

BMJ Open Impact of education and training on LGBT-specific health issues for healthcare students and professionals: a systematic review of comparative studies

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ABSTRACT

Objectives Training/education is increasingly used to improve healthcare professionals' knowledge, attitudes and clinical skills about lesbian, gay, bisexual and transgender (LGBT) health, but few reviews have assessed their effectiveness. This review describes the impact of training about LGBT healthcare for healthcare professionals on participants' knowledge, attitudes and clinical practice.

Design Systematic review of intervention studies with contemporaneous comparators.

Data sources Medline, CINAHL (Cumulated Index in Nursing and Allied Health Literature), PsycINFO, Social Sciences Citation Index, Education Resources Information Center, Cochrane Library, University of York CRD, PROSPERO and Ethos e-thesis database were searched from 15/12/2015 to 29/11/2023 to update a review published in 2017.

Eligibility criteria Interventional studies of training/education for healthcare professionals or students about LGBT-specific health issues, compared with standard or no training/education. Outcomes were changes in participants' knowledge, attitudes or clinical practice regarding LGBT health.

Data extraction and synthesis Reviewer pairs independently screened titles/abstracts and full texts. Data were extracted by one reviewer and checked by a second (population, training content, development, delivery, duration/intensity and outcomes). The National Institutes of Health tool for controlled intervention studies assessed study quality. Synthesis was descriptive.

Results 11 734 citations were screened, and 10 studies were included. 8/10 were published since 2019. Study quality was poor (8/10) or fair (2/10), and all were conducted in high-income countries. Four focused on transgender care. All studies used multi-component approaches, with topics covering terminology, lived experience, LGBT-specific health, sexuality and sexual history taking. Training duration ranged from 40 min to 50+ hours. Five studies included LGBT individuals in training development and/or delivery. 7/7 studies assessing attitudes, 2/4 studies assessing knowledge and

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ Robust systematic review methodology was followed using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines to update the findings of a previous review published in 2017.
- ⇒ The heterogeneity of training content, mode of delivery, intensity, duration and outcome measures used in included studies precluded quantitative synthesis of findings, so the review analysis was descriptive only.
- ⇒ Most included studies were of poor quality and did not include longer follow-up periods, making it difficult to determine the longevity of any observed improvements in participants' knowledge, attitudes and skills/practice regarding lesbian, gay, bisexual and transgender health following training interventions.

4/6 studies assessing skills/practice (actual or intended) reported statistically significant improvements.

Conclusions Multi-component healthcare professional training on LGBT health can significantly improve participants' knowledge, attitudes and skills. However, there was substantial heterogeneity in training content, delivery and duration, and most studies were of poor quality.

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INTRODUCTION

Lesbian, gay, bisexual and transgender (LGBT) health refers to the physical, mental and emotional well-being of people who identify as lesbian, gay, bisexual or transgender. While recognising the diversity of LGBT people, evidence suggests common experiences affecting their health and well-being. They may experience violence,

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criminalisation or involuntary medical procedures¹ and are also less likely to access health services^{2,3} or engage with healthcare professionals.⁴ LGBT people are also more likely to experience denial of care, discriminatory attitudes, bias and inappropriate pathologising in healthcare settings in relation to sexual orientation, gender identity expression and sex characteristics.^{5–9} The discrimination experienced by LGBT people is associated with multiple adverse health outcomes including higher incidence of long-term conditions,¹⁰ greater likelihood of following risky health behaviours,¹¹ greater incidence of sexual health problems,² mental health issues¹² and poorer health outcomes.^{13,14}

Recognising the pivotal role of healthcare professionals in addressing health inequalities experienced by LGBT communities, improving professionals' interaction with and healthcare delivery to LGBT people has been identified as a key means of intervention.¹⁵ This may be through adapting educational curricula in a range of ways or providing training on LGBT-specific health issues. One form of training focuses on 'cultural competence', which refers to the ability to collaborate effectively with individuals from different cultures, with cultural competence shown to improve healthcare experiences and outcomes.¹⁶ Principles of LGBT cultural competence can be integrated within healthcare professional education through training to improve healthcare workforce knowledge and skills when engaging with members of the LGBT community to reduce stigma and discrimination.¹⁷ The effectiveness of such training has been of increasing interest, and several recent reviews have highlighted the potential of training to enhance multiple aspects of LGBT care, including the promotion of positive knowledge, skills, attitudes and behaviours.^{15,18,19} There is ongoing discourse surrounding the definitions, content and aims of training,²⁰ and there have been recent critiques of the cultural competence model of training and its focus on the acquisition of skills and knowledge, suggesting instead that training should focus on 'cultural humility', which emphasises intersectionality and the importance of individuals reflecting on their own beliefs and cultural identities.²¹

