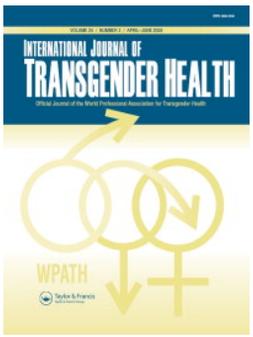

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REVIEW ARTICLE

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Transgender and gender diverse older people: health, aging and dementia

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ABSTRACT

Background and Objectives: 262,000 people in the UK identify as transgender and gender diverse (TGD), and this population is believed to be growing. As the population is aging, an increase in older TGD people accessing health and social care can be anticipated. Despite a recent expansion in research exploring the TGD population, older TGD people are often excluded from the narrative. This review aims to address gaps in the literature by exploring the complex ways older TGD adults access health and social care and how this affects health outcomes with a specific focus on dementia.

Methods: The search was conducted using NUsearch, CINAHL, PsycINFO, PubMed, Google Scholar, and MEDLINE, in addition to cross-referencing and hand searches. Data were analyzed in a narrative, exploratory manner.

Findings: Older TGD adults face many barriers when accessing health and social care including experiences of discrimination, gatekeeping by healthcare professionals and limited access to services. These barriers impact on health outcomes in this population and their interactions with the health and social care system. There are high reported rates of poor physical and mental health, including HIV, mental illness and issues associated with gender-affirming treatment. Older TGD people are also reported to be at an increased risk of dementia, which is partly due to high incidences of dementia-associated risk factors. The epidemiology and experiences of older TGD people living with dementia are largely unknown due to limited research. However, the available literature suggests the current health and social care system is ill-equipped to manage their needs.

Conclusion: Greater research exploring the major health problems faced by this population is needed, to address health inequalities. Several approaches have been suggested to help improve services for older TGD people including, expert patient programmes, co-production, and a systems approach.

KEYWORDS
Dementia; gender diverse; health outcomes; older people; transgender

Introduction

The combination of a growing older population in the UK and globally (United Nations Department of Economic & Social Affairs, 2022) alongside an expanding TGD population, will cause an increase in the number of older TGD people using old age health and social care services (Benbow et al., 2021). Despite this, there are gaps in understanding the healthcare needs of this community compared to the general older population. Although recent growth in medical research has contributed to an enhanced understanding of this population and their health needs, older TGD individuals are frequently underrepresented and overlooked in these studies (Ducheny et al., 2019). There is an absence of data investigating the unique needs of older TGD people and their relationship and interactions with the health and social care system.

Providing competent health and social care for older people can be complex and multi-faceted with 54% of >65-year-olds living with long-term health conditions (Kingston et al., 2018). Therefore, it is likely that older TGD people will have substantial medical needs, alongside experiencing additional challenges linked to their TGD identity when accessing the health and social care system. Medical conditions affecting cognitive

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function place a significant strain on the health and social care system (Scharaga et al., 2020). An estimated 50 million people worldwide are living with dementia and this figure is predicted to reach 152 million by 2050 (Patterson, 2018). Dementia is known to be associated with many modifiable risk factors including smoking, alcohol use, depression, social isolation, and physical inactivity (Livingston et al., 2020). Despite dementia having such a high-profile role in geriatric health and social care, there is an absence of literature exploring the prevalence and experiences of TGD people living with dementia. Therefore, it is crucial to prioritize research of this community to provide an evidence base for the development of health and social care systems to improve the provision of care.

The following questions are addressed in this paper:

- What are the major health and medical issues associated with aging and TGD people?
- What barriers and problems do older TGD people face when accessing care?
- What are the risk factors for dementia in TGD people and what are their experiences of living with dementia?
- How can the health and social care system be improved to enhance the provision of quality care for TGD individuals?

Methods

An initial literature search was conducted in November 2022 using NUsearch, PubMed and MEDLINE with the search terms "transgender", "gender diverse", "old", "healthcare" and "dementia". These findings served as an initial reference to define the scope of the study to "transgender and gender diverse older people: health, ageing and dementia".

An information specialist supported the refining of search terms, using the following resources to identify papers on transgender, aging and dementia.

1. MEDLINE Ovid (from 1946 onwards)
2. CINAHL EBSCO (from inception of database)
3. APA PsycInfo ProQuest (from 1806 onwards)
4. Google Scholar https://scholar.google.co.uk.

The results of the searches were combined and de-duplicated in an EndNote database. The search strategies are available in supplementary file 1. Inclusion and exclusion criteria are shown in Table 1.

Studies with any methodology were eligible for inclusion. A quality assessment was not conducted due to the limited quantity and variable quality of the research available. While recognizing the importance of quality assessment in medical research, it is pertinent to note that, in this study, the primary objective was to provide a comprehensive overview of the existing literature.

Once all appropriate titles had been identified by the search, abstracts were screened by the lead author and coauthors to identify relevant papers. The papers were read in full and divided into three main sections corresponding to the research questions. Key information was extracted and tabulated (see results section) in agreement with the lead author and coauthors.

Furthermore, 25 additional papers were identified in April 2024 by specific topic searches, for example on cardiovascular disease, sexual health and HIV.

Results

The search identified 1141 titles (see Figure 1) from both databases and records identified from citations. 65 key papers were selected, and recurring key themes were identified as noteworthy findings. Due to the heterogeneous and variable nature of the literature, only a narrative synthesis could be tried when addressing this paper's aims and objectives. The findings are presented in the following three sections, respectively, (1) health and medical issues, (2) barriers to treatment and

Table 1. Inclusion and exclusion criteria.

Inclusion	Exclusion
Focus on older TGD population	Focus on younger TGD population
RCTs, case studies, systematic reviews, meta-analysis, books	Grey literature
No date of publication criteria	-
English language	Non-English language
Focus on the LGBT population with large TGD representation	Focus on the LGBT population with little TGD representation

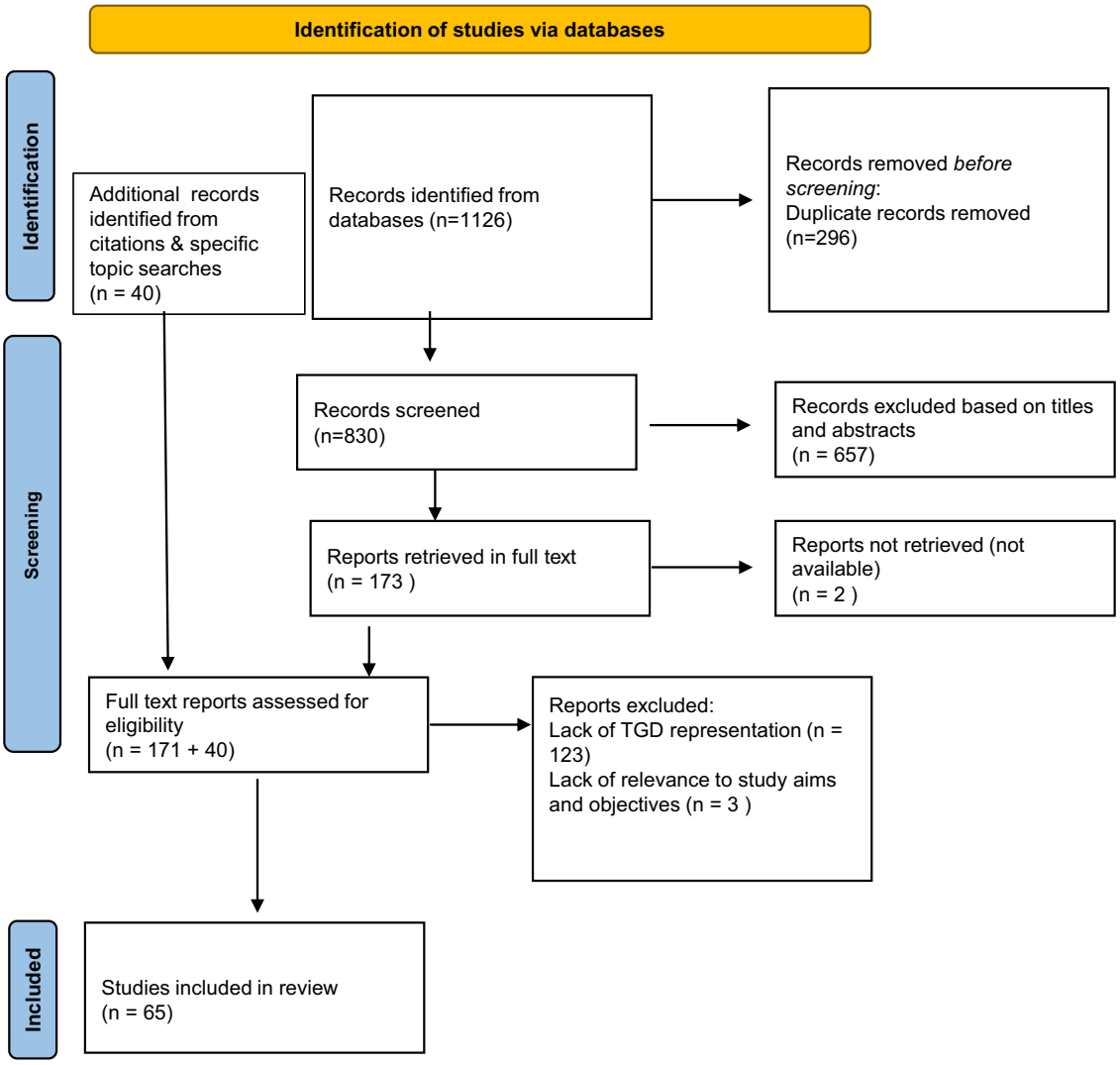

Figure 1. PRISMA flow chart showing record of selection and papers screened.
Adapted from Page et al. (2021)

care, and (3) dementia among older TGD people. Each section consists of an overview followed by subsections on major topics within that area.

