Body Image Satisfaction and Gender-Affirming Healthcare in Gender-Diverse Individuals: A Systematic Review and Meta-Analysis

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List of Abbreviations

Abbreviation	Definition
AIS	Androgen insensitivity syndrome
CAH	Congenital adrenal hyperplasia
CSH	Cross-sex hormone therapy
HRT	Hormone replacement therapy
FTM	Female-to-male transgender
GnRH	Gonadotropin-releasing hormone
GRS	Gender-reassignment surgery
MTF	Male-to-female transgender
NB	Non-binary
SRS	Sex- reassignment surgery
WPATH	World Professional Association for Transgender Health

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Attestation of Authorship

"I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgments), nor used artificial intelligence tools or generative artificial intelligence tools (unless it is clearly stated, and referenced, along with the purpose of use), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning."

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Abstract

Background: There are numerous studies on the need for gender-affirming healthcare and body dissatisfaction in the gender-diverse population. This research often connects these topics with mental health outcomes for the gender-diverse community. However, a succinct summary is needed about how receiving gender-affirming care impacts this population's body satisfaction and mental health. Understanding the connection between body image satisfaction and gender-affirming healthcare may help inform psychological practice and interventions when working with gender-diverse populations.

Objective: This study aims to fill this gap by conducting a systematic review and meta-analysis on the impact of gender-affirming care on body image for gender-diverse individuals.

Methods: A systematic search of Medline, PsycINFO, Emcare, CINAHL, and Scopus was conducted, searching for articles published between 2000-2022. Studies on body image outcomes before and after gender-affirming medical care for gender-diverse individuals were included. The ROBINS-I assessment was used to evaluate the risk of bias. Data was synthesised via a narrative summary and meta-analysis.

Results: The total number of studies included was 13, with a total number of participants of 839 across studies with pre- and post-data. Key results indicate varying effects on body image satisfaction for binary gender-diverse individuals undergoing hormone suppression; however, cross-sex hormone therapy, gender-affirming surgeries, and mixed interventions have a positive impact on body image.

Conclusion: Gender-affirming healthcare was found to have a positive impact on binary gender-diverse individuals' body image. However, this study has several serious limitations which include high levels of heterogenous data and limited sample sizes that had a lack of diversity. It was also noted that there is a lack of research examining body image and impact of gender-affirming health care for non-binary gender-diverse individuals. Overall, these findings indicate that gender-affirming health care has a positive impact on gender-diverse individuals, however, this study may not be generalizable to the wider gender-diverse population due to the lack of diversity in the included studies.

Keywords: Body Image Intervention, Gender-Affirming Healthcare, Gender-Diverse, Transgender, Non-Binary, Gender Dysphoria.

Systematic Review Registration ID: PROSPERO CRD42023452579

Chapter One: Introduction and Literature Review

Background

Gender-diverse is an umbrella term that describes individuals who do not conform to the traditional (cisgender) gender binary of female and male and includes transgender, non-binary, and genderqueer identities (Thorne et al., 2019). Gender and sex are distinct concepts that lie on a spectrum and have a complex relationship depending on one's gender identity. Gender is the culturally determined psychological, social, and behavioural aspects of being female or male (American Psychological Association, n.d.-b). While sex is the biological and physical traits that differentiate females from males (American Psychological Association, n.d.-d). Gender identity is an individual's self-identification with a specific gender informed by biological and environmental factors (American Psychological Association, n.d.-c). In contrast, cisgender is a term used to describe individuals whose gender identity is aligned with their assigned sex at birth (American Psychological Association, n.d.-a).

Transgender is a term used to describe individuals whose gender identity does not align with their assigned (biologically or surgically) sex at birth (American Psychological Association, n.d.-e). An individual born and assigned female at birth and who transitions to male is a transman, whereas an individual born and assigned male at birth and who transitions to a female is a transwoman. In addition, an individual who is intersex and transitions to a gender other than the gender they were assigned at birth may also identify as a transman or transwoman. Many transgender individuals may seek gender-affirming health care. The World Professional Association for Transgender Health (WPATH) describes gender-affirming care as a range of medical services that support individuals in aligning their physical characteristics with their gender identity to increase physical and mental well-being and to promote self-

fulfilment (Coleman et al., 2022). For transgender individuals, their gender identity is a deeply held sense of being that represents their true sense of authentic self (Kuper et al., 2018). Living in alignment with their gender identity is crucial in increasing overall well-being (Coleman et al., 2022). However, it is important to note, a transgender gender identity is not dependent on seeking any form of medical intervention, as many transgender individuals may never pursue medical intervention.

Non-binary is a broad umbrella term for all gender identities other than the traditional female and male gender (Thorne et al., 2019). The term non-binary captures a wide range of experiences of gender that may include individuals who experience aspects of both male and female genders, neither female and male genders, a different gender entirely, or an experience of gender that is fluid and ever-changing (Thorne et al., 2019). It is important to note, the term non-binary carries some contention within the gender-diverse community as the very name ‘non-binary’ poses the existence of this identity juxtaposed against the traditional understanding of male and female. Thus, the term non-binary for some may perpetuate a sense of otherness and inversely internalise further power inequities within the domain of gender identity (Thorne et al., 2019, 2023). Nonetheless, this term is widely used and accepted by many individuals.

Genderqueer (like non-binary) is an umbrella term for identities outside the traditional female and male binary (Thorne et al., 2019). In this case, the traditional gender binary is rejected as traditional expectations and conventions of the traditional gender binary do not align with these individuals' experiences and perceptions of their gender (Thorne et al., 2019). For example, the genderqueer experience may include individuals who identify with a mix of both genders, identify as neither gender or as a different gender altogether. An individual who identifies as genderqueer may reflect this in a way that does not follow traditional gender expectations and may use pronouns such as they/them, unique self-identified pronouns, or omit pronouns altogether and opt for their name only in place of pronouns. Like non-binary, the term genderqueer

comes with some contention within the community as the term ‘queer’ may come with negative connotations in contexts where queer was historically used in a pejorative and discriminatory manner (Thorne et al., 2019). In contrast, many individuals take pride in reclaiming the term ‘queer’ (Thorne et al., 2019). The term genderqueer is widely used; however, it is important to note if the term is appropriate in the context in which it is used.

Gender Dysphoria

Gender-diverse individuals often experience gender dysphoria, which is clinically significant distress or impairment due to gender incongruence (American Psychiatric Association, 2022). Gender incongruence is the misalignment of a person's deeply held sense of gender versus the gender they were assigned at birth (American Psychiatric Association, 2022). Gender dysphoria often significantly impacts body image and contributes to negative body image and poor mental health outcomes such as anxiety, depression, low self-esteem, eating disorders, and social isolation (Jones et al., 2016; Milano et al., 2020). The impact on body image is further supported by findings that higher levels of appearance congruence and gender identity acceptance positively correlate with higher self-esteem, which was linked to fewer ruminations and internalising problems (van den Brink et al., 2020). Body dissatisfaction is driven by the discrepancy between the individual's ideal and perceived body (Cash, 2000; Grogan, 2016). Body image and gender dysphoria are inherently intertwined as both concepts have factors that focus on a misalignment of body perceptions, experiences, and expectations.

Body Image

Body image and body satisfaction/dissatisfaction is a significant factor in gender dysphoria. Body image is an individual’s perception of their body and physical

appearance, while body dissatisfaction refers to their negative perspectives about their body and physical appearance. (Cash, 2000; Grogan, 2016). Body image is influenced by various social, cultural, biological, and psychological factors (Tiwari & Kumar, 2015). Body image has been widely known to directly impact an individual's self-esteem (O'Dea, 2012). Self-esteem and interpersonal problems are significant factors that influence well-being outcomes and overall quality of life in transgender populations (Bouman et al., 2016). It has been found that lower body image satisfaction led to higher internalising problems, significantly predicting lower psychological and physical well-being and health-related quality of life outcomes compared to non-transgender samples (Röder et al., 2018).

Social factors influencing body image may include social expectations, social comparisons, family dynamics, and bullying. Sociocultural expectations related to the body start from an early age, and parental influence significantly contributes to forming these expectations (Tatangelo et al., 2016). Social expectations around body image include weight, which is often communicated in ways of "fat talk," which has been correlated with body dissatisfaction (Mills & Fuller-Tyszkiewicz, 2017). Fat talk refers to negative comments about one's own or other's physical appearance to ease body image anxiety (Mills & Fuller-Tyszkiewicz, 2017). Fat talk is also interlinked with social comparison (Pollet et al., 2021). Family, peers, and society often model fat talk, and this plays a key role in creating social biases around shape and weight, which may lead to adverse experiences such as bullying or discrimination.

Gender-diverse youth often face distress related to their body shape and size, as shape and size are intricately connected to gender expression (McGuire et al., 2016). Various societal norms have specific weight and shape ideals for genders. Adhering to these ideals may help a person "pass". "Passing" is the ability to be perceived as their affirmed gender. Many youths feel pressured to adhere to society's weight and shape expectations to pass as their affirmed gender (McGuire et al., 2016).

Social expectations and experiences are significant in developing and maintaining body image. For gender-diverse individuals, social constructs of gender expectations and subsequent discrimination heavily influence negative body image experiences (Tabaac et al., 2018).

Cultural factors that may impact body image include beauty standards and media. Most forms of media are culturally determined, often reinforcing cultural standards, which can be negative or positive. For example, oppressive appearance ideals may negatively impact body image for many, as these ideas often function to maintain social hierarchies and exploit vulnerabilities (Rodgers et al., 2023). This is exemplified by how viewing unattainable beauty ideals on social media has been strongly linked to body dissatisfaction and increased social comparison (Fioravanti et al., 2022). In contrast, the emergence of the body-positive movement in media shows promising benefits for positive body image (Cohen et al., 2021). Positive body image is heavily influenced by culture and will be displayed differently across different contexts depending on their specific cultural beauty standards (Tiggemann, 2015). Culture and media are powerful influences on body image. For gender-diverse individuals, cultural factors such as media and beauty standards play a key role in shaping their experiences. Media may even challenge the right to exist as a gender-diverse person in their cultural context through a lack of representation (Galupo et al., 2021).