The incidence and pattern of discrimination experienced by LGBT communities varies internationally and domestically.²² Additionally, LGBT terminology is dynamic and can vary by region or country, highlighting the broad range of LGBT communities and identities. Because of this variability, the extent to which interventions such as cultural competence training are viable and applicable across cultures and legal jurisdictions is important for determining effective training development and implementation. Systematic reviews indicate that most research has taken place in high-income countries.^{15,17} Evidence is also lacking about the effectiveness of training and education interventions as assessed through high-quality comparative, randomised or non-randomised controlled study designs. This systematic review aims to describe the effect of training or education about LGBT sexuality and

healthcare issues for healthcare professionals on participants' knowledge, attitudes or clinical practice (actual or intended), by focusing on the findings from primary studies including intervention and comparison groups. In doing so, it aims to identify the effective components of training that could be implemented within healthcare professional education in diverse settings.

METHODS

This review was undertaken and reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines²³ (online supplemental file 1). No protocol is available, but the review was prospectively registered on PROSPERO (CRD42023414431) in June 2023 (online supplemental file 2) as an update of a previous published review,¹⁷ with the results from the previous review retained and supplemented with information from studies identified in the update. The review aim was to identify and report the findings of comparative studies which included intervention and comparison groups.

Search strategy and data sources

The search strategy (online supplemental file 3) included MeSH and individual terms related to sexuality and LGBT groups, education, training, healthcare professionals/students, knowledge and attitudes, adapted as appropriate for each database. OVID Medline, CINAHL, PsycINFO, Social Sciences Citation Index and Education Resources Information Center. The Cochrane Library, University of York Centre for Reviews and Dissemination and PROSPERO databases were searched to identify ongoing and published systematic reviews. The Ethos electronic thesis database was also searched. No restrictions were placed on the country of publication or language. The reference lists of included studies were searched to identify eligible studies that may have been missed by the database searches. The original review searched each database from inception to 15 December 2015.¹⁷ Update searches used the same search strategy, with searches undertaken from 15 December 2015 to 29 November 2023.

Study selection

Eligibility criteria were designed using the PICOS approach (Population, Intervention, Comparison, Outcomes, Study design). The population of interest was medical doctors, dentists, nursing and midwifery professionals and pharmacists receiving training or education at undergraduate or postgraduate level. Studies with mixed populations were included if more than 50% of participants came from the populations of interest. Eligible interventions were any form of training or education given to healthcare professionals or students relating to sexuality and LGBT-specific health issues, with comparators being standard training and education or no training/education on LGBT-specific issues. Outcomes of interest were changes in participants' knowledge, attitudes or clinical

practice in relation to sexuality and LGBT health. Search results were divided into batches, with titles/abstracts and full texts independently screened for eligibility by pairs of reviewers (SD, AR, KJ, AOS, IO, BM-A), with disagreements resolved through discussion.

Data extraction

A pre-piloted spreadsheet was used, with data extracted by one reviewer in each pair and checked by the second. Data extracted were study information (year conducted, country, study design), study population, description of training/education (content and how developed), training/education delivery (how delivered and by whom), intensity (number of sessions and duration) and quantitative study outcomes.

Quality assessment

The methodological quality and internal validity of included studies were assessed using the National Institutes of Health National Heart, Lung and Blood Institute tool for assessing controlled intervention studies (<https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools>). Studies were assessed on their reporting of randomisation and blinding, sample size calculation, adherence and dropout rates, validity and consistency of outcome measures and data analysis. Assessments were independently conducted by one reviewer and checked by a second, with disagreements resolved through discussion.

Data analysis

Due to heterogeneity in study design, training/education content and delivery and the outcome measures used in included studies, a quantitative synthesis was not possible. Synthesis was narrative, describing training/education delivery and exploring study findings in relation to the key outcomes of knowledge, attitudes and changes to clinical practice.