Major health and medical issues associated with older TGD adults: overview

The older TGD community experience poorer physical health, disability, increased perceived stress and depressive symptomatology compared to their cisgender and LGB counterparts (Fredriksen-Goldsen et al., 2014). In addition to these health disparities, they face unique barriers to accessing care including, delayed receipt of healthcare (Beehuspoteea & Badrakalimuthu, 2021), lack of knowledge among healthcare professionals (Benbow et al., 2021; Finkenauer et al., 2012) and experiences of discrimination (Benbow & Kingston, 2022). The available literature identified mental health, gender-affirming care, sexual health, HIV and cardiovascular disease as areas of importance.

Health disparities experienced by older TGD individuals are significant and multi-faceted as evidenced by studies such as those conducted by Fredriksen-Goldsen et al. (2014), Beehuspoteea and Badrakalimuthu (2021), Finkenauer et al. (2012) and Benbow et al. (2021). The older TGD community experience poorer physical health, disability, increased perceived stress and depressive symptomatology compared to their cisgender and LGB counterparts (Fredriksen-Goldsen et al., 2014). In addition to this, older TGD people face unique barriers to accessing healthcare, which

exacerbates their health inequalities. Some of these barriers include delayed receipt of healthcare (Beehuspoteea & Badrakalimuthu, 2021), lack of knowledge among healthcare professionals (Benbow et al., 2021; Finkenauer et al., 2012) and experiences of discrimination (Benbow & Kingston, 2022).

Mental health

Relevant studies are summarized in Table 2. Older LGBT people reported higher rates of mental illness when compared with the general population, which is likely due to stigma and discrimination experienced by this group (Yarns et al., 2016). Significantly, older TGD adults reported experiencing higher rates of depression (48%) when compared to their LGB counterparts (Fredriksen-Goldsen et al., 2014; Witten, 2014a), suggesting there may be differences in self-acceptance and social isolation within the LGBT community (Fredriksen-Goldsen, 2011). Notwithstanding these differences, many LGBT studies fail to acknowledge TGD-specific problems and have little "T" representation. Baril and Silverman (2022) argue this leads to the "merging of trans realities with sexual minorities experiences". Conflating these communities is problematic and fails to recognize the differences between sexual and gender identities.

Older TGD people have high rates of suicidal thinking and behavior, with a Swedish study reporting every third participant had seriously contemplated suicide (Fabbre & Siverskog, 2019). Although suicide rates in the TGD population are thought to decrease with age, they were significantly higher compared to the general population (Grant et al., 2011). High suicide rates are not exclusive to Sweden, with a US study finding 41% of their participants had previously attempted suicide (Clements-Nolle et al., 2001; Grant et al., 2011).

The well-established connection between mental and physical health is also applicable to the older TGD population. Experiences of stigma and discrimination are associated with adverse physical health outcomes (Lambrou et al., 2022). As a result, older TGD adults may find themselves caught in a detrimental cycle where societal discrimination heightens their risk of poor health outcomes. This in turn may heighten dependence on health and social care services, exposing them to further discrimination, potentially exacerbating both mental and physical health issues.

One way this problem could be addressed is by providing gender-affirming care, which can promote improvements in mental health (Johnson et al., 2018). Appreciative inquiry and partnership may be a useful approach for developing acceptable services (Page et al., 2016). Some research also supports estrogen treatment as being beneficial for improving rates of depression in transgender males (Ettner, 2013). Therefore, a range of measures should be explored to improve older TGD adults' mental health.

Gender-affirming care

Relevant studies are summarized in Table 3. Gender-affirming care can occur in many forms including respecting a patient's pronouns, psychological support such as counseling, gender-affirming hormone therapy and surgery to name a few (Bhatt et al., 2022). Despite the benefits of gender-affirming care there remain several gaps; for example, there is limited research exploring the impact of aging on gender-affirming interventions (Finkenauer et al., 2012).

One area that has been studied is the long-term impact of hormone therapy use on venous thromboembolism (VTE) risk in TGD people (Balcerek et al., 2021; Delgado-Ruiz et al., 2019; den Heijer, 2017). Getahun et al. (2018) found there was a 4-fold increased risk of VTE in transgender women taking hormone therapy for eight years compared to two years. Despite this, guidelines still largely rely on research conducted on cisgender men with testosterone deficiency or cisgender women receiving menopausal hormone therapy (Slack & Safer, 2021).

Shuster (2016) reported that most clinical decisions made about TGD patient care were based upon guidelines which were not supported by clinical evidence. Additionally, many of the studies had small sample sizes with little older TGD representation, there were few participants who had been on hormone therapy for over five

Table 2. Mental health.

Author	Year	Country	Study design	Age or age range/ years	Sample size	Key findings
Baril & Silverman	2022	Canada	Review	n/a	n/a	Provides suggestions for how to care for TGD older adults with dementia who may experience "gender confusion". Suggests four approaches: gender neutralization, trans affirmative stable approach, trans-affirmative fluid approach and trans-affirmative, crip-positive, and age-positive.
Beehuspoteea & Badrakalimuthu	2021	UK	Case Vignette & Literature review	76	1	Case vignette describing the experiences of a 76-year-old transgender woman with dementia including changes in toileting behavior, impaired hygiene, and nutrition, engaging in sexually inappropriate conversations with staff.
Benbow et al.	2021	UK	Narrative Review	n/a	n/a	Paper explores five themes: experience of discrimination and disrespect, health inequalities, socio-economic inequalities, positive practice and staff training and education.
Benbow & Kingston	2022	UK	Qualitative Study	>50	16	Paper identifies three themes and subgroups within them including 'levers' (forces that influenced contact with healthcare positively or negatively), 'contextual forces' (societal forces that shape experiences of healthcare) and 'positive practices).
Clements-Nolle et al.	2001	USA	Qualitative Study	>18	515	Paper found HIV prevalence among the TGD participants to be 35% and identifies the need for risk reduction interventions for transgender women.
Ettner	2013	USA	Literature Review	n/a	n/a	Paper identifies a cohort of aging TGD individuals who will be accessing healthcare services and so calls for clear guidelines, standards of care and increased training of healthcare providers in order to meet their needs.
Fabbre & Siverskog	2019	Sweden/ USA	Book Chapter	>50 (Sweden) 45-64 (USA)	6 (Sweden) 60 (USA)	Chapter focuses on empirical work from Swedish and US contexts to under social networks in this community and the role this has in physical and mental health. Considers how this may change with aging.
Finkenauer et al.	2012	Canada	Systematic Review	n/a	n/a	Paper addresses themes including, methodological challenges associated with researching TGD adults, violence and abuse, discriminatory policies, lack of appropriate HIV/AIDS care, obstacles and lack of social support.

(*Continued*)

Table 2. Continued.

Author	Year	Country	Study design	Age or age range/ years	Sample size	Key findings
Fredriksen-Goldsen	2011	USA	Quantitative & Qualitative Study	>50	n/a	Identifies the LGBT population as a resilient but "at-risk" population which experiences health inequalities. Highlights differences in health outcomes, social networks, discrimination, and obstacles within the LGBT population.
Fredriksen-Goldsen et al.	2014	USA	Cross-sectional survey	>50	2,560	Paper highlights that TGD older adults are at a higher risk of poor physical health, disability, depression, and perceived stress. Identifies indirect effects of gender identity which may impact upon this.
Grant et al.	2011	USA	Report	18-89	6,456	Survey found discrimination was pervasive throughout sample, ethnic minority participants were particularly impacted. There were high reported rates of poverty and suicide attempts.
Johnson et al.	2018	USA	Literature Review & Qualitative study	69	1	Paper discusses the role of mental health professionals in assessment, education, referral, treatment, and advocacy. Includes interview with transgender women about their lifelong experiences.
Lambrou et al.	2022	USA	Cross-sectional study	50-76 (median 58.2)	115	TGD older adults reported higher levels of subjective cognitive decline and discrimination. 16% of participants rated their memory as poor/fair.
Page et al.	2016	UK	Service development case study	n/a	n/a	Increased awareness among staff of TGD issues; older TGD participants experienced improved attitudes and acceptance from service providers.
Witten	2014a	USA	Qualitative Study	18-70+ (47% > 50)	1,963	Study analyses data from Trans MetLife Survey. Identifies modifiable risk factors within the population including increasing awareness about end-of-life preparations and include gender identity presentation in anti-discrimination policies.
Yarns et al.	2016	USA	Literature review	n/a	n/a	LGBT individuals have higher rates of depression, anxiety and substance use disorders. Improved education and training of clinicians as well as increased clinical research could mitigate these challenges.

years (Balcerek et al., 2021) and studies had not accounted for regional differences in hormone therapy prescribing (Slack & Safer, 2021).

Understanding the long-term impact of hormone therapy is crucial, as more TGD individuals start treatment at a younger age (Leinung & Joseph, 2020) and are likely to continue treatment for extended periods. While recent studies such as those conducted at the VU University Medical Center (Center of Expertise on Gender Dysphoria) have increased our knowledge (Wiepjes et al., 2018), research on

Table 3. Gender-affirming care.