Biological factors impacting body image include physical life transitions, age, physical differences, disability, and chronic illness. Physical changes due to biological development, such as puberty and ageing, impact body image, especially during key physical developmental years such as adolescence and early adulthood (Lacroix et al., 2023). Age also may influence the importance of body image; it has been found that older individuals may place less importance on body image than younger samples (Roy & Payette, 2012). Furthermore, physical differences, disability, and chronic illness have also been correlated with decreased positive body image (Pinquart, 2013). In contrast,

promoting body functionality appreciation may improve body image in those experiencing physical differences (Linardon et al., 2023). Biological factors impacting body image are dynamic and may change with age and physical life stages. For gender-diverse individuals, unwanted biological changes are a significant part of negative body image (Röder et al., 2018).

Psychological factors that impact body image may include personality, cognitive biases, and body appreciation. Personality traits such as neuroticism correlate positively with body dissatisfaction, while extraversion and conscientiousness correlate positively with positive body image (Allen & Walter, 2016). Cognitive processes such as selective attention and memory biases strongly correlate with negative body image (Rodgers & DuBois, 2016). Furthermore, body image appreciation is positively correlated with positive well-being factors such as self-esteem, self-compassion, and sexual satisfaction and negatively correlated with psychopathologies such as anxiety and depression (Linardon et al., 2022). For gender-diverse individuals' psychological factors influencing body image distress can be linked to the development of disordered eating, which often brings a host of issues of other psychological problems that feed into the body image distress, such as neurotic behaviour like perfectionism, cognitive distortions about the body, and decreased body appreciation (Jones et al., 2016).

The Intersection: Gender Dysphoria and Body Image

Several sociocultural factors influence the interaction of body image and gender dysphoria. Factors include gender characteristics, body size and shape, and social expectations (McGuire et al., 2016). It has been found that a gender-diverse individual's ability to meet cultural norms of gender characteristics of one’s gender identity influenced body shape and size control behaviour and experience of social distress (McGuire et al., 2016). In addition, individuals with gender dysphoria who have an incongruent physical appearance with their aligned gender identity may experience

more discrimination and stigma, which increases body image distress (van de Grift, Cohen-Kettenis et al., 2016). Further studies also support these findings as it has been found that discrimination was associated with lower body appreciation; however, higher self-esteem and life satisfaction mediated body appreciation (Tabaac et al., 2018). Socio-cultural norms of gender characteristics such as body shape and size are key factors in the interaction of body image and gender dysphoria, as the ability to align with these norms influences outcomes in self-esteem and social experiences (McGuire et al., 2016).

For gender-diverse individuals, gender dysphoria and body dissatisfaction have been linked to a higher prevalence of eating disorders, low self-esteem, anxiety, and depression (Jones et al., 2016; Milano et al., 2020). In addition, body-related distress has been linked to decreased health-related quality of life for transgender youth due to internalising symptoms of body dissatisfaction (Röder et al., 2018). Gender-affirming care may help improve body satisfaction, reducing psychological distress related to gender dysphoria and body dissatisfaction (Becker et al., 2018; Wernick et al., 2019).

Gender-Affirming Interventions

Gender-diverse individuals often seek gender-affirming care to mediate gender dysphoria (van Leerdam et al., 2023). Gender-affirming care can be medical and psychological interventions such as hormone replacement therapy, gender-affirming surgery, voice therapy, counselling, and other supports that support and affirm an individual's gender identity. Hormone therapy and gender-affirming surgeries are standard medical interventions for gender dysphoria in gender-diverse individuals as indicated by the WPATH (Coleman et al., 2022). Individuals who access gender-affirming care have been shown to have higher body image satisfaction with lower rates of anxiety and depression (Owen-Smith et al., 2018).

Hormone replacement therapy (HRT) involves administering hormones such as testosterone for individuals who want to achieve masculine secondary sexual characteristics and oestrogen and anti-androgens for individuals who wish to attain feminine secondary sexual characteristics (Coleman et al., 2022). Hormonal blockers such as gonadotropin-releasing hormone (GnRH) may also be administered for gender-diverse youth to temporarily delay puberty to allow them to wait until they are older to make informed decisions about hormone replacement therapy (Coleman et al., 2022). Hormone blockers have the benefit of reducing gender dysphoria from the onset of unwanted biological puberty. Delaying secondary sexual characteristics may allow gender-diverse youth to need less medical intervention in the future as there will be less needed to address secondary sexual characteristics from the unwanted biological puberty, thus decreasing psychological distress and reducing medical intervention in the future (Coleman et al., 2022).

Surgical gender-affirming interventions include a range of surgeries such as facial surgeries, breast/chest surgery, body contouring surgery and genital surgery (Coleman et al., 2022). Facial surgeries may include a range of procedures to either feminise or masculinise an individual's face to align more with their gender identity. This may include surgery on the face, brow, hair, eyelids, nose, cheek lips, jaw, chin, and trachea (Coleman et al., 2022). Breast and chest surgery may include a mastectomy (breast removal) or breast augmentation (breast reconstruction) (Coleman et al., 2022). Body contouring may include a range of procedures, such as liposuction, lipofilling, and implants (Coleman et al., 2022). Genital surgeries for individuals with the biological sex female or individuals who have female anatomy variations may include phalloplasty (surgical construction of a penis) or metoidioplasty (a surgical procedure to release the clitoral hood and ligaments which may include urethral lengthening and scrotal construction), hysterectomy (removal of the uterus) and salpingo-oophorectomy (removal of the fallopian tubes and ovaries) (Coleman et al., 2022). Genital surgeries for individuals with male biological sex or individuals who have male anatomy

variations may include vaginoplasty (surgical construction of a neovagina), vulvoplasty (creation of the external appearance of a vulva), and gonadectomy (testicle removal) (Coleman et al., 2022). Other medical interventions may include hair removal (electrolysis or laser epilation) and medical tattoos such as nipple and areola tattoos (Coleman et al., 2022). Medical interventions are chosen based on the individual's preference and medical needs. Not all gender-diverse individuals choose to access medical interventions, and it is essential to note that this list is not a checklist, nor is it exhaustive.

A systematic review investigating the impact of hormone therapy on mental health in gender-diverse individuals has found that hormone therapy improves mental health and well-being, that distress from gender dysphoria decreases, and that gender dysphoria may be connected to incongruent body image rather than psychological comorbidities (Costa & Colizzi, 2016). Furthermore, this study indicated that the timeliness of hormone intervention impacted mental health outcomes, with delay in care increasing distress versus direct access to care decreasing distress (Costa & Colizzi, 2016). These findings are further supported by recent research of a randomised control trial (the first of its kind) that indicated timely access to gender-affirming care significantly reduced gender dysphoria, depression, and suicidality in individuals who received timely access to hormone therapy (Nolan et al., 2023). Evidence also supports that results may be long-lasting, as recent studies have revealed that improved psychosocial functioning and body image congruence after hormone treatment were still apparent several years after initiating hormone therapy (Chen et al., 2023).

Gender-confirmation surgeries have several significant psychological benefits for those experiencing gender dysphoria (Wernick et al., 2019). A systematic review investigating the psychological benefits of gender-affirming surgery found that a wide range of gender-affirming surgeries, such as genital, facial, and body all have

significant increases in quality of life, body image, and overall psychological well-being (Wernick et al., 2019). Furthermore, a longitudinal study also indicated an association between receiving gender-affirming surgery and a reduction in mental health treatment over time, further demonstrating the positive impact of gender-affirming medical interventions (Bränström & Pachankis, 2020). Individuals who access gender-affirming care have been shown to have higher body image satisfaction with lower rates of anxiety and depression (Owen-Smith et al., 2018).

Barriers

Many barriers exist in accessing gender-affirming care (Howell & Maguire, 2023; Inwards-Breland et al., 2021; Puckett et al., 2018). Barriers include Sociodemographic factors such as age and cultural factors such as religion, limited access to treatment due to funding constraints, limited mental health support during the transition, and negative healthcare interactions such as lack of knowledge among healthcare professionals.

Socio-cultural expectations concerning gender norms and religious expectations may impact gender-diverse individuals' available support for accessing gender-affirming healthcare (Sorbara et al., 2021). In countries like the United States, gender expectations and religious affiliations have impacted policies where gender-affirming healthcare is banned in several states (Abreu et al., 2022). Bans like these hurt gender-diverse youth, creating an increase in depression, suicidality, anxiety, increased gender dysphoria, and stigma (Abreu et al., 2022). This stigma and lack of acceptance often occur at the family and legal levels, creating a lack of support for gender-diverse individuals engaging in transition (Sorbara et al., 2021). Family environment has been identified as a determinant of when youth present for gender-affirming health care, in which they often present when older due to lack of support (Fontanari et al., 2020).

This stigma and lack of acceptance often occur at the family and legal levels, creating a lack of support for gender-diverse individuals engaging in transition (Sorbara et al., 2021). Transition refers to the gender-affirmation process, which consists of three interconnected domains: social, legal, and medical; these can be long and stressful processes where support is often needed (Fontanari et al., 2020). Access and engagement with transition are correlated with decreased negative mental health symptoms such as depression and anxiety and increased gender positivity (Fontanari et al., 2020). Social support is a significant factor in reducing anxiety and depression and increasing resilience when gender-diverse individuals engage in transition (Puckett et al., 2019).

Negative healthcare interactions can also significantly impact gender-diverse individuals' experience and access to gender-affirming healthcare (Howell & Maguire, 2023; Inwards-Breland et al., 2021; Puckett et al., 2018). Many gender-diverse individuals experience invisibility and marginalisation while navigating their gender identity in a cis-normative environment, leading to constant challenges of ongoing barriers in living authentically in many domains of life (Austin, 2016). It has been found that cisnormativity negatively impacts gender-diverse individuals' body appreciation (Richburg & Stewart, 2022). This invisibility and marginalisation are so prevalent across many domains of life that receiving acceptance and validation in most contexts provides relief. Accessing and receiving gender-affirming health care is a form of validation and acceptance for many gender-diverse individuals. Being accepted and having needs acknowledged throughout the healthcare help-seeking process may provide positive experiences. Healthcare professionals are critical in gender-diverse individuals' positive or negative healthcare experiences. Healthcare professionals must accept, respect, and be informed of gender-diverse healthcare needs to reduce these systemic barriers (Carlström et al., 2021).