Patient and public involvement

None.

RESULTS

Overview of studies

Searches identified 11 708 studies, with 26 studies identified through other sources. After duplicate removal, the titles and abstracts of 10 476 studies were screened for eligibility. Of these, 10 305 were excluded, and the full texts of 171 studies were reviewed. A total of 161 studies were excluded following full-text screening because studies were not comparative (n=117), training content was not related to LGBT health (n=22), studies did not include the specific population(s) (n=15) or studies included no quantitative outcomes data (n=7). Ten comparative studies were included in the current manuscript.^{24–33} Study selection is detailed in the PRISMA flow diagram (figure 1).

Study quality

Eight studies were deemed to be of poor quality,^{24 25 27 28 30–33} with the remaining two deemed as fair quality.^{26 28} Study methods relating to processes of randomisation and blinding were typically unreported or could not be determined, with few studies undertaking subgroup analyses and only one reporting that an intention to treat analysis was undertaken.²⁴ Sample size calculations were absent from all studies, with generally high participant dropout rates both overall and between intervention/comparison groups (online supplemental file 4).

Study characteristics

The characteristics of the included studies are shown in online supplemental file 5. The majority of studies (n=8) were undertaken in the USA,^{24 25 28–33} one in Spain²⁶ and one in the UK.²⁷ All studies were published from 2019 onwards, with the exception of two published in 1979²⁷ and 1985.²⁵ Seven studies were carried out at a single centre,^{24–28 30 33} and three (all in the USA) recruited participants from multiple sites/institutions.^{29 31 32}

Study designs

Three studies were described as randomised controlled trials.^{28 29 31} The remaining studies were all pre-post intervention studies with concurrent comparison groups without participant randomisation, with the exception of one study in which the intervention group was randomised but not the comparison group.²⁶ Two studies included more than one intervention arm.^{26 28} Six studies assessed outcome measures using between-group comparisons of intervention and control groups^{24–26 28 30 33}; one study reported both between-group and within-group comparisons,²⁹ and three studies reported within-group changes to their chosen outcome measure(s) only.^{27 31 32}

Participant characteristics

Seven studies included undergraduate populations: three focused on nursing students,^{24 26 30} three recruited undergraduate medical students^{25 27 28} and one included a mixed population of medical students, nurses and physician assistants.²⁹ The remaining studies recruited participants at postgraduate level, including oncologists,³¹ nurses³³ and healthcare professionals involved in providing perinatal care (obstetricians, nurse-midwives, nurse practitioners, registered nurses and physician assistants).³² Four studies did not report a breakdown of participant characteristics.^{24 25 27 31} The remaining six studies all reported two or more key characteristics of participants based on sex,^{26 28–30 33} age,^{26 29 30 32 33} sexuality^{26 28 32 33} and ethnicity.^{28 30 33} Of the six studies reporting participant characteristics, three did so separately for the intervention and comparison groups^{26 28 33}; the other studies reported study-level rather than group-level characteristics.^{29 30 32} Studies in which the number of participants could be determined (n=9) included a total of 1229 individuals (range 68–200; mean 137). Eight studies reported the number of participants by group, describing a total