Author	Year	Country	Study design	Age or age range/years	Sample size	Key findings
Balcerek et al.	2021	Australia	Retrospective cross-sectional analysis	Two groups: <45 ≥45	296	There are a higher proportion of older TGD adults taking transdermal estrogen compared with oral. Those who were treated with oral estradiol on average were on a lower dose.
Bhatt et al.	2022	USA	Literature Review	n/a	n/a	Study discusses health disparities and barriers faced by TGD people, in particular focusing on how to provide gender-affirming care including small interventions such as gender-neutral language use.
Coleman et al.	2022	International	Standard of care	n/a	n/a	Provides clinical guidance for healthcare professionals for best practice in the care of transgender and gender diverse individuals.
Delgado-Ruiz et al.	2019	Europe	Systematic Review	n/a	1,640	Long-term hormone pharmacotherapy for transgender women and men does not alter the calcium, phosphate, alkaline phosphatase, and osteocalcin levels and will slightly increase bone formation in both women and transgender men.
den Heijer et al.	2017	Netherlands	Literature Review	n/a	n/a	Paper discusses what hormonal treatments are available for older TGD adults as well as their clinical effect, dosing and known side effects.
Ettner & Wylie	2013	International	Literature review	n/a	n/a	Paper uses fictional case vignettes to identify different challenges faced by older TGD people in particular, gender issues intensifying with age, receiving gender-affirming care, and long-term care.
Fredriksen-Goldsen et al.	2014	USA	Cross-sectional study	>50	2,560	See Table 3
Getahun et al.	2018	USA	Cohort study	>18	4,960	Medical record-based cohort study assessing VTE, stroke and MI risk in transgender patients (in relation to endocrine therapy). Most significant findings: VTE and stroke rates increased among transfeminine patients on endocrine therapy in comparison with both cisgender women and men.
Leinung & Joseph	2020	USA	Retrospective study	13-60	421	Paper found there are more TGD people accessing hormone therapy and the age of initiation has dropped over the past 25 years and there is an increasing number of transgender males in the TGD population.
Goldštajn et al.	2023	International	Systematic review	n/a	n/a	Review found there is limited literature on transdermal versus oral HRT however the available evidence shows that in relation to VTE risk transdermal is safer than oral administration route.
Shuster	2016	USA	Qualitative study	n/a	23	Identified two strategies that healthcare providers use when following clinical guidelines: evidence-based medicine approach/ a flexible interpretation.

(*Continued*)

Table 3. Continued.

Author	Year	Country	Study design	Age or age range/years	Sample size	Key findings
Slack & Safer	2020	USA	Literature Review	n/a	n/a	Study identifies the need for screening of cardiometabolic issues and risk reduction in all aging individuals. Lack of evidence to support specific screening of TGD individuals on long-term hormone therapy.
Porter et al.	2016	USA	Literature review & case study	68	1	Paper identifies how healthcare providers can provide competent care to TGD individuals including, proper training, gender-neutral toilet access, appropriate pronoun use and avoiding cisnormative assumptions to name some.
Wiepjes et al.	2018	Netherlands	Retrospective medical record review	>12	6793	Aims to create a dataset of all individuals presenting to the VU University Medical Center between 1972 and 2015 for gender-affirming treatment. Discusses trends in demographics accessing treatment, potential reasons for fluctuations in access and explores regret post HT.

hormone therapy in older adults often overlooks differences based on when treatment began. Differentiating outcomes based on age of initiation is vital for tailored care and this should be considered for future research.

Polypharmacy also poses additional challenges for older TGD individuals due to contraindications between hormone therapy and medication for other comorbidities (Porter et al., 2016). As previously mentioned, older TGD people are at increased risk of comorbidities compared to the general population (Fredriksen-Goldsen et al., 2014) and thus the risk of experiencing polypharmacy is higher for this population. Consequently, some older TGD patients may be unable to begin or continue hormone therapy due to the possible risks (Porter et al., 2016). This can be distressing for older TGD individuals and may be worsened by natural physical changes associated with aging being especially poignant for these individuals (Ettner & Wylie, 2013). In turn, this could place strains on relationships with healthcare professionals who are perceived as "gatekeepers" to accessing gender-affirming care, exacerbating feelings of mistrust and frustration among older TGD individuals (Willis et al., 2020a).

Conversely, recent attempts have been made to standardize TGD care, e.g. the recent publication of Standard of Care (SOC-8) by the World Professional Association for Transgender Health (Coleman et al., 2022). Additionally, research exploring specific areas such as the best route of administration for hormone therapy can provide valuable insights into optimizing care for transgender individuals. For instance, a systematic review published by Goldštajn et al. (2023) compared the vascular effects of transdermal and oral estrogen therapy in postmenopausal women. Such research can help to inform healthcare professionals and facilitate informed decisions about transgender patients care. Both examples demonstrate that research can greatly contribute to the refinement and updating of guidelines to facilitate evidence-based practices in older TGD care. It's important to acknowledge, however, that while research advancements are crucial, implementation challenges and disparities in access to care remain significant hurdles to achieving equitable healthcare outcomes for older TGD individuals.

Sexual health and human immunodeficiency virus (HIV)

Relevant studies are summarized in Table 4. Members of the TGD population are disproportionately affected by HIV and other sexually transmitted infections (STI) compared to their cisgender counterparts, with transgender woman being sixty-six times more likely to have HIV than other adults, and transgender men seven times more likely (Stutterheim et al., 2021). Coleman et al. (2022: S163-S170) provide a thorough synthesis of the literature exploring this disparity, summarizing the effects of various factors and providing recommendations in response. These issues include sexual health provision for TGD patients in relation to gender-affirming care, stigma and trauma, counseling of STI prevention, use of World Health Organization (WHO) guidelines for STI assessment and management, and the importance of sufficient understanding of the nuances of TGD patient care as health care professionals.

For TGD individuals, there is often a distrust of healthcare services, likely based on experience of non-gender affirming care, misgendering, judgment and insensitivity (Witten, 2014b), discussed further in the section on Discrimination. Healthcare professionals may also hold ageist attitudes, assuming older people to be sexually inactive, therefore conversations about safe-sex practice may fail to occur; preventative interventions are rarely targeted at the TGD population, and even less so at the older TGD population (Finkenauer et al., 2012). When we consider these ideas, we can begin to observe the impact of negative attitudes toward older TGD adults on their sexual health more specifically. Despite the increased prevalence of HIV in this group.

Another contributing factor could be the potential for heightened risk behaviors during certain phases of transition. It can also be noted that the TGD population may be an especially vulnerable population, often abused and unsupported (Grossman & D'Augelli, 2006). Vulnerability within public health is understood in one paper as "the initial level of wellbeing, the degree of exposure to risk, and the capacity to manage risk effectively within a population" (Zarowsky et al., 2013). Consequently, TGD individuals may be (a) more heavily exposed to risk, and (b) less able to manage risk. A phenomenon coined "biphasal adolescence" describes an increase in risky behaviors for a brief period post-transition (Jenkins & Johnston, 2004; Walker et al., 2016). This may impact upon an individual's likelihood of engaging in risky sexual behaviors and increase their risk of contracting STIs. Therefore, healthcare professionals need to consider older TGD patients' transition timeline especially when considering risky behaviors (Witten, 2014a) and associated conditions.

Coleman et al. (2022) provide a vital resource in employing effective health service management of TGD persons, however some aspects of care within peripheral systems may require further consideration. By employing best practice both within clinical settings and externally, awareness, prevention and management of STIs could become more attainable. STIs such as HIV and Hepatitis B are conditions with lifelong implications, and so to maintain good sexual health in the older TGD population this prevention must begin in adolescence, which may be prior to presentation to a healthcare setting.

Stutterheim et al. (2021) suggest that the desire to access preventative strategies e.g. use of pre-exposure prophylaxis against HIV, would be increased if education around its importance was improved; effectively, many patients are simply unaware of this information. Pound et al. (2017) provide extensive recommendations for improved sex and relationships education (SRE) in English schools, but particularly relevant here is the guidance that SRE should include LGBTQIA + sexual activity and relationships, challenge gender stereotypes and consider risky practices where appropriate. By improving school-level education and so normalizing conversation around TGD-related issues, pupils may gain a better understanding of protection of sexual health, irrespective of their genders.

By starting support of sexual health needs in adolescence but following through with older TGD individuals, the risk of developing conditions associated with HIV such as cardiovascular disease (Feinstein, 2021) and dementia (Johnson

Table 4. Sexual health and human immunodeficiency virus (HIV).

Author	Year	Country	Study type	Age or age range/years	Sample size	Key findings
Brown & Jones	2016	USA	Case-control study	Mean age = 55.8	5135	Study observing psychiatric and mental health outcomes in transgender veterans using medical chart data. Transgender veterans were more likely to have been homeless, reported sexual trauma while on active duty and to have been incarcerated. Study found transgender veterans were five times more likely to be HIV positive than non-veterans.
Coleman et al.	2022	International	Standard of care	n/a	n/a	See Table 4
Finkenauer et al.	2012	Canada	Systematic Review	n/a	n/a	See Table 3
Grossman & D'augelli	2006	USA	Small cohort study	15-20	24 (3 groups of 8)	Three groups of transgender youths were studied, assessing areas and degree of vulnerability including access to services, experience of risky behaviors and of discrimination. It can be extrapolated from the results that this population may be particularly vulnerable to risk, marginalization, and abuse.
Jenkins & Johnston	2004	USA	Literature review	n/a	n/a	Reviews the ethics of conversion therapy, exploring ethical use of social work, the importance of human relationships, competence and integrity of therapists/social workers and the complex life experiences and behaviors of LGBTQIA + persons.
Johnson et al.	2018	USA	Literature Review and Qualitative Study	69	1	See Table 3
Mitra & Sharman	2022	USA	Literature Review	n/a	n/a	Patients with HIV have been found to have various forms of neuropsychiatric illness including symptoms of cognitive disorders as well as mood and anxiety disorders. The introduction of antiretroviral therapy has led to a decline in prevalence of HIV-associated dementia, present in 2% of cases. Asymptomatic neurocognitive impairment is the most common disorder.
Pound et al.	2017	UK	Qualitative study review	n/a	n/a	Research established that school-based sex and relationships education (SRE) and sexual health services are effective at improving sexual health. By having a 'life skills' teaching focus avoiding abstinence focus and using a sex-positive approach SRE can be improved in schools. It is important to discuss risks, but findings showed that current approaches to risk in SRE need improvement. The paper presents recommendations for best practice from the results found.
Rumbaugh & Tyor	2015	USA	Literature review	n/a	n/a	Discusses nomenclature, etiology, prevalence, diagnostic testing, and recommendations for best practise management for HIV-related neurocognitive disorders (HAND), including dementia, and suggestions for future treatment strategy research.

