 (1.04)		4.11 (.74)			
I am confident in my knowledge of the health needs of: Sexuality diverse people	3.53 (.92)	3.53 (.87)	3.54 (.94)	3.61 (.91)	3.47 (.98)	3.37 (.96)	.108 (.980)	103.733 (< .001)	.680 (.710)
Trans and gender diverse people	3.01 (.93)	3.01 (.92)	3.01 (.88)	3.00 (1.09)	3.03 (.89)	2.89 (.94)	(4, 350)	(1.79, 625.74)	(7.151, 625.74)
People born with an intersex variation	2.70 (.91)	2.76 (.93)	2.71 (.88)	2.65 (.98)	2.55 (.86)	2.79 (.92)			
— are more difficult to treat: Sexuality diverse people	1.97 (.84)	1.95 (.85)	1.92 (.85)	1.90 (.79)	2.16 (.89)	2.26 (.81)	1.236 (.295)	26.657 (1.92, 670.31)	1.386 (.202)
Trans and gender diverse people	2.25 (.92)	2.30 (.86)	2.14 (.93)	2.26 (.95)	2.42 (.92)	2.37 (.96)	(4, 349)		(7.68, 670.31)
People born with an intersex variation	2.36 (.85)	2.49 (.86)	2.23 (.83)	2.41 (.85)	2.47 (.89)	2.32 (.75)			
I am interested in education about the unique health needs of: Sexuality diverse people	4.14 (.80)	3.95 (.68)	4.24 (.84)	4.38 (.77)	3.95 (.77)	3.74 (.87)	6.897 (< .001)	4.797 (1.76, 608.42)	.319 (7.03, 608.42)
Trans and gender diverse people	4.24 (.76)	4.03 (.66)	4.35 (.75)	4.52 (.72)	3.97 (.75)	3.84 (.90)	(4, 346)		
People born with an intersex variation	4.21 (.78)	4.03 (.71)	4.32 (.78)	4.45 (.76)	4.03 (.75)	3.79 (.86)			

Response scale: 1 = strongly disagree – 5 = strongly agree.

Table 3
Proportion of participants agreeing with attitude statements about LGBTQI cancer care, by HCP professional group.

	Overall	By professional discipline					Test for between-group differences	
		Medical (n = 87)	Nursing (n = 142)	Allied health (n = 69)	Leadership (n = 38)	Other (n = 20)	χ^2	p
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)		
To provide the best cancer care, it is important to know:								
The sexual orientation of my patients	144 (40.7%)	46 (53.5%)	56 (39.4%)	30 (43.5%)	9 (23.7%)	3 (15.8%)	15.588	.004
The gender identity of my patients	236 (66.7%)	64 (74.4%)	97 (68.3%)	49 (71.0%)	16 (42.1%)	10 (52.6%)	15.085	.005
My patients' assigned sex at birth	163 (46.0%)	58 (67.4%)	59 (41.5%)	27 (39.1%)	11 (28.9%)	18 (42.1%)	22.922	< .001
If my patients have an intersex variation	199 (56.5%)	59 (68.6%)	78 (54.9%)	38 (56.7%)	15 (39.5%)	9 (47.4%)	10.399	.034
Upon first encounter, I assume:								
A patient is heterosexual	83 (23.4%)	24 (27.6%)	31 (22.0%)	14 (20.3%)	9 (23.7%)	5 (26.3%)	1.470	.832
A patient's gender is the same as their sex assigned at birth	199 (56.4%)	55 (64.0%)	86 (61.0%)	32 (46.4%)	16 (42.1%)	10 (52.6%)	9.290	.054
I/my organisation would be willing to be listed as a LGBTQI friendly provider	293 (83.0%)	73 (84.9%)	116 (82.3%)	58 (84.1%)	31 (81.6%)	15 (78.9%)	.600	.963
There should be mandatory education on LGBTQI health needs	290 (81.9%)	64 (73.6%)	124 (87.9%)	63 (91.3%)	27 (71.1%)	12 (63.2%)	19.205	.001
It is important to address the needs of carers	342 (97.2%)	83 (95.4%)	137 (97.9%)	67 (98.5%)	37 (97.4%)	18 (94.7%)	2.092	.719
I am confident in my knowledge of carers needs in LGBTQI communities	121 (34.2%)	29 (33.3%)	39 (27.7%)	33 (47.8%)	13 (34.2%)	7 (36.8%)	8.463	.076

3.2.2. Awareness of importance of SOGI status; heteronormative and cisnormative assumptions; and institutional inclusion and education

HCPs were significantly more likely to report that it was important to know patients' gender identities (67%) and if they had any intersex variation (57%), than to know sex assigned at birth (46%) and sexual orientation (41%), in order to provide the best cancer care (Table 3, Fig. 2). Medical professionals were significantly the most likely to agree that it was important to know sexual orientation, gender identity assigned sex at birth, and intersex variation, with HCPs working in leadership the least likely to agree that this was important. Overall, a minority of HCPs assumed patients were heterosexual (23%). However, the majority (56%) did assume that gender was the same as that assigned at birth. This did not significantly differ across professional groups. The majority of HCPs across all professions were willing to be listed as LGBTQI-friendly professionals (83%) and they agreed that there should be mandatory education/training on LGBTQI health needs (82%), with significantly higher agreement among nursing (98%) and allied health professionals (91%), compared with medical practitioners (74%), HCPs in leadership roles (71%) and others (63%). Across all professions, HCPs agreed it was important to address the needs of carers (97%), but only 34% were confident in their knowledge of LGBTQI carers' needs.