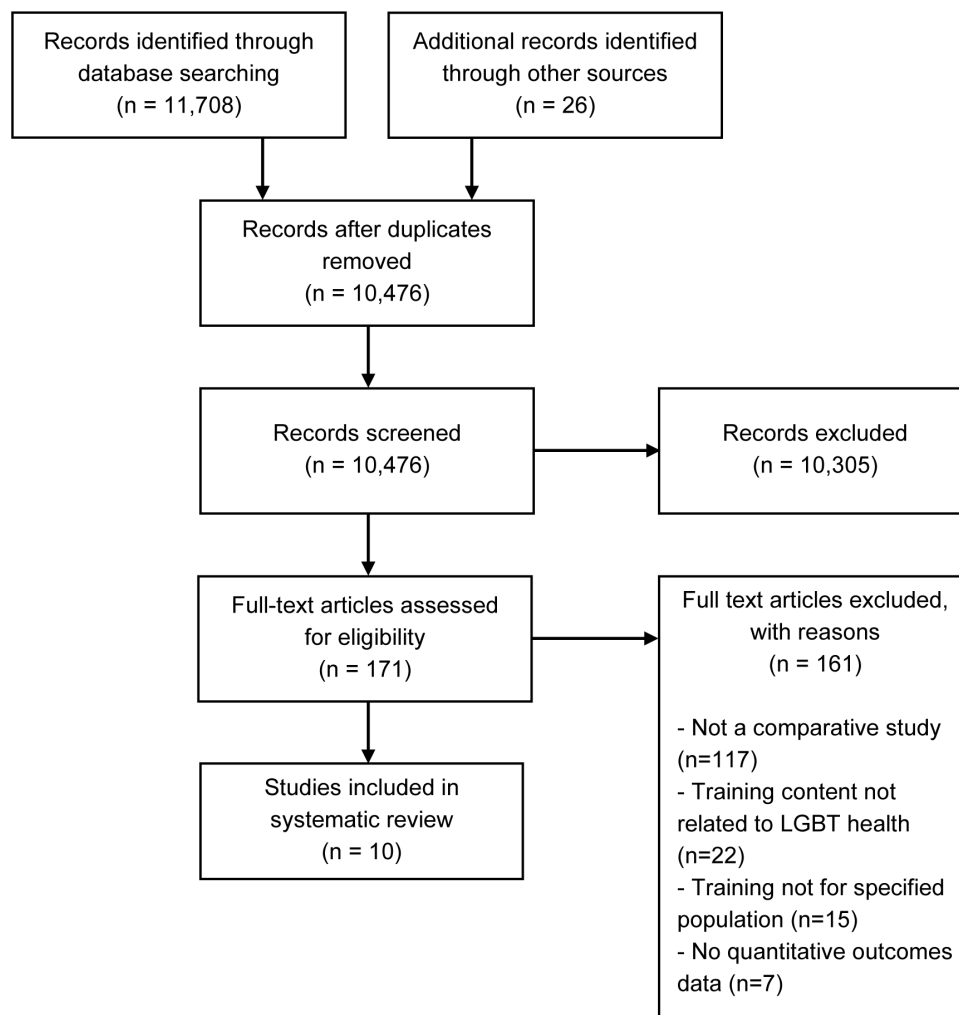


Figure 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram. LGBT, lesbian, gay, bisexual and transgender.

of 518 individuals receiving interventions (range 16–99; mean 64) and 486 individuals in comparison groups (range 28–88; mean 61).

Characteristics of training

Online supplemental file 6 summarises training content, methods, duration and development/delivery. Four studies delivered training about healthcare for transgender people.^{24 26 29 30} Three included topics relating to caring for LGBT patients.^{28 31 32} Two focused on healthcare for gay and lesbian people.^{25 27} One study delivered a training course on healthcare disparities experienced by a range of groups (eg, elderly, disabled patients), which included issues specific to sexual and gender minority patients.³³

Training content

All studies included multi-component training covering multiple topics. Five main training topics were covered: terminology and key terms; lived experience, stigma and discrimination; LGBT-specific health issues and health disparities; sexuality and sexual dysfunction and sexual history taking. Three studies reported the inclusion of

key terms and terminology relating to LGBT individuals³² or gender identity and the correct use of pronouns for transgender people.^{24 29} Six studies included content relating to LGBT or transgender lived experience, stigma and discrimination. Content covered societal biases and healthcare delivery,²⁵ experiences of healthcare services,^{26 29} implicit bias,²⁸ cultural sensitivity³¹ and the influence of cisnormativity and heteronormativity on patient care.³² LGBT-specific health and health disparities were covered in the training delivered in six studies. Four of these focused on healthcare and sexual health issues specific to transgender people^{24 26 30} or transgender youth specifically.²⁹ Two studies focused on specific medical problems experienced by members of gay/lesbian communities²⁵ and sexual/gender minorities.³³ The two least recent studies were the only ones to focus on sexuality, sexual dysfunction and sexual history taking, both in relation to gay and lesbian communities. Hawton²⁷ described a human sexuality course with topics including sexual intercourse, masturbation and sexual dysfunction. Bauman and Hale²⁵ included course content on establishing rapport with patients and techniques for

taking patient histories. It is important to note that the language used, understanding of sexual identity and discourses around equality within these two early studies were framed using the terminology prevalent at the time of their publication (1979 and 1985, respectively).