(*Continued*)

Table 4. Continued.

Author	Year	Country	Study type	Age or age range/years	Sample size	Key findings
Stutterheim et al.	2021	Netherlands	Systematic Review	n/a	n/a	Review outlines that transgender individuals are disproportionately affected by HIV. Need to address their care needs and preventative measures. HIV prevalence – 19.9% of transgender women and 2.56% of transgender men.
Walker et al.	2016	USA	Narrative Inquiry – case study	70	1	Case study based on 70-year-old white transgender woman – lifespan approach so before, during and after transition. Biphasal adolescence is a term used to describe risky choices and behaviors after transitioning likened to a second adolescence. Important for healthcare professionals to be aware of this. Genital status only important if it is relevant to care.
Witten	2014a	USA	Qualitative Study	18-70+ (47% > 50)	1,963	See Table 3
Zarowsky et al.	2013	South Africa	Literature review	n/a	n/a	Explores 'vulnerable' populations in general in relation to exposure and capacity to cope with risk and provides suggestions for response to harm as a result of health risks.

et al., 2018; Rumbaugh & Tyor, 2015) would likely be reduced. Therefore, by offering HIV testing to high-risk TGD patients, this could reduce the expanding burden of these conditions on healthcare and the impact on the individual.

Moreover, older TGD adults living with HIV/AIDS may experience a "dual stigmatized" identity (Brown & Jones, 2016; Johnson et al., 2018; Witten, 2014a) and therefore, as in various contexts for TGD individuals, may be reluctant to access healthcare due to fears of discrimination (Finkenauer et al., 2012). Consequently, this may cause delays in identifying comorbid conditions, including cardiovascular disease or dementia.

Cardiovascular (CV) health

Relevant studies are summarized in Table 5. TGD adults are more at risk of cardiovascular disease (CVD) and future cardiovascular episodes (e.g. myocardial infarction, VTE, stroke) in comparison with the cisgender population. This may be for various reasons; for example, higher prevalence of smoking (Balcerek et al., 2021) and poor physical health (Fredriksen-Goldsen et al., 2014).

In addition, it has been suggested that transgender hormone therapy, especially estrogen taken by transgender women, may increase the risk of CVD (Getahun et al., 2018; Gooren & T'Sjoen, 2018; Nota et al., 2019). Careful surveillance of potential vascular side effects of hormone therapy (specifically estrogen) may be important in prevention of CVEs (Getahun et al., 2018) and reduction of estrogen dosage may be necessary in aging patients (Gooren & T'Sjoen, 2018). den Heijer et al. (2017) concluded that long-term hormone therapy was generally safe, though there was an increased risk of venous thromboembolism due to estrogen and polycythemia due to testosterone. Slack and Safer (2021) also thought that despite various potential metabolic and biochemical interactions with the use of exogenous hormones, these are not generally clinically important, and modern long-term treatment is safe.

The presence of HIV is also a risk factor for CVD. HIV infection results in a 'procoagulant' state, with increased levels of systemic inflammation, both potential precursors to atherosclerosis and thrombosis that may result in myocardial infarction (Feinstein, 2021). Vascular stiffness, inflammation, immune dysregulation and co-infection are some of the factors that mediate hypertension, microvascular disease, valvular

Table 5. Cardiovascular (CV) health.

Author	Year	Country	Study type	Age or age range/years	Sample size	Key findings
Balcerek et al.	2021	Australia	Retrospective cross-sectional analysis	Two groups: <45 ≥45	296	See Table 4
den Heijer et al.	2017	Netherlands	Literature Review	n/a	n/a	See Table 4
Feinstein et al.	2019	USA	Review article	n/a	n/a	Reviews evidence of HIV-associated cardiovascular disease to inform care of patients. There is an increased risk of CVD in patients living with HIV, which remains even in the context of anti-retroviral therapy.
Feinstein	2021	USA	Literature Review	n/a	n/a	Review establishes that patients living with HIV are more at risk of cardiovascular disease (CVD) and cardiac events, due to immune dysregulation and inflammation. Anti-retroviral medications reduce CVD risk in those with HIV. Patients with HIV are more likely to smoke, adding to this risk.
Fredriksen-Goldsen et al.	2014	USA	Cross-sectional survey	>50	2,560	See Table 3
Getahun et al.	2018	USA	Cohort study	>18	2842 trans-feminine 2118 trans-masculine	See Table 4
Gooren & T'Sjoen	2019	Netherlands	Literature review	n/a	n/a	Review focuses on risks of endocrine treatment for aging transgender patients. Finds higher degrees of cardiovascular disease in transgender women: though this is not fully understood. Follow up recommended for these patients and consider lowered dosage/route of estrogens in those over 50.
Johnson et al.	2018	USA	Literature review & Qualitative study	69	1	See Table 3
Nota et al.	2014a	Netherlands	Large cohort study	Median ages: TW 30 TM 23	2517 transwomen 1358 transmen	Discusses results from a large cohort study reviewing cardiovascular events in transgender patients presenting to the clinic between 1972 and 2015. Findings show that the prevalence of strokes and VTEs are higher in transwomen (receiving hormone therapy) than in cisgender women and men, and the entire transgender population more likely to experience an MI than cisgender women. Discusses the importance of knowledge of this information for clinicians working with transgender patients.
Sabin et al.	2016	International	Cohort study	32-44	>49,000	Highlights a persistent association between use of antiretroviral therapy (specifically abacavir) and risk of cardiovascular disease.
Slack & Safer	2020	USA	Literature Review	n/a	n/a	See Table 4
Stutterheim et al.	2021	Netherlands	Systematic Review	n/a	n/a	See Table 5

disease and arrythmia, which, though somewhat improved with use of antiretroviral therapy (ART), are all mechanisms of CVD resulting in heart failure (Feinstein, 2021). Some studies have highlighted ART as negatively affecting CV health (Sabin et al., 2016), but in a risk versus benefit scenario, this does not appear to be a reason to avoid long-term ART (Feinstein et al., 2019). The high prevalence of HIV infection in transgender women (Stutterheim et al., 2021) may be a significant contributor to CVD risk in this group.

A decline in CV health can contribute to both cognitive decline and vascular dementia in older adults (Johnson et al., 2018), but there is little literature specifically on this within the TGD community. Further research is needed to establish whether poor CV health in TGD adults may lead to greater prevalence of vascular cognitive impairment in the aging TGD population.

In summary, TGD adults, especially transgender women, may have increased risk factors for CVD, and people who are high risk should be offered closer monitoring of their health. However, there is insufficient evidence to propose separate screening recommendations for the older TGD population.

Barriers to accessing services: overview

Barriers to accessing appropriate care exist across various sectors of the health and social care system, encompassing primary care, mental health services, transgender health clinics and long-term nursing care (Dhillon et al., 2020; Fabbre & Siverskog, 2019; Finkenauer et al., 2012; Willis et al., 2020a; 2020b). This indicates that challenges associated with providing TGD-affirming care are systemic and institutional (Willis et al., 2020a), a situation likely exacerbated for individuals with intersecting minority identities (Walker et al., 2023). Despite the implementation of policies such as the Gender Recognition Act 2004, 2004 (2004) and Equality Act (2010), inconsistencies persist in the extent and quality of TGD care.

The available literature identifies concerns of being "outed" (Willis et al., 2020a), previous negative experiences leading to expectations of bias/discrimination (Fabbre, 2014), inadequate education of healthcare professionals on TGD issues (Beehuspoteea & Badrakalimuthu, 2021) and a lack of awareness about availability of LGBT-friendly services (Di Lorito et al., 2021). Access to health and social care is vital for individuals to achieve a comprehensive healthy lifestyle (Nowakowski et al., 2021). Therefore, the barriers to care and the lack of medical research on this population is concerning.

Lack of access to services

Relevant studies are summarized in Table 6. Accessing services can be challenging for all TGD people due to various factors, including a lack of specialist services, long waiting times and other practical problems (Aldridge et al., 2022; Finkenauer et al., 2012; Willis et al., 2020a; Witten, 2014a). These challenges can range from necessities such as suitable bathroom access to restricted availability of specialist services such as transgender health clinics (Whittle et al., 2007; Witten, 2014a). Willis et al. (2020a) argue that long waiting times and General Practitioners (GP) acting as gatekeepers are two major obstacles to accessing specialist TGD care.

Transgender health clinics in the UK are reported to have the longest waiting times compared to any other specialist service (Vincent, 2018). This can result in feelings of frustration for TGD individuals, particularly among the older TGD community transitioning later in life, who may experience a sense of "time lost" before transitioning (Knochel & Flunker, 2021). Additionally, healthcare professionals may have conscious/unconscious ageist attitudes toward older TGD people wanting to undergo medical transition (Benbow et al., 2021), leading to further delays in accessing specialist care. In spite of this, efforts have been made to improve access to services. The Nottingham Center for Transgender Health has taken important steps toward addressing increased demands for services by introducing facilities in areas such as the East of England which previously had few specialist centers (Nottingham Centre for Transgender Health Network, 2021). Although gradual changes are being made, the demand for services still far outweighs their availability.

Table 6. Lack of access to services.