Current State of Research

Research on gender-diverse individuals and body image has been increasing in recent years (Becker et al., 2018; Jones et al., 2016; Milano et al., 2020; Owen-Smith et al., 2018; Röder et al., 2018; van Leerdam et al., 2023). Many studies focus on the impacts of various gender-affirming interventions, the prevalence of body image concerns, and mental health outcomes; however, there are currently no systematic reviews focused on the impact of gender-affirming care on body image, specifically for gender-diverse individuals (Marshall et al., 2019). Current research has several limitations. Many studies researching gender-affirming medical interventions have limited diversity in their samples as the focus seems to be on binary transgender experiences rather than non-binary samples, which may be reflected in healthcare disparities between binary and non-binary gender-diverse individuals (Puckett et al., 2018). These limitations may be of concern as results may not be generalisable to all gender-diverse individuals. In addition, there seems to be a lack of diversity in the samples, as there appears to be a focus on predominantly white and Western samples; therefore, findings may not be generalisable in different cultural contexts (Howell & Maguire, 2023; Passos et al., 2020; van Leerdam et al., 2023).

Overall, gender-affirming health care can significantly impact body image and improve the quality of life in gender-diverse individuals (Passos et al., 2020; White Hughto & Reisner, 2016). Positive body image improves gender dysphoria, which improves overall well-being and mental health for gender-diverse individuals (Bränström & Pachankis, 2020). Thus, body image is a key factor as the achievement of gender congruence via body image and decreased gender dysphoria has been found to reduce the likelihood of the need for mental health treatment for gender-diverse individuals due to a reduction of mental distress (Bränström & Pachankis, 2020). This is beneficial to the well-being of the gender-diverse community and may also be helpful for the overloaded mental health sector by reducing support needs.

Therefore, closing the gap between the inclusion and representation of gender-diverse individuals in body image and gender-affirming healthcare in research is essential.

Aim

Our study aims to fill this gap by conducting a systematic review and meta-analysis on the impact of gender-affirming care on body image for gender-diverse individuals. This area of research is essential in improving and informing healthcare providers, informing policy, and contributing to increasing the well-being of gender-diverse individuals.

Chapter Two: Methods

This review was guided by the Preferred Reported Items for Systematic Reviews and Meta-analysis (PRISMA) (Page et al., 2021) and was registered with the International Prospective Register of Systematic Reviews (PROSPERO) registration identification: CRD42023452579.

Search Strategy

This systematic review followed PRISMA guidelines (Page et al., 2021). Searches were conducted through the following five databases: Medline, PsycINFO, Emcare, CINAHL, and Scopus. Search terms such as transfem* were truncated to avoid British and American spelling conflicts. These databases were searched for articles published between 2000 and 2022. The search terms used were:

agender* OR bigender* OR "gender atypical" OR "gender diver*" OR "gender dysphoria" OR "gender fluid*" OR "gender identit*" OR "gender identity disorder" OR "gender incongruence" OR "gender minorit*" OR "gender neutral" OR "gender non-conform*" OR "gender nonconform*" OR "gender queer" OR genderfluid OR genderqueer OR nonbinary OR non-binary OR pangender* OR "third gender*" OR "trans boy" OR "trans female" OR "trans girl" OR "trans male" OR "trans man" OR "trans men" OR "trans woman" OR "trans women" OR transex* OR transfem* OR transgend* OR transmasculin* OR transsex* OR trigender*

AND

"body acceptance" OR "body appreciation" OR "body checking" OR "body dissatisfaction" OR "body dysmorphia" OR "body esteem" OR "body evaluation" OR "body image" OR "body perception" OR "body positivity" OR "body representation" OR "body satisfaction" OR "body shame" OR "body uneasiness" OR "body-esteem"

AND

gender-affirm* OR "gender confirm*" OR Intervention* OR treatment OR therapy OR surgery OR support

Eligibility Criteria

The inclusion and exclusion criteria for the study selection are displayed in Table 1 below. The inclusion criteria were peer-reviewed studies published between 2000 and 2022. This time frame was chosen as this is a period of significant research and medical development for gender-diverse healthcare. The time frame was also chosen for the practicality of data and resource availability within the limits of this research time frame. The decision to end with 2022 was to make future reviews in this space more practical and efficient by ending on a completed year.

The participant population were gender-diverse people, the study focus was gender-affirming healthcare, and body image measures and outcomes were reported. Non-gender diverse identities, such as cisgender male and female, were excluded. Participants with disorders of sex development (e.g., Congenital Adrenal Hyperplasia (CAH) or Androgen Insensitivity Syndrome (AIS)) or medical need for hormone or surgical intervention not impacting gender identity (e.g., menopause or andropause) or participants who received non-consensual interventions were excluded (e.g., intersex variation intervened in childhood and hormonal development disorders). Gender-affirming medical care was defined as hormone replacement surgery, gender-confirmation surgery, and other secondary medical interventions that support and affirm an individual's gender identity. Studies not focused on gender-affirming medical care, such as mental health interventions, intersectionality and disparities studies, research methodology studies, narrative experiences, sexual health studies, social and cultural factors studies, and identity development studies were excluded.

The comparison point of the study was body image variables from body image measures pre- and post-gender-affirming medical intervention. Studies that did not

report on body image variables pre- and post-intervention were excluded. There were no restrictions on study design or language.

Table 1

Inclusion and exclusion criteria for study selection

Inclusion	Exclusion
● Studies published between 2000 – 2022 ● All gender-diverse populations ● Individuals who experience gender dysphoria/ gender incongruence ● Measures including body image and body satisfaction with this population ● Medical Gender-affirming care, including any hormone replacement therapy or surgery. ● Pre- and post-measures for body image for body satisfaction concerning medical gender-affirming healthcare ● Peer-reviewed studies	● Participants with disorders of sex development or medical need for hormone or surgical intervention not impacting gender identity or participants who received non-consensual interventions will not be included. (e.g., intersex variation and hormonal development disorders) ● Studies focused on individuals who are not gender-diverse ● Studies that do not assess body image variables ● Studies not focused on medical interventions ● Studies that are not peer-reviewed ● Grey Literature ● Studies that are not primary research

Study Selection and Data Collection

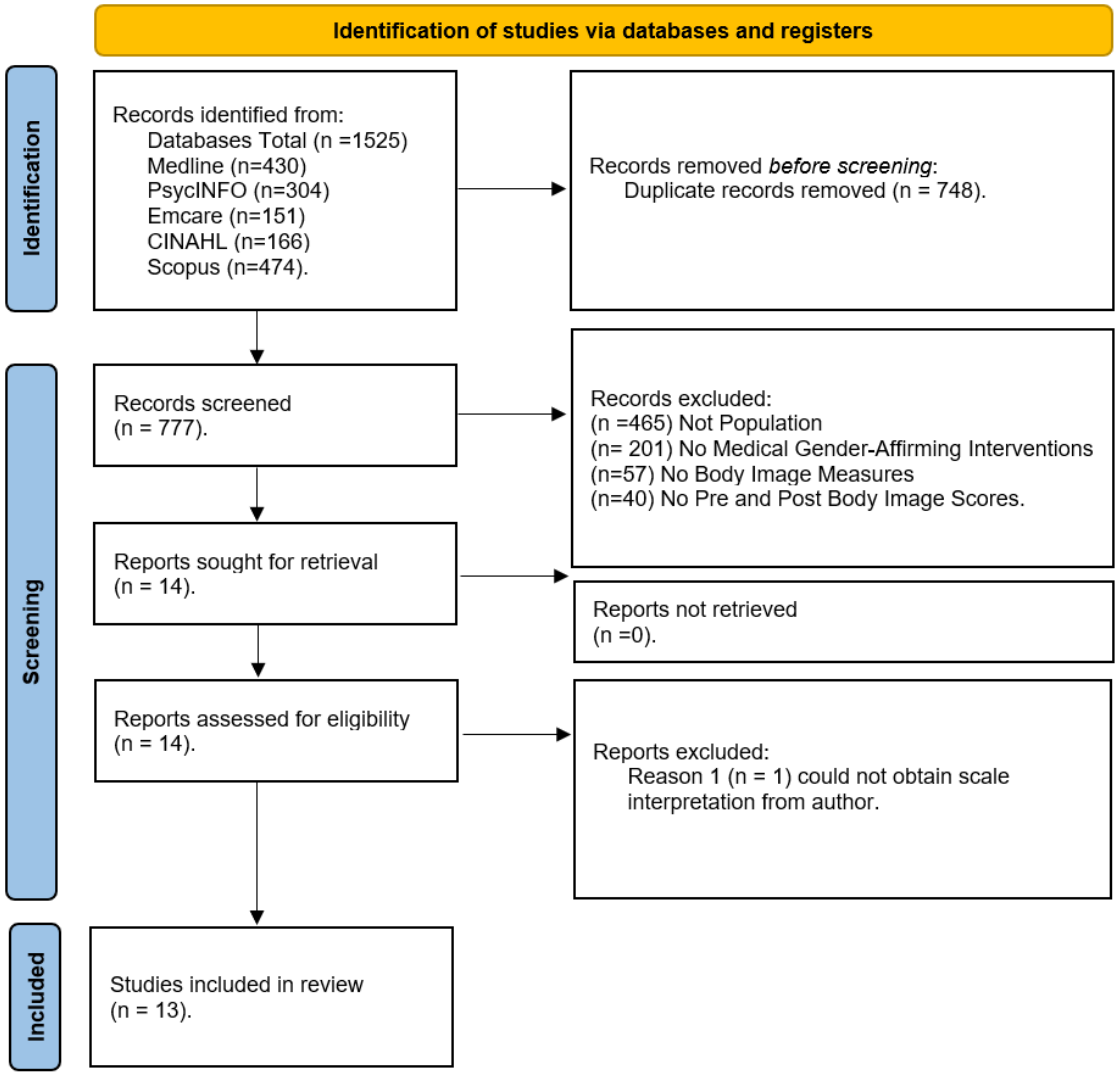
The study selection process included title and abstract screening, full-text screening, and checking against eligibility criteria. Data was extracted into a Microsoft Excel Spreadsheet. Two independent reviewers (SPW/LD) conducted the screening process, and disagreements were agreed to be resolved through discussion or a third reviewer. There were no disagreements between the reviewers about included studies.