3.2.3. Knowledge about LGBTQI health needs

The proportion of HCPs correctly answering each knowledge item (see Table 4) ranged from 23% (private health insurance cover among TGD people) to 83% (breast cancer risk among lesbian women). Only 3% of the total sample correctly answered all questions, and fewer than half (46%) correctly answered 5 (out of 10) questions. There was a high proportion of "don't know" or neutral responses to knowledge questions (Fig. 3). With the exception of four items, performance on knowledge questions did not differ significantly between HCP professional groups. Medical professionals were most likely to recognise correctly the possibility of HPV-associated cervical dysplasia occurring in LGBQ women. Allied health professionals were most likely to answer questions correctly on prevalence of smoking among sexuality and gender diverse people, private health insurance cover among TGD people, and differences in support structures of LGBTQI communities.

3.2.4. LGBTQI inclusive practice behaviours

In all professional groups, a minority of HCPs indicated that patient records at their workplace recorded sexual orientation (12%), sex assigned at birth (29%) and/or gender identity (40%) (Table 5). A minority (39%) reported that records allowed patients to indicate a non-binary gender, a practice that varied significantly between professions and was most commonly reported by allied health professionals (54%). Approximately a third of HCPs reported having LGBTQI friendly referral options (32%), workplace visible indicators of LGBTQI inclusivity (30%), and their workplaces having taken active steps to be LGBTQI-friendly (33%). LGBTQI-friendly referral options were significantly higher in allied health professions (42%) and those in leadership (53%), and allied health professionals (47%) were significantly more likely to report their workplaces had taken active steps to be LGBTQI-friendly, compared with medical (34%) and nursing (20%) professions.

3.3. Qualitative analysis

Quotes from the interviews and open-ended survey responses referenced within the thematic analysis below are contained in Table 6. Pseudonyms are used in quotes from interviews.

3.3.1. "This is not an issue that is flagged as being of high importance": systems barriers prevent LGBTQI culturally competent cancer care

Participants reported systems barriers to the provision of LGBTQI culturally competent cancer care, including lack of recognition of LGBTQI patients within education and health systems. Within the "overstretched" context of cancer care, HCPs indicated that other more pressing issues, such as "survival" (1) took precedence, meaning that LGBTQI culturally competent care is "not an issue that is flagged as being of high importance" (2). This was evidenced by lack of inclusion of LGBTQI content in education/training curricula and the invisibility of LGBTQI experiences in patient resources and cancer guidelines. For example, HCPs recalled having "nothing" in their training (3) or only "one or two lectures in my whole two-year master's" (4) that addressed LGBTQI topics. The specific absence of education/training regarding patients who are TGD or born with intersex variations was reported (5, 6), meaning that "brush stroke imagining" was all HCPs had to rely on (5). The need for LGBTQI-

Table 4
Proportion of participants correctly answering knowledge questions about LGBTIQ health, by HCP professional group.

	By professional discipline				Test for between-group differences		
	Overall						
	Medical (n = 87)	Nursing (n = 142)	Allied health (n = 69)	Leadership (n = 38)	Other (n = 20)	X ²	p
LGBTIQ patients may avoid or delay accessing health care due to difficulty communicating with providers, perceived stigma, or fear of discrimination (true)	277 (80.3%)	73 (85.9%)	110 (78.0%)	57 (86.4%)	13 (72.2%)	7.457	.114
Heterosexual women have more risk for breast cancer compared to lesbian women (false)	287 (83.2%)	73 (85.9%)	121 (85.8%)	52 (78.8%)	14 (77.8%)	3.342	.502
HPV-associated cervical dysplasia is only found in women with a history of heterosexual intercourse (false)	273 (79.6%)	79 (94.0%)	109 (77.3%)	51 (77.3%)	11 (61.1%)	18.250	.001
Regularly screening gay and bisexual men for anal cancer using the anal Pap test can increase a patient's life expectancy (true)	151 (44.2%)	32 (38.1%)	59 (42.1%)	37 (56.1%)	8 (44.4%)	5.275	.260
Sexuality and gender diverse people have a higher prevalence of smoking, compared with other individuals (true)	110 (32.0%)	31 (36.9%)	32 (22.7%)	32 (48.5%)	10 (29.4%)	15.174	.004
Trans and gender diverse people are less likely to have private health insurance than other people (true)	80 (23.3%)	29 (34.5%)	20 (14.3%)	16 (24.2%)	11 (32.4%)	13.923	.008
Sexuality and gender diverse people are likely to have different support structures (e.g. more likely to be single, have less family support, be supported by friends and ex-partners) (true)	202 (58.9%)	53 (63.1%)	72 (51.4%)	50 (75.8%)	17 (50.0%)	13.007	.011
Gay and bisexual men have higher rates of psychosexual distress during cancer than heterosexual men (true)	126 (36.6%)	30 (35.7%)	51 (36.2%)	29 (43.9%)	5 (26.3%)	2.701	.609
In Australia, same-sex partners of patients are recognised as next-of-kin and legally entitled to make decisions about the medical treatment of their partner (true)	222 (64.5%)	49 (58.3%)	100 (70.9%)	43 (65.2%)	10 (52.6%)	5.597	.231
Aboriginal people and people of colour may face discrimination within LGBTIQ+ communities (true)	205 (59.6%)	56 (66.7%)	75 (53.2%)	44 (66.7%)	13 (68.4%)	7.431	.115

Table 5
Proportion of participants reporting LGBTIQ-inclusive practice behaviours by HCP professional group.