Author	Year	Country	Study type	Age or age range/ years	Sample size	Key findings
Aldridge et al.	2022	UK	Qualitative study	Mean = 45.6	23	Study investigated factors that impact wellbeing in TGD adults who have had gender-affirming treatment. The study identified social support, protective legislation, awareness of trans issues and improving knowledge of non-specialist healthcare providers as important factors to consider.
Beehuspotee & Badrakalimuthu	2021	UK	Case Vignette & Literature review	76	1	See Table 3
Benbow et al.	2021	UK	Narrative Review	n/a	n/a	See Table 3
Dhillon et al.	2020	USA	Scoping review	n/a	n/a	TGD people face barriers to accessing cervical smears. Some suggestions for how this could be improved include, national screening initiatives, targeted healthcare campaigns and creating accessible and inclusive healthcare environments.
Di Lorito et al.	2022	UK	Scoping review	n/a	n/a	Barriers to LGBT caregivers receiving support include poor representation in support services, negative attitudes of staff and a reluctance to seek support. Some strategies could include staff awareness training and kite-marking inclusion.
Fabbre	2014	USA	Qualitative study	>50	22	Study explores "queer ageing" highlights awareness of "time left to live" and a feeling of "time served" as having an important role in later life development.
Fabbre & Siverskog	2019	Sweden/USA	Book chapter	>50 (Sweden) 45-64 years (USA)	6 (Sweden) 60 (USA)	See Table 3
Finkenauer et al.	2012	Canada	Systematic Review	n/a	n/a	See Table 3
House of Commons	2016	UK	Govern-ment report	n/a	n/a	Report of Women and Equalities Committee, areas covered include gender recognition act, equality act, NHS services and tackling everyday transphobia.
Knochel & Flunker	2021	USA	Qualitative study	>55	24	Participants feared mistreatment and loss of authentic gender expression and recognition in long-term care and highlights the role this plays consideration of suicide and physical transition.
Nottingham Center for Transgender Health Network	2021	UK	Website	n/a	n/a	The Nottingham Center for Transgender Health Network has launched a new national pilot, the East of England gender service.
Nowakowski et al.	2021	USA	Book Chapter	>40	100	Paper considers gaps in access and quality of healthcare delivery for older TGD adults. Suggests this gap could be bridged using research, education, and system operation
Siverskog	2014	Sweden	Qualitative study	62–78	6	Paper addresses three themes: intersections of age and gender during life course, lack of knowledge of transgender issues and how previous experiences of healthcare matter in later life.

(*Continued*)

Table 6. Continued.

Author	Year	Country	Study type	Age or age range/ years	Sample size	Key findings
Siverskog	2015	Sweden	Qualitative study	62-78	6	Older TGD adults may face ageist attitudes during the transition process and later life that could create fears about receiving care in the future.
Vincent	2018	UK	Book	n/a	n/a	Provides a comprehensive guide for healthcare professionals regarding, terminology, referral process, patient interactions, providing care and gender affirming treatment.
Walker et al.	2023	USA and Canada	Multiple Method Analysis	18-70	829	Paper highlights five different responses to receiving care in later life: no concerns, anticipated discrimination, loss of control, quality of life, general concerns.
Whittle et al.	2007	UK	Book	n/a	n/a	Discusses TGD people's experiences throughout their life including sections on accessing healthcare, the Gender Recognition Act, and the Equality Act
Willging et al.	2006a	USA	Qualitative Study	n/a	20	Healthcare providers had a "neutral therapeutic posture" which likely heightens barriers to accessing quality care for the LGBT population.
Willging et al.	2006b	USA	Qualitative Study	n/a	38	Study found that positive experiences can result from help seeking however some LGBT people continue to experience anti-LGBT sentiments.
Willis et al.	2020a	UK	Qualitative study	50-74	22	Older TGD individuals are 'reluctant educators' of primary care healthcare professionals. TGD individuals face transphobia and cisnormative assumptions across healthcare.
Willis et al.	2020b	UK	Qualitative Study	50-74	22	Paper identified four key themes: facilitative factors for transitioning in mid- to later life, growing older as a new lease of life, regrets, delays, and uncertainties when growing older and ambivalent expectations of social care services.
Witten	2014a	USA	Qualitative Study	18-70+ (47% > 50)	1,963	See Table 3

Furthermore, specialist services tend to be based in urbanized areas which can pose challenges for older TGD individuals living in rural areas (Witten, 2014a). This not only creates practical challenges such as long travel times but may also inadvertently "out" people who live in small tight-knit communities (Willging et al., 2006a; 2006b). As a result, older TGD individuals living in rural areas may face an increased risk of violence and abuse in their home community, which could reduce their willingness to access transgender health clinics. Additionally, the risk of being "outed" can occur when accessing "gender-specific" services such as breast cancer clinics (Dhillon et al., 2020).

In the UK, access to specialist TGD care is dependent on a GP referral. However, a lack of knowledge about referral pathways and treatments may result in GPs inadvertently acting as gatekeepers to specialist clinics (House of Commons Women and Equality Committee, 2016; Siverskog, 2014, 2015; Willis et al., 2020a). Furthermore, even when patients successfully navigate the referral process and access transgender health clinic, they may encounter further obstacles. These may include meeting diagnostic

criteria for "gender incongruence" (Willis et al., 2020a) and feeling pressure to conform to preconceived notions of what it means to be "trans enough". The legal requirement to receive a clinical diagnosis of "gender incongruence" in order to change gender in the UK contributes to a power imbalance between the services and its users (Willis et al., 2020a).

Binary gender norms and expectations are ingrained within the health and social care system, as evidenced by practices such as the assignment of hospital ward bays based upon binary gender (Whittle et al., 2007; Willis et al., 2020b). Despite, protections provided under the Equality Act (2010) allowing TGD individuals to be placed on a ward based on their preferred gender, this fails to address the needs of gender-diverse individuals. Numerous studies have reported instances where TGD patients have been placed inappropriately highlighting the inconsistent application of TGD-affirming policy (Willis et al., 2020b). This failure to accommodate gender diverse individuals underscores the need for more inclusive and equitable policies within the healthcare system.

Discrimination

Relevant studies are summarized in Table 7. Discrimination is an ingrained aspect of the TGD experience of health and social care, with 25% of TGD adults reporting experiences of discrimination or denial of equal treatment by a physician or hospital (Porter et al., 2016). Discrimination can occur in different forms of micro (Nadal et al., 2012) and macro-aggressions (Grant et al., 2011), including refusal of care (Walker et al., 2023), improper use of pronouns (Willis et al., 2020a), changing legislation (Perone, 2020) and verbal and physical abuse (Finkenauer et al., 2012).

Firstly, it is important to consider that older TGD adults have probably experienced lifelong discrimination and, as a result, anticipate discriminatory behavior every time they access the health and social care system (Benbow & Kingston, 2022). Consequently, individuals may delay receiving care (Seelman et al., 2017), which can worsen health and wellbeing outcomes (Walker et al., 2017). Consistent with this, Seelman et al. (2017) found that delayed receipt of care due to discrimination had a greater influence on health outcomes than not receiving TGD-inclusive care. Although, contrary to the main body of literature, this highlights the pivotal role that discrimination plays in determining health outcomes for the older TGD community. Furthermore, experiences of discrimination may worsen with age as older TGD people are vulnerable to "double discrimination" from both ageism and transphobia (Benbow et al., 2021).

In addition to poor health outcomes, it has been hypothesized that experiencing repeated and prolonged discrimination alongside related social stressors can evoke a trauma-like response (Lambrou et al., 2022). This results in repetitive stimulation of the autonomic nervous system and the hypothalamic-pituitary-adrenal axis which can accumulate and pose as a risk factor for dementia (Correro & Nielson, 2020; Lick et al., 2013). Although more research is needed to support this argument, experienced trauma is thought to underlie many stress-related gender minority health disparities (Correro & Nielson, 2020). Meyer's (2003) minority stress model has also been applied to the TGD population and illustrates the relationship between the unique stressors faced by TGD people and increased risks of psychological distress (Breslow et al., 2015), suicidal ideation and attempts (Grant et al., 2011: Clements-Nolle et al., 2006; Xavier et al., 2005), and overall poor physical health (White Hughto & Reisner, 2016).

Healthcare professionals should consider the impact of an individual's identity on their life experiences and be mindful of their coping mechanisms for daily stressors. A recurrent theme within the literature was use of suicide or 'self-euthanasia' to avoid discrimination in long-term care (Witten, 2014b). One participant expressed concerns about developing dementia and not having "the resolve to kill myself when I cannot support myself any longer" (Witten, 2014a).

Another frequently expressed concern is whether they will be able to "pass" in long-term care, which means to be identified in their preferred gender but not identified as being transgender (Coleman et al., 2022). The worry is that

Table 7. Discrimination.

Author	Year	Country	Study type	Age or age range/years	Sample size	Key findings
Benbow & Kingston	2022	UK	Qualitative Study	>50	16	See Table 3
Breslow et al.	2015	USA	Quantitative Study	n/a	552	Results found minority stressors (discrimination, stigma awareness and transphobia) were correlated with psychological distress. Study found that resilience did not impact the relationship between minority stressors and psychological distress.
Clements-Nolle et al.	2006	USA	Qualitative Study	>18	392	Study found some of the factors associated with attempted suicide were younger age, depression, history of substance abuse, discrimination, and victimization.
Correro & Nielson	2020	USA	Literature Review	n/a	n/a	Paper explores the relationship between chronic minority stress and cognitive aging. Paper suggests a testable model describing how minority stress heightens risk of premature cognitive aging in LGBT older adults.
Dhillon et al.	2020	USA	Scoping review	n/a	n/a	See Table 7
Ettner & Wylie	2013	Inter-national	Literature Review	n/a	n/a	See Table 4
Finkenauer et al.	2012	Canada	Systematic Review	n/a	n/a	See Table 3
Grant et al.	2011	USA	Report	18-89	6,456	See Table 3
Johnson et al.	2018	USA	Literature Review & Qualitative study	69	1	See Table 3
Knochel & Flunker	2021	USA	Qualitative Study	>55	24	See Table 7
Lambrou et al.	2022	USA	Cross-sectional study	50-76 (median 58.2)	115	See Table 3
Lick et al.	2013	USA	Literature review	n/a	n/a	Health disparities in the LGB community including in mental health, chronic conditions and cancer could be a result of minority stress. This concept could be applicable to the TGD population.
Meyer	2003	USA	Meta-analysis	n/a	n/a	A conceptual framework to help understand minority stress, stating that stigma, prejudice, and discrimination create a hostile and stressful environment that causes mental health problems.
Nadal et al.	2012	USA	Qualitative Method	21-44	9	Identified microaggressions faced by TGD individuals some of which included: use of incorrect gender terminology, disapproval of TGD experience, assumption of sexual pathology and physical threat/ harassment.
Perone	2020	USA	Commentary	n/a	n/a	Focuses on federal policies impacting healthcare for transgender older adults and three main areas: insurance coverage, discrimination, and religious-based exemptions.
Porter et al.	2016	USA	Literature review	68	1	See Table 4
Seelman et al.	2017	USA	Quantitative Study	n/a	417	There is strong association between delaying healthcare because of fear of discrimination and poor general and mental health among TGD adults.
Walker	2017	USA	Qualitative Study	>50	384	Identifies a link between perception of aging successfully and larger social networks and higher levels of confidence that a healthcare professional will treat them with dignity and respect. Paper calls for practitioners, researchers, policy makers and institutions to work together to improve healthcare disparities in this population.