Two reviewers (SPW/LD) independently extracted data using a standardised data extraction form. Data extracted included study characteristics such as the title, author, year, study design, location, language, sample size, publication type, and year

of data collection. Data on participant demographics included gender identity, age, ethnicity, excluded populations, other treatment received, comorbidities, withdrawals, exclusions, and missing participant data. Data on interventions collected included gender-affirming healthcare access, duration of intervention, intervention delivery, providers, intervention description, duration of participation, and timing. Data collected from body image outcome measures also included type of body image scale, how body image was assessed (e.g., self-report), scoring information, baseline and follow-up mean scores, standard deviation, effect sizes, statistical methods used to synthesise data and scale validation. This was extracted and recorded manually via Microsoft Excel. There were no disagreements between the reviewers about extracted data.

Figure 1

Flow diagram demonstrating systematic search method for body image satisfaction and gender-affirming healthcare in gender-diverse individuals.



Data Analysis

A narrative summary and meta-analysis were conducted as a quantitative synthesis to combine, analyse, and interpret the results. This was done by utilising Microsoft Excel for data management, analysis, and visualisation. Two researchers conducted data synthesis (SPW/LD). A consensus-based approach was followed in discrepancies. Input from a neutral third party was agreed upon to be used in discrepancies.

Narrative Synthesis

A narrative synthesis was conducted for all data that. Comparisons of gender identity and intervention type concerning body image outcomes were explored in the narrative synthesis as was a synthesis by outcome measure. The narrative synthesis was reported by groupings of specific interventions and grouping of gender identity. These grouping were decided on to provide accessibility of results for non-binary individuals as they can identify the information of concerning interventions that may be relevant to them.

Meta-analysis

The meta-analysis was conducted using Statistical Package for the Social Sciences (SPSS) version 28 statistical software. Statistical tests such as Cochran's Q test and a heterogeneity forest plot, assessed heterogeneity among studies and evaluated the overall effect size across studies that could be grouped together. Criteria for synthesis include at least two homogenous studies based on similar study designs and similar outcome measures to ensure robustness and reliability in the conclusions drawn. Factors such as homogeneity in body image scale, intervention, and gender identity were considered. Each study with homogenous measures was grouped together for a further sub-analysis. These considerations comprehensively overview our target population's findings from several body image scales. Random-effects meta-analysis models were used to combine individual study data. This accounted for effect size variations and provided a more accurate representation of the overall effect. Cohen’s d (Standard Mean Difference) was used to measure effect size.

Risk of Bias

All included studies were non-randomized as the target intervention does not ethically lend itself to a randomised research approach. The quality and risk of bias assessment of the included studies were assessed through the Risk of Bias in Non-Randomized Studies of Interventions (ROBINS-I) tool aligned with Cochrane

recommendations (Sterne et al., 2016). Two reviewers conducted the ROBINS-I assessment independently (SPW/LD). It was planned that reviewer discrepancies would be mediated via a third reviewer; however, this was not required. The ROBINS-I was selected given all of the studies in the view were observational studies. Characteristics assessed through the ROBINS-I tool were bias due to confounding factors, selection of participants, classification of interventions, deviation from intended interventions, missing data, measurement of outcomes, and selection of reported results. This assessment was completed at the study level.

The ROBINS-I tool scores are based on a judgement of low, moderate, serious, or critical risk of bias (Sterne et al., 2016). A low score means that the study is comparable to a well preformed randomised trial. A low scoring is rare for a non-randomised study in the domain of confounding and selection bias. A moderate score means the study is sound for a non-randomised study however it is not considered comparable to a well-performed randomised trial. A serious score for risk of bias means the study has some important problems. A critical score for risk of bias means that the study is too problematic to provide useful evidence and should not be used for synthesis.

The ROBINS-I assessment informed the data synthesis by identifying the weighting of the study results, identifying the reliability and credibility of the findings, informing subgroup analysis, contributing to the quality of evidence assessment by identifying confidence levels and informing and guiding the discussion and interpretations of implications of the systematic review. The risk of bias assessment results with the ROBINS-I tool are displayed in the results section.

Chapter Three: Results

This chapter outlines the results of this systematic search using the methods above. The systematic search identified 13 studies capturing pre- and post-intervention data on body image satisfaction for gender-diverse individuals (see Table 2 for the included study characteristics).

The type of studies included consisted of longitudinal and pre-/post- designs of cohorts of gender-diverse individuals seeking gender affirming care. All 13 studies examined data on binary transgender individuals, which consisted of male-to-female (MTF) and female-to-male (FTM) transgender individuals and youth prior to transition. The collective number of participants with both pre-and post-data across the studies was 839.

Three studies focused on hormone suppression (Carmichael et al., 2021; de Vries et al., 2011; Kuper et al., 2020), five studies focused on cross-sex hormone therapy (Kuper et al., 2020; Manieri et al., 2014; Mazzoli et al., 2022; Turan et al., 2018; van de Grift et al., 2017), three studies focused on mixed intervention of hormone interventions and surgery (de Vries et al., 2014; Kuper et al., 2020; van de Grift et al., 2017), two studies focused on FTM and MTF sex reassignment surgery (Gümüşsoy et al., 2022; Smith et al., 2005), two studies focused on FTM chest surgery, (Agarwal et al., 2018; van de Grift, Kreukels, et al., 2016) and one study focused on MTF craniofacial surgery (Isung et al., 2017).

Table 2

Studies included in the review

Study	Type of Study	Body Image Scale	Target Population	Pre/Post Data (N)	Type of Medical Intervention
(Agarwal et al., 2018)	pre-post study design	BUT BREAST-Q	FTM	n=42	Surgery (FTM Chest Surgery)
(Carmichael et al., 2021)	longitudinal study design	BIS	MTF/FTM (Prior transition)	n=40	Hormones (Suppression)
(de Vries et al., 2011)	pre-post study design	BIS	MTF/FTM (Prior transition)	n=70	Hormones (Suppression)
(de Vries et al., 2014)	longitudinal study design	BIS	MTF/FTM	n=45	Mixed (Suppression, CSH, SRS)
(Gümüşsoy et al., 2022)	pre-post study design	BIS	FTM	n=55	Surgery (SRS)
(Isung et al., 2017)	pre-post study design	BIS	MTF	n=10	Surgery (Craniofacial Reconstructive Surgery)
(Kuper et al., 2020)	longitudinal study design	BIS	MTF/FTM	n=96	Hormones (Suppression/ CSH)
(Manieri et al., 2014)	longitudinal study design	WHOQOL-100 - Body Image Subscale	MTF/FTM	n=83	Hormones (CSH)
(Mazzoli et al., 2022)	longitudinal study design	BUT	MTF/FTM	n=62	Hormones (CSH)
(Smith et al., 2005)	pre-post study design	BIS Appraisal of	MTF/FTM	n=107	Surgery (SRS)

		Appearance Inventory			
(Turan et al., 2018)	longitudinal study design	BUT	FTM	n=37	Hormones (CSH)
(van de Grift, Kreukels, et al., 2016)	pre-post study design	BIS ASI-R BIQLI MBSRQ SIBID	FTM	n-26	Surgery (FTM Chest Surgery)
(van de Grift et al., 2017)	longitudinal study design	BIS	MTF/FTM	n=166	Hormones (CSH and Surgery (not specific)

Abbreviations: FTM: female to male transgender, MTF: male to female transgender, CSH: cross-sex hormone therapy, GRS: gender reassignment surgery, SRS: sex reassignment surgery, BIS: Body Image Scale, BUT: Body Uneasiness Test, WHOQOL-100 - Body Image Subscale: World Health Organisation Quality of Life 100, ASI-R: Appearance Schemas Inventory-Revised, BIQLI: Body Image Quality of Life Inventory, MBSR: Multidimensional Body-Self Relations Questionnaire, SIBID: Situational Inventory of Body Image Dysphoria.

Risk of Bias Results

The Risk of Bias (ROB) assessment results are outlined in Table 3. The included studies varied in design, gender identity of the participants, intervention of gender-affirming health care and were all non-randomised studies. All studies noted the risk of their small sample sizes and use of self-report measures in their limitations. The risk of bias judgments for each domain is summarised below:

Confounding:

All studies had a moderate risk of bias due to confounding. Confounding variables were comorbid mental health status and previous gender-affirming healthcare interventions, which were identified in Agarwal (2018), Smith (2005), and van de Grift (2017). Van de Grift (2016) had a serious risk of bias as accurate body image results were hindered by several participants who needed follow-up corrective surgeries that fell outside the assessment time reported. In addition, Gumussoy (2022) identified recall bias as a potential confounding factor in their study. All the included studies apart from van de Grift (2016), had a moderate risk of bias.

Selection Bias:

All studies had a moderate risk of bias for the selection bias domain as all participants only included binary transgender individuals who received gender-affirming healthcare and were motivated to engage in research. Several studies excluded participants with comorbid mental health status, which included Carmichael (2021), Gumussoy (2022), and Manieri (2014). Intersex presentation was excluded by Turan (2018). In addition, several of the studies were convenience samples from medical gender clinics, which included Carmicheal (2021), de Vries (2011), de Vries (2014), Isung (2017), Kuper (2020), Manieri (2014), Mazzoli (2022), Smith (2005) and van de Grift (2016). De Vries (2014) was a uniquely biassed sample as this study was a follow-

up of the de Vries (2011) sample measuring engagement in different gender-affirming interventions. In addition, Carmichael (2021) had an exclusion of participants with a body mass index (BMI) greater than the second centile for age and birth sex.

Classification of interventions:

All studies had a moderate risk of bias for the classification of interventions. The description of the interventions within the included studies were well-defined and did not have any apparent issues of classification. Interventions received such as hormone interventions and surgery type were identified and defined in all studies.

Intended Interventions:

All studies had a low risk of bias due to deviation from the intended intervention. All surgical and hormonal interventions followed through on the course of treatment for all included studies (Sterne et al., 2016).