Training development and trainers

Three studies did not report how the training had been developed.^{26 31 33} Two studies used externally developed resources, one using a commercially developed virtual patient simulation product,²⁴ and another using an 'everyday bias' workshop developed by a consulting company.²⁸ The remaining five studies reported that training content was delivered by the author(s).^{25 27 29 30 32} For three of these studies, additional information was given about the development process, with authors reporting that training content drew on other similar courses used elsewhere,²⁷ followed best practice guidelines,³⁰ or was developed collaboratively with members of the transgender community and educational content experts.²⁹ Most training was delivered by faculty at the host institution,^{24-27 30 32} with two studies reporting the involvement of educators from multiple academic and clinical disciplines.^{26 27} One study, in which training focused on the presentation of videos about transgender healthcare issues embedded within teaching materials, was delivered by either a transgender or cisgender woman.²⁹ Five studies described the involvement of people from the transgender, gay/lesbian or LGBT communities in training design²⁹ or delivery.^{25-27 29 30}

Training delivery and duration

Training was delivered in multiple ways across the included studies (online supplemental file 7). For the nine studies in which the details of training were reported, a total of 11 methods of delivery were identified, with the number used in each study ranging from ²⁴2 to ³³7 (mean 4). The most commonly reported approach was lectures, which were used in all nine studies reporting training details. Other commonly used approaches were films or videos,^{26 27 29 32 33} simulation of patient experience in a clinical encounter^{24 25 28 30} and small group discussions.^{25 27 28 33} Less commonly used approaches were Question and Answer (Q&A) sessions or patient panels,^{28 29 32} role play,^{25 27 33} postsession reflection and debriefing,^{28 29 32} workshops and discussion round tables,^{26 33} case studies,^{32 33} social events²⁵ and LGBT concept mapping.³² Most studies did not report whether the training (in whole or in part) was provided face-to-face or remotely, but two studies (both recruiting participants across multiple sites or institutions) described wholly remote delivery.^{29 31}

Training duration ranged from 40 min³⁰ to 50+ hours.²⁸ Three studies reported brief training lasting for 3 hours or less,^{29 30 32} with the remaining studies describing training lasting for 1.5 days,²⁷ being delivered over multiple weeks²⁴⁻²⁶ or as an entire dedicated course/curriculum.^{28 33}

Outcome measures

All studies used pre-post training scores measuring changes in one or more outcome measures relating to knowledge, attitudes or skills/practice, with changes measured at the individual level only. Outcomes were assessed immediately postintervention in all ten studies. Only two studies included additional follow-up periods: one of 30 days²⁹ and one of 3 months.³¹ Four studies used validated measures. These were the Transgender Attitudes and Beliefs Scale (TABS),²⁴ the Implicit Association Test,²⁸ Transgender Knowledge, Attitudes and Beliefs Scale²⁹ and the Transcultural Self-Efficacy Tool (TSET).³⁰ The remaining studies used non-validated surveys and scoring scales typically developed by the study authors.

Study findings

Results from the included studies are described in online supplemental file 5, and the direction of effect is summarised in online supplemental file 8. A range of terms was used to describe the outcomes measured across studies. These were grouped under the broad headings of attitudes (including beliefs, human value and acceptance), knowledge (including sensitive language and misconception) and skills/practice (including comfort, preparedness, self-efficacy, changes to practice and confidence in providing care).

Attitudes

Seven studies measured outcomes related to one or more aspects of attitudes towards LGBT,^{28 31 32} gay/lesbian^{25 27} or transgender individuals.^{24 29} Various terms were used, including attitudes,^{24 25 27 31} beliefs,²⁴ human value or healthcare equivalence,^{24 32} implicit bias,²⁸ tolerance²⁹ and acceptance.^{25 29 32} All seven studies reported significant improvements to at least one measure of attitude for participants who had received training intervention(s). Five studies reported significant improvements in attitudes^{25 27 31 32} or a significant reduction in implicit bias.²⁸ One study reported outcomes for multiple study arms combined and for each arm separately,²⁹ reporting that attitudes towards transgender individuals significantly improved for combined interventions, but that changes for each arm individually were not statistically significant. One study reported that participants' sex/gender beliefs did not significantly change following the training intervention.²⁴ Two studies assessed human value, with one reporting a statistically significant improvement on the TABS human value subscale²⁴ and the other reporting no change in participants' perceptions about the healthcare equivalence of LGBT people.³² Finally, three studies assessed acceptance. All studies reported statistically significant improvements: one study reported that participants receiving training showed significantly improved acceptance of gay and lesbian people compared with those that did not receive the training.²⁵ Martin *et al* demonstrated significantly improved acceptance of transgender people across all intervention arms in their study,²⁹ and Singer *et al* reported significantly improved acceptance of LGBT

people, expressed as a significant improvement in normativity for the intervention group compared with control.³²