(*Continued*)

Table 7. Continued.

Author	Year	Country	Study type	Age or age range/years	Sample size	Key findings
Walker et al.	2023	USA and Canada	Multiple Method Analysis	18-70	829	See Table 7
White Hughto & Reisner	2016	USA	Quantitative Study	50-75	61	Gender-related discrimination and everyday experiences of discrimination are associated with increased odds of past-week depressive distress. Commonest reasons for experiencing discrimination were related to gender (80.3%) and age (34.4%).
Willis et al.	2020a	UK	Qualitative Study	50-74	19	See Table 7
Witten	2014a	USA	Qualitative Study	18-70+ (47% > 50)	1,963	See Table 3
Witten	2014b	International	Qualitative Study	18-70 57% male 43% female	1,963	TGD populations are underprepared for events and legalities that are associated with approaching end of life. Example of these include, having an advance directive, power of attorney, partaking in end-of-life discussions and care plans.
Xavier et al.	2007	USA	Qualitative Study	13-61	248	TGD people who belong to a minority ethnic group are at high risk for HIV/AIDS, substance abuse, suicide, and violence. Identifies an urgent need for increased medical and social services for this group.

if they are revealed as transgender in a long-term care setting, they may become exposed to stigma or discrimination, from staff and other residents (Knochel & Flunker, 2021). Such anticipatory anxiety may create additional pressures for older TGD people to undergo full surgical transition before going into long-term care facilities (Ettner & Wylie, 2013). In contrast, "passing" as one's preferred gender can lead to TGD people being overlooked for appropriate care (Knochel & Flunker, 2021). This can include not partaking in medical screening or sexual health programmes; for example, transgender males or gender diverse people who have a cervix not presenting for cervical smears (Dhillon et al., 2020) or the same patient group not presenting to gynecological assessment units with STI concerns. However, it should be noted that aging, regardless of gender identity can bring about uncertainties and worries about maintaining one's health and wellbeing.

Nonetheless, high levels of resilience are often reported within the TGD community (Johnson et al., 2018) which may help TGD people to challenge healthcare professionals and overcome obstacles in the health and social care system. However, for older TGD adults, levels of resilience may decrease with cognitive decline and age (Willis et al., 2020a). Therefore, healthcare professionals need to support and cultivate resilience within this population and advocate for them when they can no longer advocate for themselves.

Knowledge within the TGD community and amongst healthcare professionals

Relevant studies are summarized in Table 8. TGD people frequently encounter healthcare professionals who lack knowledge of basic TGD health issues. One study reported that 50% of respondents had experienced having to teach their healthcare professional about fundamental TGD health needs (Grant et al., 2011). Reflecting this, Willis et al. (2020a) described TGD people as "reluctant educators and self-advocates". Members of the TGD community reported feeling burdened by this role (Siverskog, 2014) and some perceived healthcare professionals' lack of knowledge as an "unwillingness to investigate further" (Willis et al., 2020a). For older TGD patients, these repeated, often lifelong, experiences may result in low confidence in health and social care services (Smolle & Espvall, 2021).

In contrast, some patients have reported positive experiences, with one person describing their GP as "highly supportive" (Willis et al., 2020a).

Table 8. Knowledge within the TGD community and amongst healthcare professionals.

Author	Year	Country	Study type	Age or age range/years	Sample size	Key findings
Di Lorito et al.	2022	UK	Scoping review	n/a	n/a	See Table 7
Nowakowski et al.	2021	USA	Book Chapter	>40	100	See Table 7
Porter et al.	2016	USA	Literature review	68	1	See Table 8
Siverskog	2014	Sweden	Qualitative Study	62–78	6	See Table 7
Smolle & Espvall	2021	Sweden	Qualitative Study	n/a	16	Identifies challenges in social work with older TGD adults, some examples included invisible needs, lack of knowledge and social services organizations not prioritizing gender identity and expression.
Walker et al.	2017	USA	Qualitative Study	>50	384	See Table 7
Walton et al.	2015	UK	Letter	n/a	n/a	Highlights the important role that support groups have in offering people living with dementia an opportunity to acknowledge their diagnosis and have access to professional and personal information and advice.
Willis et al.	2020a	UK	Qualitative Study	50-74	22	See Table 7
Witten	2014a	USA	Qualitative Study	18-70+ (47% > 50)	1,963	See Table 3
Witten	2014b	International	Qualitative Study	18-70	1,963	See Table 8

Another individual recounted past negative experiences, yet a recent positive experience had played a pivotal role in restoring their trust and confidence (Willis et al., 2020a). This illustrates the importance of consistent care and utilizing opportunities to rebuild trust with patients. Looking to the future, this could be achieved in several ways, including diversification of sex- and gender-related clinical education (Nowakowski et al., 2021), implementation of inclusive and respectful policies to address their bio-psycho-social-spiritual needs, particularly in elderly services (Witten, 2014a), and use of preferred names and pronouns (Walker et al., 2017).

As well as gaps in the knowledge of healthcare professionals, there is a disconnect between TGD people and their knowledge of what services and facilities are available (Witten, 2014a). Di Lorito et al. (2021) reported a lack of knowledge throughout the LGBT community about LGBT-friendly services, especially dementia services. Furthermore, it has been reported that TGD people often feel a lack of belonging to the wider LGBT community (Porter et al., 2016), meaning they face social isolation and may not benefit from having a strong social network. Social support networks are important for patients with long-term health conditions as they allow individuals a space to share knowledge and receive support (Walton et al., 2015). Witten (2014a) emphasized the need for community outreach programmes for "hard to reach" members of the TGD community, including the older cohort to encourage intergenerational and multicultural interactions.

Dementia: overview

It has been suggested that TGD people are at an increased risk of developing dementia than the general population (Guo et al., 2022). This may be due to the increased prevalence of health problems and risk factors associated with dementia (Davis et al., 2022; Livingston et al., 2020), including depression, HIV, smoking, physical inactivity, cardiovascular disease, alcohol consumption and hypertension (NICE, 2021).

Much of the literature highlighted similarities in concerns expressed by older cisgender individuals and TGD people regarding dementia. However, older TGD people also held unique fears including concerns of being "outed" because of dementia (Willis et al., 2020b), loss of gender identity (Knochel & Flunker, 2021) and fears of being forced to live in the wrong gender (Benbow et al., 2021). Considering the complexities and challenges of caring for patients with dementia combined with the unique needs of TGD patients, greater education of healthcare professionals is needed to address the specific health and social care needs of older TGD patients living with dementia.

Epidemiology and risk factors

Relevant studies are summarized in Table 9. The prevalence and incidence rates of dementia in the TGD population are largely unknown due to an absence of accurate data, although some researchers have suggested potential estimates (Guo et al., 2022). Witten (2014a) estimated that within the current cohort of elderly TGD people globally, between 1.3 to 4.1 million transgender adults may develop Alzheimer's and die as a result of it. Epidemiological research in this area faces numerous limitations, including challenges in defining the population at risk, small sample sizes and the failure to adjust for confounding variables such as poor health or socio-economic deprivation.

Addressing modifiable risk factors could delay or even prevent the progression of dementia by up to 40% (Livingston et al., 2020). Therefore, understanding risk factors within the TGD population, could have potential benefits for both patients and the health and social care system. Several studies have reported high rates of dementia-associated risk factors within the older TGD population (Balcerek et al., 2021; Beehuspoteea & Badrakalimuthu, 2021; Guo et al., 2022; Witten, 2014a). One Australian study found nearly one in four older TGD participants (≥45 years) were current smokers (Balcerek et al., 2021), which was considerably higher than the Australian general population. Increased rates of risk-associated behaviors also include physical inactivity, hypertension, alcohol-use disorder, obesity, and depression (Guo et al., 2022).

This is concerning for several reasons. Firstly, older TGD people are more likely to delay receiving care (Seelman et al., 2017) and therefore could develop otherwise preventable health conditions due to not receiving regular health checkups e.g. monitoring blood pressure to prevent hypertension (Seelman et al., 2017). In addition, Benbow and Kingston (2016) found a large percentage of participants complained of long waiting times when waiting to be assessed for dementia. As a result, coupled with the tendency for TGD individuals to delay seeking care, they are unlikely to receive a timely dementia diagnosis (Benbow et al., 2021; Seelman et al., 2017). Timely diagnosis has many benefits including creating care plans, management of conditions, prevention of unsafe behaviors (e.g. unsafe driving) and planning for the future (Lambrou et al., 2022; Walker et al., 2023).

In addition to modifiable factors, there are several non-modifiable risk factors for dementia including age, sex, and family history (Loeffler, 2021). Most studies report higher rates of dementia among women, with possible reasons including differences in educational attainment, early menopause or higher mortality among older men (Mielke, 2021; Podcasy & Epperson, 2016; Rocca et al., 2011). When considering sex-specific risk factors, the literature fails to address how this applies to TGD individuals. Greater research investigating these differences in relation to disease progression, risk factors and symptoms is needed including its application to the TGD population.