	By professional discipline					Test for between-group differences	
	Overall						
	Medical (n = 87)	Nursing (n = 142)	Allied health (n = 69)	Leadership (n = 38)	Other (n = 20)	X ²	p
The patient records at my workplace enquire about a patient's:							
Sexual orientation	40 (12.1%)	15 (18.1%)	11 (16.9%)	3 (10.3%)	1 (6.3%)	7.761	.101
Sex assigned at birth	96 (29.2%)	27 (32.5%)	24 (36.9%)	3 (10.3%)	5 (31.3%)	7.605	.107
Gender identity	131 (39.7%)	30 (36.1%)	31 (47.7%)	14 (48.3%)	3 (18.8%)	6.056	.195
The patient records at my workplace allow patients to indicate a non-binary gender identity	127 (38.5%)	32 (38.6%)	44 (32.1%)	12 (41.4%)	4 (25.0%)	10.157	.038
I have referral pathways to other clinical, health or hospital services that I know are LGBTIQ friendly	105 (31.8%)	20 (24.1%)	37 (27.0%)	10 (34.5%)	4 (25.0%)	16.759	.002
There are visible indicators (e.g. rainbow flags, signs/posters) that my workplace is LGBTIQ friendly	100 (30.1%)	26 (31.3%)	34 (25.0%)	9 (29.0%)	3 (18.8%)	7.498	.112
My workplace has taken active steps to be LGBTIQ friendly (e.g. specific service and resource development, staff training)	110 (33.1%)	28 (33.7%)	28 (20.4%)	16 (53.3%)	7 (43.8%)	22.023	< .001

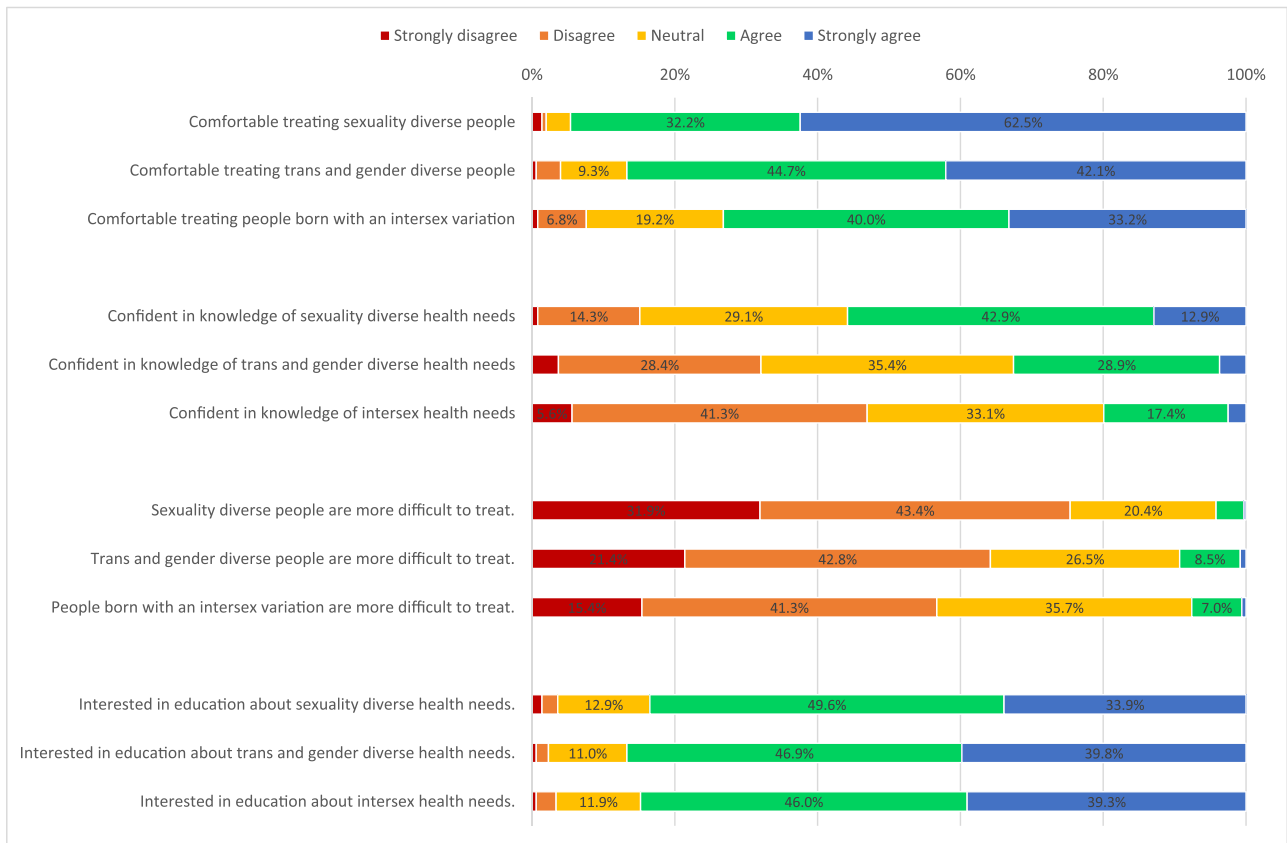


Fig. 1. HCP Attitudes towards cancer care for different LGBTQI patient groups.

targeted patient resources was widely acknowledged. One HCP described giving an LGBTQI cancer resource to a patient who “cried”, saying, “I’ve never had anybody give me something that’s specific to my sexuality” (7). Many HCPs explained that they had to use the

“same resources I would provide my non-LGBTQI patients” as “that’s an area that’s lacking” (8). These generic resources were not always suitable for LGBTQI patients, as one HCP commented, “I have a [transgender] woman with prostate cancer, all the books have men