Knowledge

Four studies measured outcomes relating to knowledge about LGBT people,^{31 32} transgender individuals²⁶ or sexual and gender minorities.³³ Two studies demonstrated statistically significant improvements in knowledge: García-Acosta *et al* reported that knowledge about transgender people significantly improved in each arm of their study (film forum group and problem-based learning group) compared with control,²⁶ and Schabath *et al* reported significant increases in knowledge about LGBT people, although this effect was also seen in the comparison group who did not receive the intervention.³¹ The third study did not show any difference between participants in sexual health knowledge, which was high in both intervention and comparison groups.³³ One study reported on specific dimensions of knowledge in relation to LGBT people, reporting a significant improvement in the use of LGBT-sensitive language (in both intervention and comparison groups) and a significant reduction in misconceptions about LGBT people.³²

Skills/practice

Skills and practice (actual or intended behaviour) were assessed in six studies, focusing on LGBT groups,^{31 32} transgender patients^{24 29 30} or sexual and gender minorities.³³ The most frequently assessed dimension of skills/practice was perceived comfort in providing care. Two studies reported significant improvements in comfort in their intervention groups^{29 33}; the third did not report any significant differences between groups following a transgender-specific training intervention.²⁴ Two studies reported on participants' preparedness to provide sensitive care to LGBT people or sexual/gender minorities. One did not report any significant differences between groups on this measure.³² White *et al* reported a statistically significant improvement in preparedness for participants receiving the training course.³³ The remaining dimensions of skills/practice were each reported by a single study. Ozkara San, using the TSET, reported significant improvements in perceived self-efficacy in participants receiving training, both in terms of overall TSET score and for the cognitive, practical and affective subscales.³⁰ Schabath *et al* reported that LGBT-related affirmative practice significantly improved following training (although a significant improvement was also seen in the comparison group).³¹ White *et al* reported that confidence to perform sexual health assessments with people from sexual or gender minorities had significantly improved in the intervention group compared with control.³³

Longer-term follow-up

Only two studies assessed outcomes beyond the immediate postintervention period. Both reported that all statistically significant improvements that had been

observed postintervention to attitudes, knowledge and skills/practice persisted at 30 days²⁹ and at 3 months.³¹

DISCUSSION

This systematic review focused on comparative randomised and non-randomised studies evaluating the effectiveness of a broad range of LGBT-specific training and education for healthcare students and professionals. The use of systematic review methodology enabled a wide and thorough search of the available primary evidence, with robust methods for data extraction and analysis conducted in accordance with PRISMA guidelines. Our findings demonstrate that the evidence base in relation to LGBT-focused training and education assessed through comparative study designs has increased substantially in recent years, with eight out of ten included studies published since 2019. The heterogeneity of training content, methods of delivery, training intensity/duration and the outcome measures assessed precluded quantitative synthesis of outcomes across studies, and the main limitation of our study is that analysis was descriptive only. However, our descriptive analysis demonstrated that multi-component training and education courses and curricula could be effective in significantly improving participants' attitudes towards LGBT people, their knowledge about LGBT-specific health issues and positively influencing actual or intended LGBT-affirming clinical practice.