One study investigating short-term impacts of hormonal replacements found masculinization in white matter tracts of transgender men (female-to-male participants) and feminization of fibers in transgender women (male-to-female participants) (Kranz et al., 2017; Scharaga et al., 2020). Another study found evidence that transgender women taking estrogen-replacement therapy experienced decreases in grey matter in the hippocampus (Seiger et al., 2016). Although there is limited research, this could indicate a possible link between hormone therapy causing hippocampal atrophy in transgender women and a diagnosis of dementia. Contrastingly, there is evidence to suggest that estrogens may be protective of the brain (Vinogradova et al., 2021), demonstrating contradictions in the present literature. Another study suggested that there may be other explanations for gender differences in dementia within this population including high rates of anxiety, depression and loneliness found among transgender women, rather than long-term use of hormone therapy (van Heesewijk, 2023). Overall, this highlights the uncertainties surrounding the impact of sex hormones and hormone therapy on cognitive functioning and the need for more research exploring this. This is especially relevant to the TGD population due to the integral role of sex hormones in gender-affirming care.

Table 9. Dementia: Epidemiology and risk factors.

Author	Year	Country	Study type	Age or age range/years	Sample size	Key findings
Balcerek et al.	2021	Australia	Retrospective cross-sectional analysis	2 groups: <45 years ≥45 years	296	See Table 4
Beehuspoteea, & Badrakalimuthu	2021	UK	Case Vignette & Literature review	76	1	See Table 3
Benbow et al.	2021	UK	Narrative Review	n/a	n/a	See Table 3
Benbow & Kingston	2016	UK	Qualitative Study	n/a	41	Explores the experiences of TGD individuals living with dementia and their carers. Identifies themes which contribute to experiences of dementia, approaches to coping and looking to the future.
Benbow & Kingston	2022	UK	Qualitative Study	>50	16	See Table 3
Davis et al.	2021	UK	Narrative Literature Review	n/a	n/a	Review discusses different types of dementia, including frontotemporal, alcohol-related and HIV dementia, and highlights the need for healthcare professionals to have awareness of different symptoms and disease progression associated with these types of dementia.
Erosheva et al.	2016	USA	Quantitative Study	>50 years	1,913 (136 TGD participants)	Social network size and diversity was associated with many factors including being female, transgender identity, employment, higher income, younger age, and service use.
Fabbre & Siverskog	2019	Sweden/ USA	Book Chapter	>50 (Sweden) 45-64 years (USA)	6 (Sweden) 60 (USA)	See Table 3
Fredriksen-Goldsen	2011	USA	Quantitative & Qualitative Study	>50	n/a	See Table 3
Guo et al.	2022	USA	Quantitative Study	n/a	1784	Prevalence of Alzheimer's and related dementias was higher in TGD adults when compared with the cisgender sample. Addressing these modifiable risk factors may help to prevent/delay dementia cases.
Knochel & Flunker	2021	USA	Qualitative Study	>55	24	See Table 7
Kranz et al.	2017	Austria	Quantitative Study	n/a	44 TGD 33 controls	In both TGD participants and controls; hormonal fluctuations were correlated with changes in white matter microstructure. Results suggest that sex hormones do play a role in white matter variability.
Lambrou et al.	2022	USA	Cross-sectional study	50-76 (median 58.2)	115	See Table 3
Livingston et al.	2020	UK	Literature Review	n/a	>10,000	Identifies modifiable risk factors which contribute to incidence of dementia and ways in which they may be preventable.
Loeffler	2021	USA	Literature Review	n/a	n/a	Positive association found with 6 factors and Alzheimer's disease: malnutrition, genetic variants, altered gene regulation, baseline cognitive level, neuropsychiatric symptoms, and extrapyramidal signs.
Mielke	2018	USA	Book Chapter	n/a	n/a	Sex can affect the measurement/ interpretation of Alzheimer's disease related cerebrospinal fluid biomarkers, including sex differences in the diagnosis/ prognosis of the biomarker.
NICE	2021	UK	Website	n/a	n/a	Listed risk factors for dementia: age, learning disability, genetics, CV disease, Parkinson's disease, lower educational attainment, hypertension, smoking, obesity, hearing impairment etc.
Podcasy & Epperson	2016	USA	Literature Review	n/a	n/a	Identifies sex and gender differences in the development of dementia including societal factors impacting upon lifestyle and advanced education.

(*Continued*)

Table 9. Continued.

Author	Year	Country	Study type	Age or age range/years	Sample size	Key findings
Porter et al.	2016	USA	Literature Review & case study	68	1	See Table 4
Rocca et al.	2011	USA	Literature Review	n/a	n/a	Study explores the role of estrogen on the brain depending on age at time of treatment, type of menopause/ stage of menopause. There is currently conflicting data on the neuroprotective role of estrogen.
Scharaga et al.	2021	USA	Case Study	85	1	Case study exploring cognitive decline in the older TGD population. Overall, study was unable to identify gender differences due to participant's marked cognitive impairment.
Seelman et al.	2017	USA	Quantitative Study	n/a	417	See Table 8
Seiger et al.	2016	Austria	Quantitative Study	Mean age: Female: 24.9 Male: 28.0	39	Study investigating the effects of sex hormones on the brain. Study found transgender women receiving estradiol and anti-androgens were associated with decreases in hippocampal region. Hormones influence subcortical structures relating to memory and emotional processing.
van Heesewijk et al.	2023	Netherlands	Qualitative Study	56-84	112: 73 trans women 39 trans men	Study researching the impact of gender-affirming hormone therapy on cognitive functioning of older TGD adults. Study suggests small cognitive differences between transgender men and cisgender counterparts does not suggest long-term testosterone impacts cognitive functioning. Transgender women had lower cognitive functioning than cisgender groups, which can be explained by mental/social health.
Vinogradova et al.	2021	UK	Case-control studies	>55	118,501 participants 497,416 controls	Study investigating link between hormone therapy use and risk of dementia. Study found no increased risks of developing dementia with menopausal hormone therapy. Slight increased risk of developing Alzheimer disease among long-term users of estrogen-progestogen therapies.
Walker et al.	2023	Canada & USA	Multiple Method Analysis	18-70	829	See Table 7
Willis et al.	2020b	UK	Qualitative Study	50-74	22	See Table 7
Witten	2014a	USA	Qualitative Study	18-70+ (47% > 50)	1,963	See Table 3
Witten	2014b	International	Qualitative Study	18-70 57% male 43% female	1,963	See Table 8
Zwaanswijk et al.	2013	Netherlands	Quantitative Study		1494	Identified a need for professional support for informal caregivers irrespective of stage of illness process. Carers need guidance on how to cope with symptoms of dementia, how to deal with behavior problems and information about dementia.

Healthcare professionals also need to be aware of different family structures within the TGD community, with emphasis on 'families of choice' throughout the literature (Benbow & Kingston, 2022; Porter et al., 2016; Walker et al., 2023). Using inclusive questions, such as "Who is most important to you in your life?" is vital when understanding older TGD patients' social support networks. This is particularly important as social support networks naturally decline with age (Erosheva et al., 2016) and informal care makes up a large part of long-term dementia care (Zwaanswijk et al., 2013). Evidence also suggests that social support improves wellbeing outcomes in the TGD population (Aldridge et al., 2022), something which

Table 10. Experiences and care of TGD older adults living with dementia.

Author	Year	Country	Study type	Age or age range/years	Sample size	Key findings
Baril & Silverman	2022	Canada	Literature Review	n/a	n/a	See Table 3
Barrett et al.	2015	Australia	Qualitative Study	47-79	30	Study identifies the fear of discrimination by service providers resulting in greater reliance on intimate partners for care and worsens social isolation.
Beehuspoteea & Badrakalimuthu	2021	UK	Case Vignette & Literature review	76	1	See Table 3
Benbow et al.	2021	UK	Narrative Review	n/a	n/a	See Table 3
Latham & Barrett	2015	Australia	Educational Resource	49-79	15	Resource created based upon TGD stories exploring access to medical care, key issues in TGD health and aging, living with dementia and practical guidance for practitioners.
Marshall et al.	2015	Canada	Case Study	94 years	1	Case study about gender dysphoria in a biological male who developed cognitive impairment and subsequent gender confusion. The study considers how best to approach and care for these patients.
Porter et al.	2016	USA	Literature review & case study	68 years	1	See Table 4

is especially important for older TGD adults living with dementia.

While these findings are significant, it is important to address the limitations of dementia research conducted on this population. Most research exploring TGD individuals and dementia were often part of wider studies about the LGBT population, failing to recognize the distinctions between these contrasting communities (Lambrou et al., 2022). Social support networks represent one such difference. Despite being perceived as a homogenous community, many TGD individuals reported a sense of exclusion from the wider LGBT community (Fredriksen-Goldsen, 2011). This may be especially evident among the older generations due to historical tensions between these communities, exemplified by homophobia present in some early TGD groups (Fabbre & Siverskog, 2019). Subsequently, this may result in social isolation of TGD individuals, likely to worsen with age (Witten, 2014b). With social isolation being a known contributing factor to cognitive decline (Beehuspoteea & Badrakalimuthu, 2021), this creates additional obstacles for older TGD people.

Experiences and care of TGD older adults living with dementia

Relevant studies are summarized in Table 10. Research on the concerns of older TGD adults in relation to aging consistently highlights dementia as a recurring theme. Despite a recent increase in literature addressing this issue, there is limited research on the actual experiences of older TGD people living with dementia. Several studies have provided accounts of patients forgetting that they had transitioned and re-identifying with their gender-assigned at birth. One case study detailed a 76-year-old transgender female who presented with toileting behavior which aligned with a male gender identity (their sex-assigned at birth) e.g. standing up to urinate (Beehuspoteea & Badrakalimuthu, 2021). This created upset and confusion for the patient's partner who was their full-time caregiver.