Missing Data:

Four of the thirteen studies had a serious risk of bias due to missing data. Missing data was due to human error, withdrawals, and failure to engage with follow-up questionnaires post-intervention. Carmichael (2021) had high attrition rates in data due to questionnaire fatigue when assessing follow-up outcomes after one year and human error in data recording for a small number of participants. Agarwal (2018) had a serious risk of bias in missing data due to a system error that impacted the availability of response data, resulting in a low response rate. Kuper (2020) reported missing data due to clinical recording errors. Smith (2005) reported a significant dropout number of 34 participants.

Measurement Outcomes:

All studies had a moderate risk of bias for measurement outcomes as all the scales used in the included studies were self-report measures which come with an

inherent level of bias. There were no significant errors in assessing the outcomes for body image.

Reported Results:

All studies had a moderate risk of bias for reported results except for Carmichael (2021) which had a serious risk of bias. Carmichael (2021) did not report standard deviation or *p* value for significance therefore was rated as a serious risk of bias. Manieri (2014) did not report standard deviation and was rated serious risk of bias as well. Turan (2018) did not report the *p* value for the BUT-B scores therefore was rated as serious risk of bias. The remaining studies were rated as moderate risk of bias in reported results.

Overall Bias:

ROB indicated a serious risk of bias from seven studies, which include Agarwal (2018), Carmichael (2021), Kuper (2020), Manieri (2014), Smith (2005), Turan (2018), ve de Grift (2016) and a moderate risk of bias from the remaining six studies. Overall, there is a serious risk of bias for the included studies within this systematic review.

Table 3

Risk of bias assessment with ROBINS-I tool

Study ID	Confounding	Selection Bias	Classification of Intervention	Intended Intervention	Missing Data	Measurement Outcome	Reported Results	Overall Bias
Agarwal, 2018	Moderate	Moderate	Low	Low	Serious	Moderate	Moderate	Serious
Carmichael, 2021	Moderate	Moderate	Low	Low	Serious	Moderate	Serious	Serious
de Vries, 2011	Moderate	Moderate	Low	Low	Moderate	Moderate	Moderate	Moderate
de Vries, 2014	Moderate	Moderate	Low	Low	Moderate	Moderate	Moderate	Moderate
Gumussoy, 2022	Moderate	Moderate	Low	Low	Moderate	Moderate	Moderate	Moderate
Isung, 2017	Moderate	Moderate	Low	Low	Moderate	Moderate	Moderate	Moderate
Kuper, 2020	Moderate	Moderate	Low	Low	Serious	Moderate	Moderate	Serious
Manieri, 2014	Moderate	Moderate	Low	Low	Moderate	Moderate	Serious	Serious
Mazzoli, 2022	Moderate	Moderate	Low	Low	Moderate	Moderate	Moderate	Moderate
Smith, 2005	Moderate	Moderate	Low	Low	Serious	Moderate	Moderate	Serious
Turan, 2018	Moderate	Moderate	Low	Low	Moderate	Moderate	Serious	Serious
van de Grift, 2016	Serious	Moderate	Low	Low	Moderate	Moderate	Moderate	Serious
van de Grift, 2017	Moderate	Moderate	Low	Low	Moderate	Moderate	Moderate	Moderate

Description of Study Population

Table 4 outlines the participant demographics across the included studies. All studies were published in English and from Western countries. Two studies were from North America (Agarwal et al., 2018; Kuper et al., 2020). Nine studies were from Europe (Carmichael et al., 2021; de Vries et al., 2011, 2014; Isung et al., 2017; Manieri et al., 2014; Mazzoli et al., 2022; Smith et al., 2005; van de Grift et al., 2017; van de Grift, Kreukels, et al., 2016). Two studies were from Eurasia (Gümüşsoy et al., 2022; Turan et al., 2018). Ethnicity was inconsistently reported across studies; however, of reported ethnicity, most participants were white.

Table 4

Participants demographics across studies included in the systematic review

Study ID	Gender Identity	Age (Average)	Ethnicity	Location
Agarwal, 2018	FTM	27.7	Race: White (31), Asian (1), African American (1), Biracial (AA/White) (2)	USA
Carmichael, 2021	MIXED (FTM/MTF) (Prior to transition)	13.6	Race: white (39) south Asian (1) black (2) mixed (2)	UK
de Vries, 2011	MIXED (FTM/MTF) (Prior to transition)	13.6 +/-1.8	Dutch	Netherlands
de Vries, 2014	MIXED (FTM/MTF)	13.6 (suppression)+/-1.9 16.7 (CSH) 20.7(GRS)	Dutch	Netherlands
Gumussoy, 2022	FTM	27.27 +/-4.82	Not reported	Turkey
Isung, 2017	MTF	44+/-1.3	Not reported	Sweden
Kuper, 2020	MIXED (FTM/MTF)	14.9	Race: White (95%) African American (2%) Multiracial (2%) American Indian (1%)	USA
Manieri, 2014	MIXED (FTM/MTF)	32.7 +/-8.8 (MTF) 30.2 +/-8.1 (FTM)	Not reported	Italy
Mazzoli, 2022	MIXED (FTM/MTF)	not reported	Not reported	Italy
Smith, 2005	MIXED (FTM/MTF)	30.9	Not reported	Netherlands
Turan, 2018	FTM	24.59 +/-4.90	Turkish	Turkey
van de Grift, 2016	FTM	26.1	Not reported	Netherlands
van de Grift, 2017	MTF / FTM	39.2 +/-12.8 (MTF) 30.6 +/-11.3(FTM)	Dutch (100) Belgium (61) German (40)	Netherlands Belgium Germany

Abbreviations: FTM: female to male transgender, MTF: male to female transgender, CSH: Cross-sex hormone therapy, GRS: gender reassignment surgery.

Body Image Scales Used

Several body image scales were identified within the 13 included studies. Several studies used multiple scales (n=839). Nine studies utilised the Body Image Scale (BIS) (Carmichael et al., 2021; de Vries et al., 2011, 2014; Gümüşsoy et al., 2022; Isung et al., 2017; Kuper et al., 2020; Smith et al., 2005; van de Grift et al., 2017; van de Grift, Kreukels, et al., 2016), and three studies utilised the Body Uneasiness Test (BUT) (Agarwal et al., 2018; Mazzoli et al., 2022; Turan et al., 2018). Several scales were only used in one study. These were the World Health Organization Quality of Life -100 - Body Image subscale (WHOQOL-100) (Manieri et al., 2014), the BREAST-Q (Agarwal et al., 2018), the Appearance Schemas Inventory-Revised (ASI-R) (van de Grift, Kreukels, et al., 2016), the Body Image Quality of Life Inventory (BIQLI) (van de Grift, Kreukels, et al., 2016), the Multidimensional Body-Self Relations Questionnaire (MBSRQ) (van de Grift, Kreukels, et al., 2016), the Situational Inventory of Body Image Dysphoria (SIBID) (van de Grift, Kreukels, et al., 2016), and the Appraisal of Appearance Inventory (Smith et al., 2005). Most of the scales in the included studies were self-report measures and were appropriately validated for the population. The BUT, ASI-R and the BREAST-Q have not been validated specifically for transgender populations but were utilised as the best available scales for that study (Agarwal et al., 2018; van de Grift, Kreukels, et al., 2016). All the scales were self-report measures except for the Appraisal of Appearance Inventory, which was conducted by observers such as clinicians and researchers (Smith et al., 2005).

Body Image Scale (BIS)

The Body Image Scale (BIS) is a self-report scale that was developed to measure body image satisfaction for binary transgender individuals who experience gender dysphoria (Lindgren & Pauly, 1975). Body image satisfaction is rated on a 5-

point Likert scale, with 1 being the highest satisfaction, 5 being the lowest satisfaction, and three being neutral (Lindgren & Pauly, 1975). The BIS scale evaluates body image satisfaction across 30 body features (Lindgren & Pauly, 1975). The 30 body features fall into three groups: primary gender, secondary gender, and neutral hormonally unresponsive characteristics (Lindgren & Pauly, 1975). Primary gender characteristics items for females include the vagina, clitoris, ovaries-uterus, breasts, chest, facial hair, and voice. In contrast, primary items for males include the penis, scrotum, testicles, facial hair, body hair, and breasts. Secondary gender characteristics include broader features for both females and males, such as figure, hips, waist, buttocks, arms, appearance, stature, muscles, weight, legs, and hair. In addition to chest and voice for males and body hair for females. Neutral hormonally unresponsive characteristics include the face, eyebrows, nose, Adam's apple, chin, shoulders, calves, hands, feet, and height for both females and males. The BIS may be scored in two ways: an overall median score of all 30 items or the ten items from the primary, secondary, or neutral domain (Lindgren & Pauly, 1975).

Body Image Results for BIS

Nine studies utilised the BIS (Carmichael et al., 2021; de Vries et al., 2011, 2014; Gümüşsoy et al., 2022; Isung et al., 2017; Kuper et al., 2020; Smith et al., 2005; van de Grift et al., 2017; van de Grift, Kreukels, et al., 2016). Of the nine included studies using the BIS, Isung (2017), Kuper (2020), Gümüşsoy (2022), Smith (2005), van de Grift (2017), van de Grift (2016), de Vries (2011), and de Vries (2014) indicated significant positive impacts of gender-affirming healthcare on body image. While Carmichael (2021) and de Vries (2011) found neutral impacts of gender-affirming healthcare (specifically hormone suppression) on body image.

In Carmichael (2021), the overall mean body image satisfaction before hormone suppression for a mixed group of FTM and MTF participants group (n=40) was = 3.1 (SD = not reported), and after hormone suppression was 3.2 (SD = not reported). This

indicated a slight decrease but no significant change (*p* value not reported) in body image satisfaction after gender-affirming care.

In Isung (2017), the overall mean body image satisfaction before craniofacial reconstructive surgery for the MTF group (n=10) was 82.7 (SD = 19.3), and after craniofacial reconstructive surgery was 71.5 (SD = 13.6) (*p*=.047). When assessed specifically for the head and neck region, body image satisfaction before craniofacial reconstructive surgery for the MTF group was 20 (SD = 5), and after craniofacial reconstructive surgery was 16 (SD = 4.6) (*p*=.063). Isung (2017) reported this as statistically significant with an increase in body image satisfaction after gender-affirming care however, the p-value threshold was unclear (it is assumed p <.1).