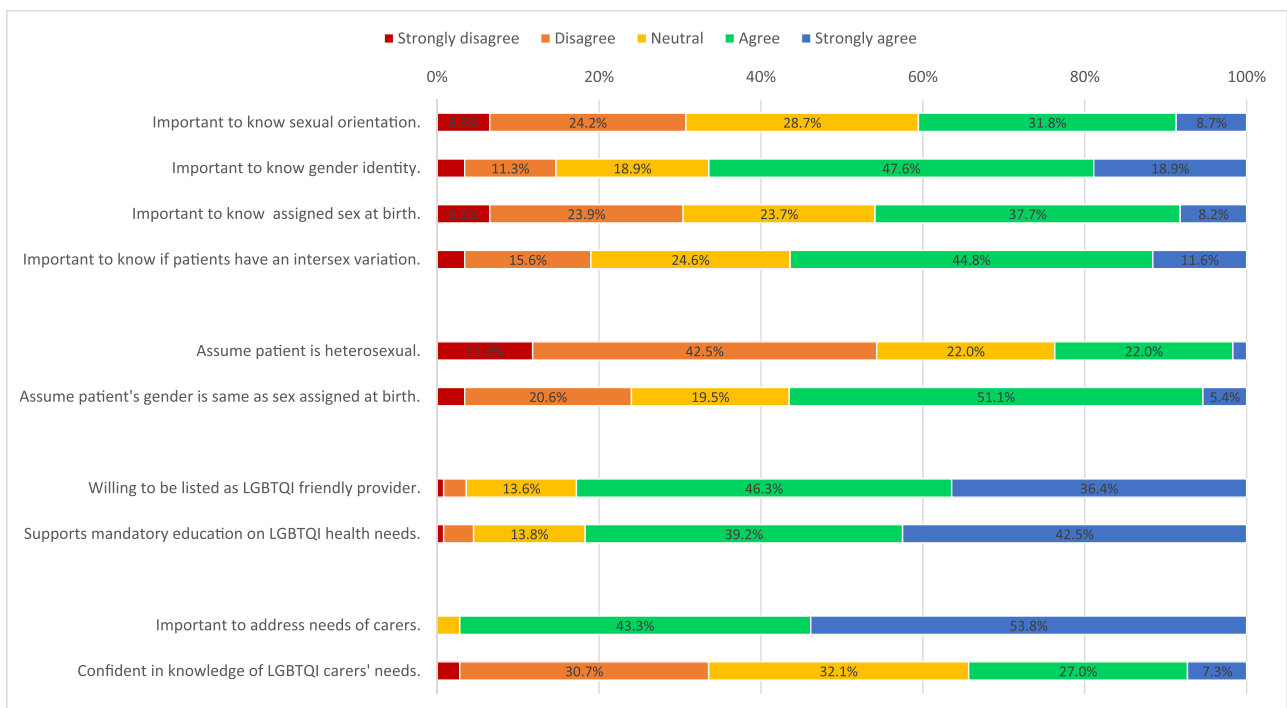


Fig. 2. HCP Attitudes towards LGBTQI cancer care. Responses less than 5% are not labelled on the figure.

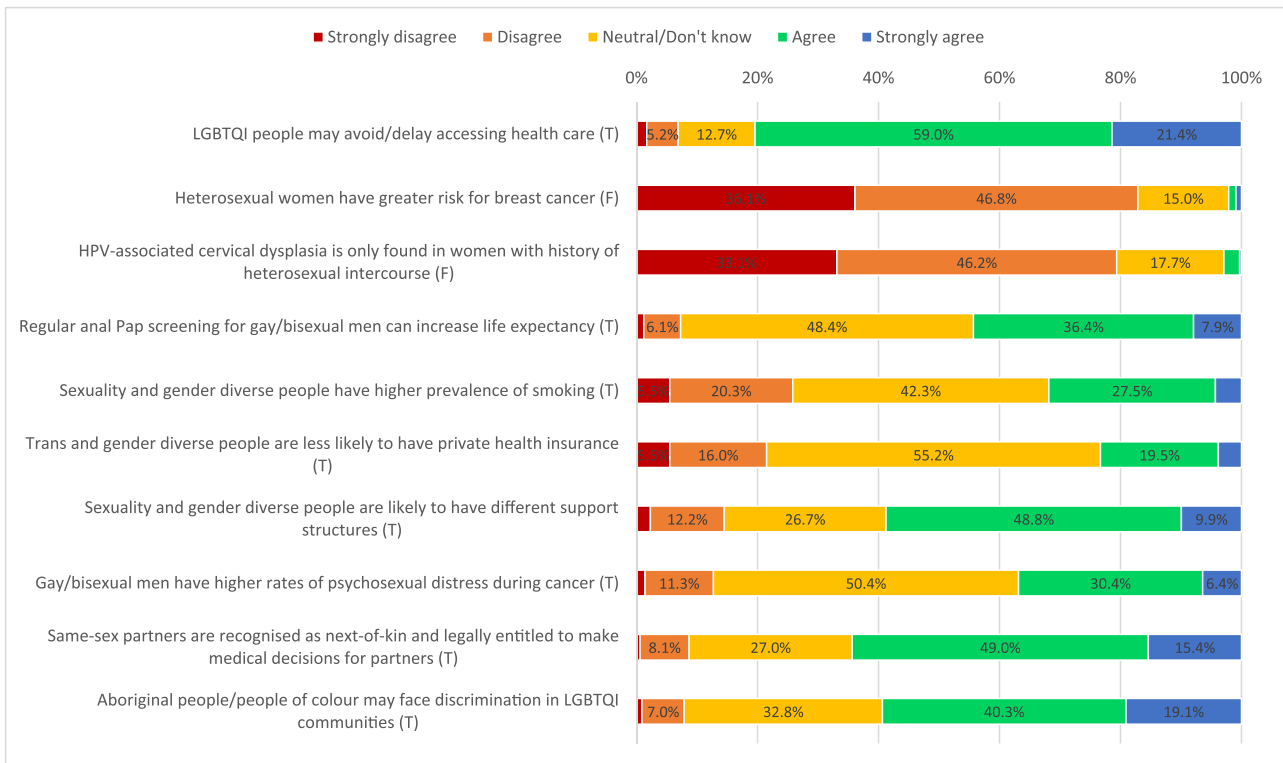


Fig. 3. HCP knowledge of LGBTQI health needs. T = true (strongly agree/agree responses are correct); F = false (strongly disagree/disagree responses are correct). Responses less than 5% are not labelled on the figure.

in them” (9). For topics such as intimacy “the slants and the tone [...]” were described as “often very much around conventional heterosexual couples” (10). HCPs also noted other barriers to the provision of culturally competent care such as being “time poor” (11), “very gendered language” on clinical documentation (12), “lack of structure” for how to “gain information” about LGBTQI status with patients (13) and limited “evidence in this space”, particularly the use of “hormone-based therapy to a person who has/is transitioning” (14).