Older TGD adults living with dementia may experience pressures from family members and healthcare professionals to conform to cisgender ideals and norms. For example, Latham and

Barrett (2015) reported a case where a transgender woman lived and dressed as a man in a care home as a result of pressure from relatives. These examples highlight how the concept of "gender confusion" is complex and cannot be simply presumed to be a symptom of dementia (Baril and Silverman, 2022). This also demonstrates that older TGD adults' fears surrounding being forced to live in their birth-assigned sex has a rational and valid basis. Cases such as this (Latham & Barrett, 2015) touch on issues about elder abuse and undue influence and raise important questions about how healthcare professionals and the health and social care system can best support older TGD adults.

Baril and Silverman (2022) discuss four approaches to transgender issues in dementia care settings: gender-neutralization (Marshall et al., 2015), trans-affirmative stable (Latham & Barrett, 2015 and Barrett et al., 2015) trans-affirmative fluid, and trans-affirmative, age-positive, and crip-positive (an approach which aims to value the identity of disabled people) (Baril & Silverman, 2022). The trans-affirmative fluid approach provides suggestions for attempting to care for TGD patients who experience "gender confusion" (Benbow et al., 2021) e.g. patients changing their preferred gender on a daily basis (Westwood & Price, 2016). This approach focuses on accepting an individual's reality as it changes over time. Baril and Silverman (2022) identified techniques which could be utilized, such as having a badge that clearly shows their preferred gender/pronoun use for that day or having a range of gendered or gender-neutral clothes to choose from.

Although this approach demonstrates the potential for trans-affirmative fluid dementia care, it fails to acknowledge the reality of delivering care in settings with limited resources. To achieve trans-affirmative dementia care is likely to require significant and sustained training of what is often a transient workforce. However, this approach does provide support for gender diverse individuals, unlike the trans-affirming stable approach which mainly focuses on affirming a person's historical gender; for example, dressing a transgender woman in feminine clothes and using she/her pronouns, despite them experiencing "gender confusion". Although the trans-affirming stable approach aims to support TGD identities, it is rooted within binary gender assumptions. By denying people with dementia the agency to make decisions about their gender identity and reenforcing binary gender, it pathologises non-binary gender identities (Baril & Silverman, 2022).

One way to support dementia care could be by encouraging TGD individuals to make legal arrangements such as advance care or end-of-life plans. TGD individuals are less likely to have advanced care plans (Porter et al., 2016), but should be afforded the same opportunities as anyone else.

The available literature fails to address some aspects of TGD-specific care. For example, TGD individuals with dementia who have undergone vaginoplasty may need support to undergo vaginal dilation regularly (Benbow et al., 2021). Such interventions may require access to specialist care and so may be affected by discrimination. Therefore, the issue of gender identity in dementia care clearly requires further consideration in both research and clinical practice.

Discussion

This study offers a comprehensive overview of the health concerns faced by older TGD individuals, with a particular focus on dementia. Our main finding is that older TGD people face many varied health and social challenges in comparison with older cisgender individuals. For older TGD people, barriers to the health and social care system can lead to delayed receipt of healthcare, hiding their TGD identities or even ending their own lives. It is important to recognize the varying needs of communities within the LGBT population, and the specific problems TGD individuals face. As a group, they have a high prevalence of several long-term physical and mental health conditions, which we have attributed to be in relation to multiple factors, comprising of: lifestyle (including sexual behaviors, smoking), psychological wellbeing (including access to gender-affirming care, general mental health) as well as healthcare related issues (transgender hormone therapy use, barriers to accessing healthcare). These components may all

contribute to the health disparities identified throughout this review, with a particular contribution to dementia risk. Dementia was identified an important problem for older TGD people; the prevalence of dementia may be higher in this population compared to the general population, potentially amplifying the challenges associated with recognizing and delivering suitable health and social care. Moreover, there is a paucity of literature in this field, hindering the establishment of evidence-based dementia care for this community.

The findings of this study have implications for healthcare professionals and how best practice care can be provided to older TGD people. We identified three approaches on how this may be achieved. Firstly, expert patients could help to reduce the frequent feelings of isolation experienced by older TGD people and help provide a sense of togetherness. The Expert Patient Programme has been effectively utilized throughout the health and social care system, particularly for individuals with long-term health conditions (Department for Business, Innovation & Skills, 2013). This concept could be applied to the TGD population to help to support and guide TGD individuals with aging. Expert patients may help by providing information and helping to ease the transition into later life and can educate and encourage TGD individuals to make end-of-life arrangements such as advance directives. In turn, this would help to empower individuals to live their lives as they intend to even toward the end of their life. The use of TGD individuals as educators can help to facilitate a welcoming and accepting environment for older TGD people. In turn, this could encourage isolated individuals to access health and social care services when needed.

A second approach is by adapting services and policy to ensure consistent quality of care for older TGD individuals, while also recognizing the importance of a collaborative approach when improving these services. Co-production is "*when groups of people get together to influence the way that services are designed, commissioned and delivered*" (Care Act Factsheets, 2016). Utilizing this approach for this population would allow TGD people to work with healthcare professionals (Nowakowski et al., 2021) to deconstruct the binary and heteronormative assumptions ingrained within health and social care services. This approach empowers older TGD people by giving them a voice and actively involving them in collaboration with healthcare professionals. It shifts the burden away from solely relying on the TGD community to navigate the health and social care system. This could also facilitate conversations about TGD peoples' experiences so changes could be made accordingly, e.g. implementing additional procedures to ensure cervical smears are more comfortable for transgender men and gender diverse people (Dhillon et al., 2020).

Finally, a systems approach involves observing the way decisions and actions in one part of the system will impact upon other areas (Clarkson et al., 2018). For example, researching how healthcare students are educated about TGD issues and how this education impacts their care for TGD patients. On average UK medical schools only have 11 h of LGBTQ+ specific teaching across the whole undergraduate course (Tollemache et al., 2021). Considering limited knowledge of healthcare was a recurring theme throughout the literature, it is vital for education to start at a base level. Therefore, targeting this part of the system could cultivate an environment where healthcare professionals are encouraged to be "willing learners" and aim to keep up to date with LGBTQ+ issues. Importantly, a systems approach encourages reflection of previous errors and mistakes which may be valuable when considering the care of TGD older adults.

Limitations and implications for further research

The study has several limitations, primarily arising from gaps in existing literature and the restricted viewpoints of some studies. The published literature derives mostly from higher income countries like the UK, USA and the Netherlands. Cultural aspects of transgender and gender diversity vary greatly across countries, but even within countries where research has been conducted there is tendency to neglect TGD people from different cultural groups and minority identities. Where some studies have addressed additional challenges ethnic minority groups may face, this group was often researched from a

one-dimensional perspective of merely being viewed as victims. Furthermore, researchers often use different variations of terminology, which can also be confusing and ambiguous.

Another limitation of the study is the varying sample sizes and different representations of transgender women, men, and non-binary/gender diverse individuals. It is too simplistic to combine the experiences of these groups under the single label of TGD. Notably, there was an absence of gender diverse representation, often meaning that research involving TGD people only included transgender participants, and often primarily transgender women. For future research, gender diverse individuals could be researched independently of transgender people to identify similarities and differences between these groups. By improving study methods to include stratified random sampling, studies may be able to access currently underrepresented demographics e.g. Black, Asian and minority ethnic (BAME) TGD persons, gender diverse and non-binary persons, and transgender men. This could have important clinical implications to help curate a personalized approach rather than a "one-size fits all" approach for this population.

Studies such as those conducted at the VU University Medical Center have begun to consider TGD health over long time periods, however there are associated challenges including the retrospective nature of the study (Wiepjes et al., 2018) and difficulty in following up patients who have left the services. This may be particularly challenging in the TGD population due to changes of names, addresses and contact details during transition phases. With consideration of these limitations, this study could be used to inform future research taking a longitudinal approach in researching this population.

Another consideration for this study is the large age range included in our review. Whilst our focus is targeted at the older TGD population, the study includes individuals whose age range spans across several decades (>50 years). Therefore, personal experiences, health conditions and societal context are likely to vary greatly amongst this group. Additionally, the experiences of the current cohort of older adults are likely to differ greatly from future generations due to changes in societal norms and culture. It is important to consider the impact of the "cohort effect" on research findings and consider possible ways to mitigate these effects for future research, including researching perceptions of aging using younger participants and use of longitudinal studies.

It was beyond the scope of the study to consider the full range of medical conditions that may impact upon older TGD people. Although the focus of this study has been on topics of relevance to aging and TGD issues, there is scope for further research on cancers and chronic respiratory diseases.

The different methodologies of studies utilized in the literature review are a limitation. For example, although case studies were valuable when exploring dementia because of the otherwise limited research, their use posed additional challenges. One of these challenges was that case studies can be heavily anonymized to protect individuals from being identified and thus at risk of discrimination and abuse. Consequently, cases may be distorted which can detract from results. For example, even concealing a detail such as which part of the UK a participant is from could be relevant because of differences in legislation, as seen in Scotland (Gender Recognition Reform (Scotland) Bill, 2022). It is also likely that researchers exploring this area of study may have close connections with the TGD community which may lead to unconscious biases when analyzing and interpreting data.

In conclusion, this paper fills a gap in current literature by offering an overview of the older TGD population's interactions with the health and social care system and the impact this has upon health outcomes and needs, with a broad scope of review throughout. Although it is not comprehensive and there are some limitations, this extended literature review has considered some of the health care challenges and how they might be met in an organized manner. This paper draws attention to the importance of stigma and discrimination and how the TGD community are often overlooked in the health and social care system. This is a growing and important area for care research and policy, evidenced by a recent increase in literature. Future reviews would be

well placed to consider narrower foci on individual conditions in older TGD populations, although it is important to approach this sensitively, appreciating the risk of over-sampling an already sensationalized demographic. Overall, there is great scope and opportunity for changes to be made in further research.

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