In Kuper (2020), the overall mean body image satisfaction before a total of hormone suppression, hormone therapy, and sex reassignment surgery for a mixed group of FTM and MTF participants group (n=96) was 69.9 (SD = 15.6) and after a total of hormone suppression, hormone therapy, and sex reassignment surgery were 51.7 (SD = 18.4) (*p*<.001).

When divided by gender identity, the overall mean body image satisfaction before hormone suppression, hormone therapy, and sex reassignment surgery for a group of FTM participants group (n=66) was 71.1 (SD = 13.4), and after hormone suppression, hormone therapy, and sex reassignment surgery were 52.9 (SD = 16.8). In contrast, the overall mean body image satisfaction before hormone suppression, hormone therapy, and sex reassignment surgery for a group of MTF participants group (n=30) was 67.5 (SD = 19.5), and after hormone suppression, hormone therapy, and sex reassignment surgery were 49 (SD = 21.6). When controlling for the impact of hormones specifically, the overall mean body image satisfaction before hormone suppression for a mixed group of FTM and MTF participants group (n=10) was 64.1 (SD = 18.2), and after hormone suppression, was 53.8 (SD = 20.1). For mean body image satisfaction before hormone therapy for a mixed group of FTM and MTF

participants, group (n=86) was 70.7 (SD = 15.2), and after hormone therapy, it was 51.4 (SD = 18.3). The overall full sample group was indicated to be significant with an increased mean body image satisfaction (p<.001) after gender-affirming care in all interventions. However, subgroups significance was not reported.

In Gumussoy (2022), the overall mean body image satisfaction before sex reassignment surgery for a group of FTM participants group (n=55) was 80.74 (SD = 21.24), and after sex reassignment surgery was 74.54 (SD = 19.8) (p=0.037). This indicated a significant increase in mean body image satisfaction after gender-affirming care.

In Smith (2005), the overall mean body image satisfaction before sex reassignment surgery for a mixed group of FTM and MTF participants group (n=107) on the primary subscale was 18.1 (SD = 2.7), and after sex reassignment surgery was 6.6 (SD = 3.2) (p<0.001), on the secondary subscale before sex reassignment surgery was 34.8 (SD = 6.9), and after sex reassignment surgery was 25.2 (SD = 6.8) (p<0.001), and on the neutral subscale before sex reassignment surgery was 46.8 (SD = 9.6), and after sex reassignment surgery was 36.5 (SD = 8) (p<0.001). This indicated a significant increase in mean body image satisfaction across all subscales after gender-affirming care.

In van de Grift (2016), the overall mean body image satisfaction before chest surgery for a group of FTM participants group (n=26) was 2.94 (SD = 0.54), and after chest surgery was 2.75 (SD = 0.43) (p≤.001). This indicated a significant increase in mean body image satisfaction after gender-affirming care.

In van de Grift (2017), the overall mean body image satisfaction before hormone therapy for a mixed group of FTM and MTF participants group (n=166) was 3.34 (SD = 0.52), and after hormone therapy was 2.72 (SD = 0.73) (p < .001). When

the same group was assessed after receiving the sex-reassignment surgery, the overall body image satisfaction before sex-reassignment surgery with hormone therapy was 3.34 (SD = 0.52), and after sex-reassignment surgery with hormone therapy was 2.51 (SD = 0.58) ($p < .001$). This indicated a significant increase in mean body image satisfaction after gender-affirming care.

In de Vries (2011), the overall mean body image satisfaction before hormone suppression for a mixed group of FTM and MTF participants group (n=70) on the primary subscale before hormone suppression was 4.1 (SD = 0.56), and after hormone suppression 3.98 (SD = 0.71) (p=0.145), on the secondary subscale before hormone suppression was 2.74 (SD = 0.65), and after hormone suppression was 2.82 (SD = 0.68) (p=0.569), and on the neutral subscale before hormone suppression was 2.41 (SD = 0.63), and after hormone suppression was 2.47 (SD = 0.56) (p=0.620). Overall, this indicated a slight increase in body image satisfaction after gender-affirming care for primary sex characteristics and a slight decrease in body image satisfaction after gender-affirming care for secondary and neutral characteristics for the mixed FTM and MTF participants group. However, this was not a significant change in body image satisfaction overall.

When divided by gender identity, the FTM (n=37) on the primary subscale before hormone suppression was 4.16 (SD = 0.52), and after hormone suppression was 4.17 (SD = 0.58) (p=0.145) on the secondary subscale before hormone suppression was 2.81 (SD = 0.76), and after hormone suppression was 3.18 (SD = 0.42) (p=0.569), and on the neutral subscale before hormone suppression was 2.24 (SD = 0.62), and after hormone suppression was 2.61 (SD = 0.5) (p=0.620). This indicated no significant change in body image satisfaction after gender-affirming care for the FTM group on hormone suppression.

In contrast, the mean body image satisfaction for the MTF participants (n=33) on the primary subscale before hormone suppression was 4.02 (SD = 0.61), and after hormone suppression 3.74 (SD = 0.78) (p=0.145), on the secondary subscale before

hormone suppression 2.66 (SD = 0.5), and after hormone suppression was 2.39 (SD = 0.69) (p=0.569), and on the neutral subscale before hormone suppression was 2.6 (SD = 0.58), and after hormone suppression was 2.32 (SD = 0.59) (p=0.620). Overall, this indicates no significant change in body image satisfaction after gender-affirming care for the MTF group on hormone suppression.

De Vries (2014) followed the first cohort of gender-diverse individuals from De Vries (2011) after the process of full transition from hormone suppression to hormone therapy and sex reassignment surgery. In de Vries (2014), the overall mean body image satisfaction before hormone therapy and sex reassignment surgery for a mixed group of FTM and MTF participants group (n= 45) on the primary subscale before hormone therapy and sex reassignment surgery was 4.13 (SD = 0.59), and after hormone therapy and sex reassignment surgery were 2.59 (SD = 0.82) (p < .001), on the secondary subscale before hormone therapy and sex reassignment surgery were 2.73 (SD = 0.72), and after hormone therapy and sex reassignment surgery were 2.27 (SD = 0.56) (p < .001), and on the neutral subscale before hormone therapy and sex reassignment surgery was 2.35 (SD = 0.68), and after hormone therapy and sex reassignment surgery were 2.23 (SD = 0.49) (p=.29). Overall, this indicated a significant increase in mean body image satisfaction across groups for the primary and secondary sex characteristic subscale and no significant change in body image satisfaction in the neutral subscales after gender-affirming care.

When divided by gender identity, the FTM (n=28) on the primary subscale before hormone therapy and sex reassignment surgery was 4.18 (SD = 0.53), and after hormone therapy and sex reassignment surgery was 2.89 (SD = 0.71) (p < .001), on the secondary subscale before hormone therapy and sex reassignment surgery was 2.8 (SD = 0.72), and after hormone therapy and sex reassignment surgery were 2.48 (SD = 0.4) (p=.05), and on the neutral subscale before hormone therapy and sex reassignment surgery was 2.21 (SD = 0.64), and after hormone therapy and sex reassignment surgery were 2.32. (SD = 0.44) (p=.40). Overall, this indicates a

significant increase in mean body image satisfaction after gender-affirming care for the FTM group for the primary and secondary sex characteristics and a slight decrease (not significant) in body image satisfaction for the neutral sex characteristics.

In contrast, the mean body image satisfaction for the MTF participants (n=17) on the primary subscale before hormone therapy and sex reassignment surgery was 4.03 (SD = 0.68) and after hormone therapy and sex reassignment surgery 2.07 (SD = 0.74) ($p < .001$), on the secondary subscale was before hormone therapy and sex reassignment surgery 2.63 (SD = 0.6), and after hormone therapy and sex reassignment surgery were 1.93 (SD = 0.63) ($p < .001$), and on the neutral subscale before hormone therapy and sex reassignment surgery was 2.6 (SD = 0.58), and after hormone therapy and sex reassignment surgery were 2.32 (SD = 0.59) (p=.014). Overall, this indicated significantly increased body image satisfaction for the primary, secondary, and neutral sex characteristics after gender-affirming care for the MTF group.

Body Uneasiness Test

The Body Uneasiness Test (BUT) is a self-report questionnaire that consists of 71 items that are grouped into two domains, the BUT-A and BUT-B (Cuzzolaro et al., 2006). The BUT-A includes 34 items that measure body image concerns, weight phobia, avoidance, compulsive self-monitoring, and depersonalisation of one's own body (Cuzzolaro et al., 2006). The BUT-B includes 37 items that measure specific worries about particular body parts and functions (Cuzzolaro et al., 2006). The BUT-A and BUT-B are rated on a 6-point Likert scale (0-50 from never to always (Cuzzolaro et al., 2006). The higher the score, the greater the body uneasiness (Cuzzolaro et al., 2006). The BUT-A may be scored with an overall score (Global Severity Index (GSI)) and with the subscales weight phobia (WP), body image concerns (BIC), avoidance (A), compulsive self-monitoring (CSM), and depersonalisation (D) (Cuzzolaro et al., 2006). Whereas the BUT-B may be scored by global measures within positive

symptom total (PST), the number of symptoms rated higher than zero, or through the positive symptom distress index (PSDI), which is the average rating of items of the positive symptom total (Cuzzolaro et al., 2006). The BUT-B may also include subscales including BUT-B I Mouth, BUT-B II Face Shape, BUT-B III Thighs, BUT-B IV Legs, BUT-B V Harms, BUT-B VI Moustache, BUT-B VII Skin, and BUT-B VIII Blushing (Cuzzolaro et al., 2006).

BUT - Body Image Results

The BUT was utilised by three studies (Mazzoli et al., 2022; Turan et al., 2018; Agarwal et al., 2018). The BUT consisted of two domains: the BUT-A, which measures aspects of body image and the BUT-B, which measures aspects of body concerns.

In Agarwal (2018), the overall mean of body uneasiness before chest surgery for the FTM group (n=42) was 2.68 (SD = 0.73), and after chest surgery was 1.2 (SD = 0.68) ($p < 0.0001$). This indicates a significant decrease in body uneasiness after gender-affirming care.

In Mazzoli (2022), the overall mean of body uneasiness before hormone therapy for a mixed group of FTM and MTF participants (n=62) was 2.39 (SD = 0.87), and after hormone therapy, it was 1.49 (SD = 0.83) ($p < 0.001$). This indicates a significant decrease in body uneasiness after gender-affirming care.