3.3.2. “I’ve put my foot in it multiple times”: lack of knowledge and confidence about LGBTQI patient cancer care

HCPs reported poor knowledge and lack of confidence in working with LGBTQI patients, contributing to being unsure “if I’m doing the right thing” (15). Demonstrating reflexive awareness of their limited capacities to provide culturally competent care, HCPs were conscious of having “put my foot in it multiple times” (16), with the potential to “cause offence”, “damage rapport” (17) or appear “insensitive” (18). Many HCPs “worried” about asking “stupid” (19)

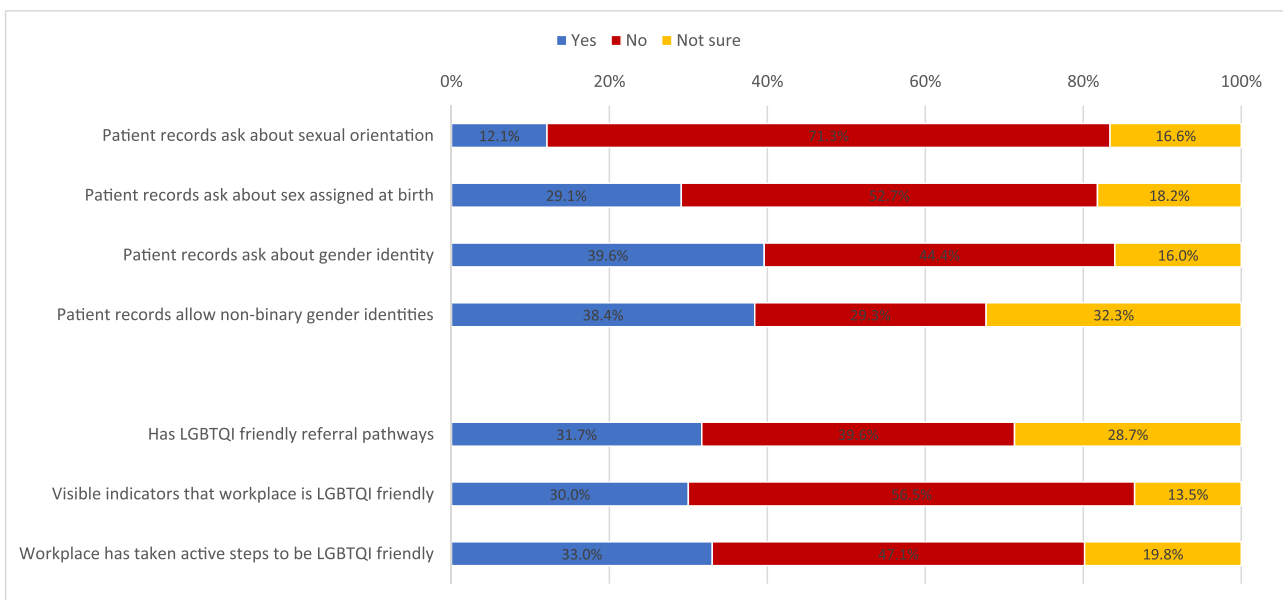


Fig. 4. LGBTQI inclusive practice behaviours.

Table 6
Interview and open-ended survey responses.

Systemic barriers prevent LGBTQI culturally safe care

There are two barriers. One of them is knowledge and education. And the other issue is prioritization. The problem with the system in general is that it is extremely overstretched. And so what happens is that when people have limited resources, what they do is they go for is the big stuff. So, you know, what's going to impact this person's survival? Is it going to kill them. [Gary, Med, 52, Male, Hetero] (1)

This is not an issue that is flagged as being of high importance and therefore has not been addressed." [Survey, Med, 43, Male, LGBTQ] (2)

There was nothing in my clinical training to educate me in correct provision of clinical care and support for LGBTQI+ please educate me. [Survey, Allied, 51, Female, Hetero] (3)

I had one or two lectures in my whole two-year Masters that were around LGBTQ issues. [Natasha, Med, 29, Female, Hetero] (4)

I don't recall ever having any specific training in the medical treatment of gender diversity, so I can broad brush strokes imagine what it means in terms of, you know, hormone and then surgical treatment. But I've never had an actual training in that. [Brett, Med 37, Male, LGBTQ] (5)

I don't have any training in the healthcare setting on how to care for trans and gender diverse or intersex patients. And I think it is different. [Lizzie, Allied, 28, Female, Hetero] (6)

I did give [a resource specific for gay and bisexual men with prostate cancer] to a man one day and he cried because he said, 'I've never had anybody give me something that's specific to my sexuality' [Cindy, Nurse, 58, Female, Hetero] (7)

[I use] the same resources I would provide my non-LGBTQI patients. That's an area that's lacking. [Ayomi, Med, 35, Female, Hetero] (8)

[There is] minimal written information for transgender patients. I have a woman with prostate cancer, all the books have men in them. [Survey, Nurse, 59, Female, Hetero] (9)

Even though we're starting to talk more openly about the importance of psychosocial well-being for all groups, for LGBTQI patients it is very rarely verbalised. Even if you look at things like intimacy as a way of helping people going through any health crisis, the slants and the tone of information is often very much around conventional heterosexual couples. [Russel, Med, 42, Male, Gay] (10)