The original review¹⁷ identified numerous weaknesses in the evidence base, noting a lack of evidence from countries other than the USA, that validated outcome measures were rarely used, a dearth of evidence relating to transgender health, that educational curricula were typically developed without input from national bodies or professional guidelines and that people from LGBT communities rarely contributed either to training development or delivery. Our updated review shows significant advances in several of these areas. Four studies focused specifically on transgender health,^{24 26 29 30} and one had a broad focus on gender and sexual minority groups,³³ demonstrating the growing importance of improving healthcare for transgender individuals. Numerous studies have highlighted the importance of involving people with lived experience of LGBT health issues in training.^{4 34} Five studies in our review included people from the transgender, gay/lesbian or LGBT communities in training design and/or delivery,^{25–27 29 30} and three developed training following national guidelines or drawing on accredited educational guidelines and standards.^{24 28 30} All of these studies demonstrated statistically significant improvements in participants' knowledge, attitudes and/or skills. Others have noted that the nursing field has lagged behind other medical disciplines in incorporating LGBT health into undergraduate and postgraduate training.³⁵ A positive finding of our review was that six of the ten included studies included nurses either as the

sole recipients of training or as part of mixed populations including other healthcare professionals.^{24 26 29 30 32 33}

Other aspects within the evidence remain largely unchanged since the original review, with studies from the USA still dominating the evidence base and no comparative studies conducted outside of high-income countries. There remained a lack of validated outcome measurement, with only four studies using validated measures^{24 28–30} and the remainder using unvalidated measures developed by study authors or those delivering the training. These issues have also been highlighted in other recent systematic reviews.^{15 18 19} Further to this, the studies included in this review were generally of poor quality, and all studies measured outcomes immediately postintervention, with only two having additional longer follow-up periods.^{29 31} This impacts on the extent to which the longevity of improvements to knowledge, attitudes or skills/practice can be determined, with the latter usually focused on behavioural intention rather than actual practice.

In line with other reviews in this area,^{15 18} our review found attitudes and knowledge to be the primary target of many studies rather than practice, implying that once informed about LGBT health issues, participants will be equipped to provide LGBT-affirming care that will lead to better patient outcomes. However, improving knowledge may not translate to behaviour change.³⁶ Similarly, studies that focused on practice-related outcomes such as comfort, preparedness or self-efficacy in providing culturally sensitive healthcare may not bring about changes in actual performance.³⁷

Implications for clinicians and policy makers

Despite the need to reduce healthcare disparities experienced by LGBT communities increasingly being the focus of healthcare policy and guidelines in numerous countries,^{38–42} there are a number of considerations that could improve the effectiveness of healthcare professional training to facilitate culturally sensitive care for LGBT individuals. All training for healthcare professional undergraduates and postgraduates should use multi-component approaches (including interactive components such as simulation), drawing on the lived experience of individuals from the LGBT communities in development and delivery. While the increase in comparative studies in recent years is encouraging, such studies should use consistent, validated outcome measures and robust methodologies to assess the effectiveness of their interventions, with follow-up taking place longitudinally rather than solely focusing on immediate postintervention changes. Most interventions assessed in this review were part of an elective training course or one-off intervention rather than a broad integration of competencies relating to LGBT health and well-being within educational curricula, and training participants often self-selected their participation rather than such courses being mandatory. It is crucially important to focus on actual behaviour and skills change rather than assuming

that such changes will automatically follow from changes in attitudes and/or knowledge. Finally, intersectionality, that is, multiple aspects of identity such as age, ethnicity, health conditions and disability that may intersect with LGBT identity and experience of healthcare services, was not explicitly addressed by any studies included in this review. However, the intersection between ethnicity and gender identity in particular is increasingly recognised as an important mediator of healthcare access, health risk and outcomes.⁴³

CONCLUSION

Multi-component training for healthcare professionals on LGBT health can significantly improve participants' knowledge, attitudes and skills. However, there was substantial heterogeneity in training content, delivery and duration, and most studies were of poor quality, with inconsistency in outcome measures assessed and lack of longer-term follow-up. The applicability, feasibility and effectiveness of training in diverse income settings, such as middle- and low-income countries, with sexual and gender minorities representative of international populations, and in jurisdictions with varying LGBT-related legislative policies should be explored in future research.

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Contributors The study was originally conceived by AOS, KJ and NKG. AOS and KJ led protocol development. Literature searching was undertaken by RP. Citation screening was done by SD, KJ, AR, AOS, IO and BM-A. Data extraction and quality assessment were done by SD, KJ and AR, with input from AOS. Formal analysis was undertaken by SD, KJ and AR. The original draft of the manuscript was written by SD with input from AR, KJ and AOS. All authors reviewed and edited the manuscript and approved the final version. SD is the guarantor.

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