In Turan (2018), the mean of overall body uneasiness before hormone therapy for the FTM group (n=37) was 2.52 (SD = 0.84), and after hormone therapy, it was 2 (SD = 0.95) ($p < 0.001$). This indicates a significant decrease in body uneasiness after gender-affirming care.

In the BUT-B positive symptom distress index (PSDI) for Turan (2018), the overall mean of specific worries about particular body parts and functions before hormone therapy for the FTM group (n=37) was 3.29 (SD = 0.77), and after hormone therapy was 2.96 (SD = 1) (*p* value not reported). This indicates a slight decrease (not able to determine statistical significance) in specific worries about particular body parts and functions after gender-affirming care.

In the BUT-B positive symptom total (PST) for Turan (2018), the overall mean of specific worries about particular body parts and functions before hormone therapy for the FTM group (n=37) was 14.89 (SD = 7.65), and after hormone therapy was 13.81 (SD = 8.17) (*p* value not reported). This indicates a slight decrease (not able to determine statistical significance) in specific worries about particular body parts and functions after gender-affirming care.

World Health Organization Quality of Life -100 (WHOQOL-100)

The World Health Organization Quality of Life -100 (WHOQOL-100) is a self-report questionnaire to assess overall quality of life (The Whoqol Group, 1998). It contains six domains with 24 facets containing four items each, resulting in 100 items (The Whoqol Group, 1998). Responses are reported on a 5-point Likert scale with questions about how individuals evaluate their functioning in a particular area of life (The Whoqol Group, 1998). The body image facet contains four items set within the psychological health domain of the WHOQOL-100, the second domain out of six (The Whoqol Group, 1998). The WHOQOL-100 may be scored by the domain of its individual items or the global scores of all domains (The Whoqol Group, 1998). For the body image facet, items are scored by summing the four items and accounting for reverse scores where appropriate (The Whoqol Group, 1998). A higher score indicates a better quality of life (The Whoqol Group, 1998). A score greater than 50 indicates the cut-off for good quality of life (The Whoqol Group, 1998).

WHOQOL-100 - Body Image Results

The WHOQOL-100 was used by one study (Manieri et al., 2014). Overall body image satisfaction before hormone therapy for the MTF group (n=56) was 43.25 (SD = not reported), and after hormone therapy was 68.75 (SD = not reported). Overall body image satisfaction before hormone therapy for the FTM group (n=27) was 21.85 (SD = not reported), and after hormone therapy was 63.25 (SD = not reported). A score

greater than 50 indicates good quality of life. This indicates an increase in body image satisfaction across both groups but there was no statistical information about the significance. The standard deviation and statistical significance were not reported individually for the body image subscale as the body image subscale for the WHOQOL-100 was a part of a wider study that calculated a total score rather than subscale scores. Therefore, this subscale had limited value for this systematic review.

BREAST-Q

The BREAST-Q is a self-report survey to evaluate outcomes after breast surgical interventions (Pusic et al., 2009). The BREAST-Q contains two versions of the questionnaire: one pre-operation and one post-operation (Pusic et al., 2009). The BREAST-Q contains six domains: Satisfaction with breasts, Satisfaction with overall outcome, Psychosocial well-being, Sexual well-being, Physical well-being, and Satisfaction with care (Pusic et al., 2009). The survey is scored on a Likert scale of 1 to 5 to a scale of 0 to 100. Higher scores indicate higher satisfaction (Pusic et al., 2009).

BREAST-Q - Body Image Results

One study used the BREAST-Q (Agarwal et al., 2018)**.** The overall breast satisfaction before chest surgery for the FTM group (n=42) was 17.4 (SD = 14), and after chest surgery was 85 (SD = 11.7) ($p < 0.0001$). This indicates a significant increase in breast satisfaction after gender-affirming care.

Appearance Schemas Inventory-Revised (ASI-R)

Appearance Schemas Inventory-Revised (ASI-R) is a self-report survey that measures body awareness and body image investment schemas (Cash et al., 2004). This is done by assessing the psychological importance of body awareness, investments made in body awareness, and physical appearance (Cash et al., 2004).

The ASI-R contains two subscales: self-evaluation and motivation (Cash et al., 2004). The ASI-R contains 20 items rated on a 5-point Likert scale from 1 to 5. 1 indicates strongly disagree, and five indicates strongly agree (Cash et al., 2004). The ASI-R scoring consists of a mean score; the higher the mean score, the higher psychological investment is placed on physical appearance (Cash et al., 2004).

ASI-R - Body Image Results

One study used the ASI-R (van de Grift, Kreukels, et al., 2016). The overall psychological investment placed on physical appearance before chest surgery for the FTM group (n=26) was 3.11 (SD = 0.71), and after chest surgery was 3.27 (SD = 0.65) ($p \geq .05$). This indicates no significant increase in psychological investment placed on physical appearance after gender-affirming care.

Body Image Quality of Life Inventory (BIQLI)

Body Image Quality of Life Inventory (BIQLI) measures the effect of body image concerning a range of areas of quality of life (Cash & Fleming, 2002). Areas from emotional well-being to sexuality are covered (Cash & Fleming, 2002). Items are rated on a 7-point Likert scale, with -3 indicating a very negative effect and +3 indicating a very positive effect. The BIQLI scoring consists of a mean score with a high score indicating a higher body image-related quality of life and a lower score indicating a lower body image-related quality of life (Cash & Fleming, 2002).

BIQLI - Body Image Results

The BIQLI was used by one study (van de Grift, Kreukels, et al., 2016). The overall body image-related quality of life before chest surgery for the FTM group (n=26) was 0.32 (SD = 1.33), and after chest surgery was 0.38 (SD = 0.78) ($p \geq .05$). This indicates a significant increase in body image-related quality of life after gender-affirming care.

Multidimensional Body-Self Relations Questionnaire (MBSRQ)

The Multidimensional Body-Self Relations Questionnaire (MBSRQ) is a self-report measure that assesses various aspects of the attitude of one's body image (Brown et al., 1990). Items are rated on a 5-point Likert scale, with one indicating definitely disagree to five indicating definitely agree (Brown et al., 1990). The MBSRQ scale has several subscales consisting of appearance evaluation, appearance orientation, fitness evaluation, fitness orientation, health evaluation, health orientation, illness orientation, overweight preoccupation, and self-classified weight (Brown et al., 1990). The MBSRQ scale is scored through the mean values of each subscale (Brown et al., 1990). Higher scores indicate general satisfaction with one's appearance, and lower scores indicate general dissatisfaction (Brown et al., 1990).

MBSRQ - Body Image Results

The MBSRQ was used by one study (van de Grift, Kreukels, et al., 2016). The overall satisfaction with one's appearance before chest surgery for the FTM group (n=26) was 3.29 (SD = 0.42), and after chest surgery was 3.32 (SD = 0.39) ($p \geq .05$). This indicates a significant increase in satisfaction with one's appearance after gender-affirming care.

Situational Inventory of Body Image Dysphoria (SIBID)

The Situational Inventory of Body Image Dysphoria (SIBID) is a scale that assesses the frequency of uncomfortable feelings about one's physical appearance in everyday situations (Cash, 2002). The SIBID consists of 42 questions rated on a 5-point Likert scale where 0 indicates never to 4 indicates always (Cash, 2002). There are eight semi-open questions where participants may list additional situations (Cash,

2002). The SIBID scale is scored through one mean score. Higher scores indicate a higher frequency of body image dysphoria (Cash, 2002).

SIBID - Body Image Results

The SIBID was used by one study (van de Grift, Kreukels, et al., 2016). The overall frequency of uncomfortable feelings about one's physical appearance before chest surgery for the FTM group (n=26) was 1.31 (SD = 0.69), and after chest surgery was 1.13 (SD = 0.67) ($p \leq .01$). This indicates a significantly decreased frequency of uncomfortable feelings about one's physical appearance after gender-affirming care.

Appraisal of Appearance Inventory

The Appraisal of Appearance Inventory is a measure that assesses an individual's appearance concerning gender compatibility (Smith et al., 2005). This was conducted by independent observers such as the clinicians and researchers rating several physical appearance characteristics before and after medical intervention through 14 items on a 5-point Likert scale (Smith et al., 2005). A lower score indicates better physical alignment with the affirmed gender (Smith et al., 2005). Intra-class correlation coefficients evaluate observer agreement (Smith et al., 2005).

Appraisal of Appearance Inventory - Body Image Results

The Appraisal of Appearance Inventory was used by one study (Smith et al., 2005)**.** The overall physical alignment with the affirmed gender before sex reassignment surgery for a mixed group of FTM and MTF participants (n=57) was 44.7 (SD = 9.6), and after sex reassignment surgery was 33.8 (SD = 10.2) ($p < 0.001$). This indicates a significant increase in physical alignment with the affirmed gender after gender-affirming care.

Summary of Impact of Gender-Affirming Healthcare on Body Image

There were several key findings on the impact of gender-affirming healthcare on body image for gender-diverse individuals. A summary of the impacts of gender-affirming healthcare is displayed in Table 5. When assessing intervention impacts, categories of interventions consisted of hormone suppression, hormone therapy, gender-affirming surgery, and mixed interventions. Results are also discussed by gender identity. Several studies (Kuper (2020), Manieri (2014), and Turan (2018)) did not report the statistical significance *p*-value; therefore, their results will not be included in this section.

Hormone Suppression

Hormonal blockers such as gonadotropin-releasing hormone (GnRH) are used by gender-diverse youth to temporarily delay puberty till they reach the appropriate age to start cross-sex hormone therapy. When assessing the impacts of hormone suppression on body image for gender-diverse youth prior to transition, results indicated that there was no statistically significant increase or decrease in body image satisfaction for both FTM and MTF participants from hormone suppression (Carmichael et al., 2021; de Vries et al., 2011). Hormone suppression had a neutral impact on body image for binary gender-diverse individuals.

Cross-Sex Hormone Therapy

Cross-sex hormone therapy includes testosterone or oestrogen and antiandrogen hormone replacement. When assessing the impacts of cross-sex hormone therapy on body image satisfaction, all studies assessing cross-sex hormone therapy reported a statistically significant positive increase in body image satisfaction after intervention across both FTM and MTF participants (Mazzoli et al., 2022; Turan et al., 2018; van de Grift et al., 2017). Receiving cross-sex hormone therapy for the

aligned gender has a positive impact on body image for binary gender-diverse individuals.