The biggest problem is not a lack of enthusiasm. It is being time poor. It's something you actually have to have time to do. [Russel, Med, 42, Male, Gay] (11)

Our consent forms, they use very gendered language. So they'll be talking about women being pregnant and men fathering. They don't use inclusive language. That's going to make a patient feel very uncomfortable and it also might mean that you're not taking their health needs into consideration. [Lane, HCP (other), 26, Non-binary, LGBTQ] (12)

There is a lack of structure to how I gain information from individuals in relation to their gender identity [Survey, Nurse, 51, Female, Hetero] (13)

As a medical oncologist I worry when I need to give hormone-based therapy to a person who has / is transitioning. I don't feel that there is enough evidence in this space. [Survey, Med, Female, 37, Hetero] (14)

Consequences of barriers for patient care

I don't know if I'm doing the right thing. I don't feel confident. I still feel like I don't quite get it, which I guess is like anything when you don't have lived experience. [Lexie, Allied, 27, Female, Hetero] (15)

I've had two Trans patients probably in the last 15 years, I know for a fact, I've put my foot in it multiple times, calling them by their gender assigned at birth as opposed to their actual gender they consider themselves. [Damien, Med, 42, Male, Hetero] (16)

My capacity to get it wrong is massive and it's not comfortable. And then if I'm uncomfortable about my language, that does slow the session up. [...] My hesitancy comes from my lived experience of having two daughters who identify as LGBTQI, I'm absolutely clear that my language does not meet par, I have been roundly criticised for stuffing up on occasion. I would not want to cause offence or damage rapport by getting it wrong. [Leanne, Allied, 47, Female, Hetero] (17)

My confidence initiating conversations [about LGBTQI+ matters] is low because I don't know enough about it and I don't know, like, how do people perceive these kind of questions. I don't want to look insensitive [Jessica, Nurse, 38, Female, Hetero] (18)

I still worry about asking stupid questions, knowing I won't get it right all of the time!" [Survey, Nurse, 49, Female, Hetero] (19)

It's been in a more recent concept that I've started to be aware of the different pronouns that are in use. So I think that I'd possibly be a bit concerned about accidentally tripping over and using the wrong pronoun [Melanie, Nurse, 50, Female, Hetero] (20)

I guess I just I don't have a great grasp on all of the language and who falls under which bracket. [Jessica, Nurse, 38, Female, Hetero] (21)

Table 6 (continued)

Mistaking partners for a supportive friend often occurs. Especially during training years when you don't have a long-term relationship with a patient. [Survey, Med, 35, Male, LGBTQ] (21)

I know of no LGBTQI friendly organisation that we refer anyone to, to be honest. [Lizzie, Allied, 28, Female, Hetero] (22)

I have no concept about what gender reassignment surgery involves. So I would be lacking in confidence if I was treating somebody who'd been through that. [...] I would feel very much out of my comfort zone. It would be a steep learning curve for me. [Brett, Med 37, Male, LGBTQ] (23)

[I'm not confident because] I haven't had experience with an intersex person in any health care setting. I wouldn't be terrible, but I'm not very knowledgeable about it because I haven't had any experience. [Darren, Allied, 53, Male, Gay] (24)

Apart from knowing it exists, I don't know what like an intersex experience would look like. And I don't know how that would affect someone day to day [...] I just don't know what I would need to be doing to work with someone who's intersex, do I need to do anything? I don't know. It's just a lot of question marks. [Lexie, Allied, 27, Female, Hetero] (25)

I have to mash knowledge together. For example, if it's a homosexual man and he's in a relationship with a long term partner, I have to think about what knowledge is there in terms of being able to have intercourse and how do I go about approaching this? I'm precariously putting all the information a really bad jigsaw puzzle. [Alia, Allied, 31, Female, Hetero] (26)

A junior nurse was giving chemo education to a patient and the patient had to say, "Well, no, I'm in a relationship with a woman, what should I do in terms of staying safe?" and the nurse didn't know. She had to come and ask everybody else and then, of course, that kind of breaches patient confidentiality. [...] It would have made it hard and awkward for the patient, having to out herself then the nurse having to go and ask everybody. [Amelia, Nurse, 35, Female, LGBTQ] (27)

It's really difficult to work with lots of incredibly intelligent, talented people who have studied decades but realise that they might say something completely, just not OK. But they didn't realize it's not OK. [Alia, Allied, 31, Female, Hetero] (28)

I went to a workshop about cancer patients and their sexual health and I remember coming back the next day and saying to a colleague - he is young and I think he thinks he's very progressive - But he was like, oh, that's just about pronouns and stuff. And I was like, oh, it's a bit more than that. So, yeah, thinking you are doing a great job, but you don't actually know everything. [Lizzie, Allied, 28, Female, Hetero] (29)

Improving LGBTQI patient care

We're hungry for knowledge, and I think we have the capacity. We just don't know where to channel that capacity. And it would be nice to come from a place that's official and not kind of like us kind of patch working things together. [Alia, Allied, 31, Female, Hetero] (30)

We want to do a good job. We want to provide patients with the care they need. I think if people are made aware of how things might be done differently, I'm confident a large majority would be happy to do that. [Gary, Med, 52, Male, Hetero] (31)

I've spent a little bit of time on a couple of websites. Literally, I Googled them, so it relies on you deeming that the quality of the information is good and accessible, but also having the nous to do it. [Jessica, Nurse, 38, Female, Hetero] (32)

Yeah, just reading about people's personal experiences and applying what they've said has helped them to our situations. It's just being well read and understanding of different people's lived experiences and then applying that to my patients. [Lane, HCP (Other), 26, Non-binary, LGBTQ] (33)

I watched a few talks at a conference and I was like, oh, my God, why? It's just a sudden moment of, what are we doing? Why are we not doing a bit more? So this sparked me to look for more resources. [Naomi, Allied, 28, Female, Hetero] (34)

What I don't want to do is go off on an angle that I find is most appropriate when in fact it's not supported by health policies or regulations. I think I've actually stepped back in that direction by saying I really don't know enough and I don't want to put myself out there giving people the wrong information and actually being terribly wrong for them because they trust the health worker. [Kelly, Nurse, 60, Female, Hetero] (35)

Would welcome more education to improve my understanding of the additional considerations needed for LGBTQI community members. [Survey, Nurse, 60, Female, Hetero] (36)

I think there needs to be more training on even just the basics, neutral language, person first language, heteronormativity and all that stuff. [Natasha, Med, 29, Female, Hetero] (37)

Before we do anything in health that opens up the opportunity for people to disclose, we need to have people that are very well trained to receive that information, but also to know what to do next with that information. [Kelly,

(continued on next page)

Table 6 (continued)

Nurse, 60, Female, Hetero] (38)
 Cancer support services need to have regular and ongoing training on all the types of diversity that they would very likely be seeing. I would really love services to be thinking most about sister girls. If you're thinking well about sister girls, chances are you're thinking well about everybody else. So kind of really ensuring that there's training that adequately considered not only the Trans experience, but Trans people across all the intersections. [Justin, Leader, 41, Male (TGD), Gay] (39)
 I'd like to have some guidelines, some training to at least make sure that I know what I'm doing is on the right track. Working with the LGBTQI population, I find that those guidelines can be a little bit lacking. We are [all] on different spectrums of where this knowledge has come from and what we know. It all just is dependent on what kind of patient groups we've been exposed to, what our backgrounds are. [Alia, Allied, 31, Female, Hetero] (40)
 Identifying on paperwork sexual and gender orientation of all people and making this the norm I think would be good. It would ensure all medical services are open to all people and as part of their remit provide a conversation around how a patient's sexuality and gender are impacted by their medical journey. [Survey, Leader, 60, Male, LGBQ] (41)
 Need to update our forms, education for health care professionals would be extremely useful especially for those who have had no experience looking after LGBTQI." [Survey, Nurse, Female, 59, Hetero] (42)
 I would like to have resources. Help type resources of where my patients could go to for help, support which is specifically for LGBTI and also the educational resources that would help me to understand better so that I could provide a better service to my patients. [Omar, Med, 60, Male, Hetero] (43)
 Having visual cues, it doesn't have to be all everywhere, you know, like over the top, because I feel like that's disingenuous. But I think just those little things that people might see might just kind of like touch them and let them know that this is a safe place. [Brooke, Nurse, 30, Female, Hetero] (44)
 If there was something available to say, you know, we respect and celebrate gender diverse individuals here, please feel free to ask us questions about how your cancer or its treatment might impact on your gender or sexuality. You might empower patients just enough that everyone could meet in the middle. [Grant, Med, 32, Male, Gay] (45)

Pseudonyms are used for quotes from interviews. Abbreviations: Med = Medical professional; Allied = Allied health professional; Nurse = Nursing professional; Leader = Leadership position; Hetero = Heterosexual; LGBQ = Lesbian, gay, bisexual or queer; TGD = Trans and gender diverse.

questions and “using the wrong pronoun” (20) because of not having “a great grasp on all of the language and who falls under which bracket” (21). HCPs also discussed difficulties identifying LGBTQI patients such as “mistaking partners for a supportive friend” (22), lack of confidence “initiating conversations” about LGBTQI matters (18) and not knowing any “LGBTQI-friendly organisation” to refer patients to for support (22). More specifically, a number of HCPs reported feeling “out of my comfort zone” (23) when working with transgender or intersex patients because of being “not very knowledgeable about it because I haven't had any experience” (24), which meant “I don't know what like an intersex experience would look like” (25). Across the board, participants described having to “mash knowledge together” into a “really bad jigsaw” (26) in attempts to meet LGBTQI patient information needs. This was not always successful. For example, one HCP described a colleague having to “come and ask everybody else” about safe sex for a lesbian patient during chemotherapy education and feared that this “breached confidentiality” and would have “made it hard and awkward for the patient” (27). Colleagues were described as being unaware of their limitations, with “incredibly intelligent, talented people who have studied decades” being overheard to “say something completely just not okay, but they didn't realise it's not OK” (28) and having the assumption that it is all “just about pronouns” (29).

3.3.3. “We want to do a good job”: a desire to improve LGBTQI patient cancer care

The desire to develop culturally competent LGBTQI cancer care was evident in the majority of HCP accounts. HCPs described themselves being “hungry for knowledge” (30) and wanting “to do a good job” to “provide patients with the care they need” (31), but

within current healthcare contexts this required having “the nous” (i.e. initiative) (32) to seek out information independently to improve knowledge and capacity. HCPs reported having “Googled” information (32), engaged in “reading about people's personal experiences” (33), and attending conference presentations on LGBTQI topics (34). However, many were concerned about the “quality” and currency of information (32), for fear of “giving people the wrong information” that was “not supported by health policies or regulations” (35). HCPs wanted systemic, institutional support to improve cultural safety LGBTQI cancer care. This included more education and training (36, 37, 38) on LGBTQI patients “across all the intersections” of identity (39); detailed guidelines for how to work with LGBTQI patients (40); “updated” intake forms that reflects LGBTQI demographics (41,42); targeted patient resources and support (43); and “visual cues” to let LGBTQI patients know this is a “safe place” (44), so that they “feel free to ask us questions about how cancer or its treatment might impact on your gender or sexuality” (45).

4. Discussion and conclusion

4.1. Discussion

The findings of this study confirm and extend previous reports that many HCPs want to provide culturally competent care to LGBTQI cancer survivors and their families [1,2,15]. Most HCPs reported being comfortable working with LGBTQI patients and were willing to be listed as LGBTQI-friendly professionals confirming absence of overt prejudice [26,27,29,30]. However, we found significant gaps in HCP knowledge of the healthcare needs of LGBTQI patients, consistent with prior research [23–28], and many HCPs reported lacking confidence [24,27], most notably with TGD patients, as reported previously [22–24], and lowest with intersex patients, a unique finding of our study. TGD and intersex patients were perceived to be more challenging to treat, which was attributed to limited HCP education/training and/or experience, and the absence of evidence and guidelines to inform practice. Only a small minority of HCPs had received formal education/training on the healthcare needs of LGBTQI patients, and that content was least likely to be inclusive of TGD and intersex patients. The majority agreed that such education/training should be mandatory for HCPs, confirming previous research [23,24,26].

A strength of this study was the mixed-methods design, the inclusion of a range of HCP professional backgrounds, a sample drawn primarily from outside of the USA, and the evaluation of perspectives of LGBTQI patients across a range of sexuality and gender identities. A modest limitation was that our participants were a self-selected sample, including a high proportion of HCPs who reported being LGBTQI themselves and/or having LGBTQI family or friends, and a majority were women. Our sample may therefore over-represent HCPs who have already adopted LGBTQI-inclusive practice behaviours.

4.2. Conclusion

The perceived lack of relevance of a patients' SOGI status, reported by many HCPs and similar to a recent survey of US-based oncologists [24], is symptomatic of limited understanding of psychosocial vulnerabilities and specific LGBTQI patient information needs [5–7]. For example, patients may have concerns about how treatment-related bodily changes may affect their sexuality and gender identity, how cancer treatment may interact with hormone therapies for intersex variations or gender affirmation, and feel that HCPs enforce cis-heteronormative gender expectations [40,41]. Previous experiences of prejudice and discrimination in medical care [3], including medical interventions experienced by patients with

intersex variations without their consent [42] may affect a sense of safety in cancer care and how patients interact with HCPs. When coupled with difficulties initiating conversations about LGBTQI matters, HCPs assumptions and omission to facilitate LGBTQI disclosure can contribute to patient distress, distrust [22] and invisibility [3]. This can result in unmet needs, including lack of acknowledgement and inclusion of partners and carers, [9] and limited LGBTQI specific information [3].

4.3. Practice implications

Our findings reinforce the conclusion of The American Society of Clinical Oncology [2] that systemic changes are required to overcome barriers to the provision of culturally competent cancer care for LGBTQI patients [40]. Practical initiatives start with provision of LGBTQI content in HCP education and professional training curriculum (i.e. via universities, professional societies and training organisations), to build HCP confidence, improve knowledge, and challenge unconscious bias and ingrained cis-heteronormative practices [27,40]. Content pertaining to the LGBTQI community in general and specific to each sub-group is recommended. Specific practices to improve culturally competent LGBTQI cancer care include: avoiding assumptions that patients are heterosexual and cisgender by asking patients their preferred name and pronoun; not making assumptions about the person accompanying patients to appointments by asking if the patient has support and from whom, and including same-sex partners in care; and offering every patient the opportunity to discuss sexual health and fertility concerns [3,15,30,40].

Institutional (i.e. cancer centres, cancer-related community organisations) recommendations for LGBTQI-inclusive practice include the display of LGBTQI images and logos in health settings; availability of gender neutral bathrooms; the provision of tailored LGBTQI-inclusive supportive resources, and inclusion of LGBTQI people in general cancer information; and availability of LGBTQI support groups [3,27,40]. Intake forms should include sexual orientation, gender identity, and preferred name and pronoun [27,40], thereby facilitating patient disclosure and reducing patient and HCP discomfort [22]. Co-design of HCP education/training and environmental modifications with LGBTQI stakeholders can help to ensure the cultural competence and safety of these interventions [33,43]. In combination, these measures increase the likelihood of HCPs providing culturally competent and inclusive cancer care for LGBTQI patients and their carers, with positive implications for patient health outcomes and satisfaction with care.

Author statement

All authors have made substantial contributions to (1) the conception and design of the study, or acquisition of data, or analysis and interpretation of data, (2) drafting the article or revising it critically for important intellectual content, (3) final approval of the version to be submitted.

CRediT authorship contribution statement

Jane M. Ussher: Conceptualization, Funding acquisition, Formal analysis, Investigation, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing. **Janette Perz:** Conceptualization, Funding acquisition, Formal analysis, Investigation, Methodology, Project administration, Supervision, Writing – review & editing. **Kimberley Allison:** Investigation, Writing – original draft, Writing – review & editing. **Rosalie Power:** Investigation, Writing – original draft, Writing – review & editing. **Alexandra Hawkey:** Investigation, Supervision, Writing – review & editing. **Gary W. Dowsett:** Conceptualization,

Funding acquisition, Writing – review & editing. **Martha Hickey:** Conceptualization, Funding acquisition, writing – review & editing. **Chloe Parton:** Conceptualization, Funding acquisition, Writing – review & editing. **Fiona E.J. McDonald:** Conceptualization, Funding acquisition, Writing – review & editing. **Ian D. Davis:** Conceptualization, Funding acquisition, Writing – review & editing. **Gwendolyn P. Quinn:** Conceptualization, Writing – review & editing. **Katherine Boydell:** Conceptualization, Funding acquisition, Writing – review & editing. **Kerry H. Robinson:** Conceptualization, Funding acquisition, Writing – review & editing. **Suzanne Chambers:** Conceptualization, Funding acquisition, Writing – review & editing. **Antoinette Anazodo:** Conceptualization, Funding acquisition, Writing – review & editing.

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Declarations of interest

The authors have no competing interests to declare.

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