Gender-Affirming Surgery

The types of surgery assessed in the included studies were sex reassignment surgery for both FTM and MTF, FTM chest surgery, and MTF craniofacial reconstructive surgery. When assessing the impacts of sex reassignment surgery on body image satisfaction for both FTM and MTF participants, studies indicated that there was a statistically significant positive increase in body image satisfaction after sex reassignment surgery for both groups (Gümüşsoy et al., 2022; Smith et al., 2005). When assessing the impact of chest surgery (mastectomy) on body image satisfaction for FTM participants, studies indicated a statistically significant positive increase in body image satisfaction after chest surgery (Agarwal et al., 2018; van de Grift et al., 2016). When assessing the impact of craniofacial reconstructive surgery on body image satisfaction from MTF participants, one study indicated a statistically significant positive increase in body image satisfaction after craniofacial reconstructive surgery (Isung et al., 2017). Overall, receiving gender-affirming surgery has a positive impact on body image for binary gender-diverse individuals.

Mixed Interventions

The mixed interventions category consisted of individuals who received both hormone interventions and gender-affirming surgery. When assessing the impacts of mixed interventions on body image, there was a statistically significant positive increase in body image satisfaction after mixed interventions for overall body image (de Vries et al., 2014; Kuper et al., 2020; van de Grift et al., 2017). De Vries (2014) used the BIS to assess the impact of mixed intervention across primary, secondary, and neutral sex characteristics and found that there was a statistically significant positive increase in body image satisfaction for the primary and secondary characteristics and no statistically significant effect on neutral sex characteristics for a mixed group of FTM

and MTF participants. When separated by gender identity, de Vries (2014) found that there was a statistically significant positive increase in body image satisfaction for the primary, secondary, and neutral characteristics for MTF participants and that there were there was a statistically significant positive increase in body image satisfaction for the primary and secondary but no statistically significant effect neutral characteristics for FTM participants. Overall, the mixed interventions from the included studies have shown to have a positive impact on body image for binary gender-diverse individuals.

FTM

For FTM individuals, hormone suppression was found to have no statistical effect on body image satisfaction (de Vries et al., 2011). However, individuals who received cross-sex hormone therapy were reported to have statistically significant increase in positive body image satisfaction (Turan et al., 2018). FTM individuals who received chest surgery had statistically significant increases in positive body image satisfaction (Agarwal et al., 2018; van de Grift et al., 2016). In addition, individuals who received sex reassignment surgery also were reported to have a statistically significant increase in positive body image satisfaction (Gümüşsoy et al., 2022). Another study found that FTM individuals who received both hormone interventions and sex reassignment surgery reported a statistically significant increase in positive body image satisfaction for primary and secondary sex characteristics but no statistically significant increase in body image satisfaction for neutral sex characteristics (de Vries et al., 2014). Overall, gender-affirming medical interventions had a positive impact on body image for FTM individuals.

MTF

For MTF individuals, hormone suppression was found to have no statistical effect on body image satisfaction (de Vries et al., 2011). MTF individuals who received craniofacial reconstructive surgery had a statistically significant increase in positive body image satisfaction (Isung et al., 2017). Another study found that MTF individuals

who received both hormone interventions and sex reassignment surgery reported a statistically significant increase in positive body image satisfaction for primary, secondary, and neutral sex characteristics (de Vries et al., 2014). Overall, gender-affirming medical intervention has a positive impact on body image for MTF individuals.

Table 5

Summary of the impact of gender-affirming healthcare across studies and subpopulations of studies

Study ID	Gender Identity	Type of Medical Intervention	Body Image Outcome Measure	Impact
Agarwal, 2018	FTM	Surgery (FTM Chest Surgery)	BUT-A	Positive
Agarwal, 2018	FTM	Surgery (FTM Chest Surgery)	BREAST-Q (Breast satisfaction)	Positive
Carmichael, 2021	MIXED (MTF/FTM) (Prior to transition)	Hormones (Suppression)	BIS	Neutral
de Vries, 2011	FTM (Prior transition)	Hormones (Suppression)	BIS (Neutral)	Neutral
de Vries, 2011	MIXED (MTF/FTM) (Prior to transition)	Hormones (Suppression)	BIS (Neutral)	Neutral
de Vries, 2011	MTF (Prior transition)	Hormones (Suppression)	BIS (Neutral)	Neutral
de Vries, 2011	FTM (Prior transition)	Hormones (Suppression)	BIS (Primary)	Neutral
de Vries, 2011	MIXED (MTF/FTM) (Prior to transition)	Hormones (Suppression)	BIS (Primary)	Neutral
de Vries, 2011	MTF (Prior transition)	Hormones (Suppression)	BIS (Primary)	Neutral
de Vries, 2011	FTM (Prior transition)	Hormones (Suppression)	BIS (Secondary)	Neutral
de Vries, 2011	MIXED (MTF/FTM) (Prior to transition)	Hormones (Suppression)	BIS (Secondary)	Neutral
de Vries, 2011	MTF (Prior transition)	Hormones (Suppression)	BIS (Secondary)	Neutral
de Vries, 2014	FTM	Mixed (Suppression, CSH, SRS)	BIS (Neutral)	Neutral

de Vries, 2014	MIXED (MTF/FTM)	Mixed (Suppression, CSH, SRS)	BIS (Neutral)	Neutral
de Vries, 2014	MTF	Mixed (Suppression, CSH, SRS)	BIS (Neutral)	Positive
de Vries, 2014	FTM	Mixed (Suppression, CSH, SRS)	BIS (Primary)	Positive
de Vries, 2014	MIXED (MTF/FTM)	Mixed (Suppression, CSH, SRS)	BIS (Primary)	Positive
de Vries, 2014	MTF	Mixed (Suppression, CSH, SRS)	BIS (Primary)	Positive
de Vries, 2014	FTM	Mixed (Suppression, CSH, SRS)	BIS (Secondary)	Positive
de Vries, 2014	MIXED (MTF/FTM)	Mixed (Suppression, CSH, SRS)	BIS (Secondary)	Positive
de Vries, 2014	MTF	Mixed (Suppression, CSH, SRS)	BIS (Secondary)	Positive
Gumussoy, 2022	FTM	SRS	BIS	Positive
Isung, 2017	MTF	Surgery (Craniofacial Reconstructive Surgery)	BIS	Positive
Isung, 2017	MTF	Surgery (Craniofacial Reconstructive Surgery)	BIS (head and neck region)	Positive
Kuper, 2020	MIXED (MTF/FTM)	CSH	BIS	Unclear
Kuper, 2020	MIXED (MTF/FTM) (Prior to transition)	Hormones (Suppression)	BIS	Unclear
Kuper, 2020	FTM	Mixed (Suppression, CSH, SRS)	BIS	Unclear

Kuper, 2020	MIXED (MTF/FTM)	Mixed (Suppression, CSH, SRS)	BIS	Positive
Kuper, 2020	MTF	Mixed (Suppression, CSH, SRS)	BIS	Unclear
Manieri, 2014	FTM	CSH	WHOQOL-100 - Body Image Subscale	Unclear
Manieri, 2014	MTF	CSH	WHOQOL-100 - Body Image Subscale	Unclear
Mazzoli, 2022	MIXED (MTF/FTM)	CSH	BUT-A	Positive
Smith, 2005	MIXED (MTF/FTM)	SRS	Appraisal of Appearance Inventory	Positive
Smith, 2005	MIXED (MTF/FTM)	SRS	BIS (Neutral)	Positive
Smith, 2005	MIXED (MTF/FTM)	SRS	BIS(Primary)	Positive
Smith, 2005	MIXED (MTF/FTM)	SRS	BIS (Secondary)	Positive
Turan, 2018	FTM	CSH	BUT-A	Positive
Turan, 2018	FTM	CSH	BUT-B (PSDI)	Unclear
Turan, 2018	FTM	CSH	BUT-B (PST)	Unclear
van de Grift, 2016	FTM	Surgery (FTM Chest Surgery)	ASI-R	Unclear
van de Grift, 2016	FTM	Surgery (FTM Chest Surgery)	BIQLI	Positive
van de Grift, 2016	FTM	Surgery (FTM Chest Surgery)	BIS	Positive
van de Grift, 2016	FTM	Surgery (FTM Chest Surgery)	MBSRQ	Positive
van de Grift, 2016	FTM	Surgery (FTM Chest Surgery)	SIBID	Positive
van de Grift, 2017	MIXED (MTF/FTM)	CSH	BIS	Positive

van de Grift, 2017	MIXED (MTF/FTM)	Mixed (CSH, SRS)	BIS	Positive

Abbreviations: FTM: female to male transgender, MTF: male to female transgender, CSH: cross-sex hormone therapy, GRS: gender reassignment surgery, SRS: sex reassignment surgery, BIS: Body Image Scale, BUT: Body Uneasiness Test, WHOQOL-100 - Body Image Subscale: World Health Organisation Quality of Life 100, ASI-R: Appearance Schemas Inventory - Revised, BIQLI: Body Image Quality of Life Inventory, MBSR: Multidimensional Body-Self Relations Questionnaire, SIBID: Situational Inventory of Body Image Dysphoria.

Meta-Analysis

The studies included in the systematic review were very heterogenous with variations in how the data was collected, scales used, interventions, and timeframes for follow-up. Likewise, inconsistent reporting of data resulted in several studies being ineligible for the meta-analysis. Manieri (2014) and Carmichael (2021) did not report standard deviation therefore were excluded from the meta-analysis. Agarwal (2018) BREAST-Q, Smith (2005) Appraisal of Appearance Inventory, Turan (2018) BUT-B and van de Grift (2016) ASI-R, BIQLI, MBSRQ, and SIBID, were excluded as there were only one study each that used these secondary scales therefore a meta-analysis could not be done for those scales. Isung (2017), Kuper (2020), Gumussoy (2022), and Smith (2005) used modified versions of the BIS therefore were not statically comparable to the standard BIS score from other studies thus was also excluded from the meta-analysis.

The included studies for the meta-analysis were Agarwal (2018), de Vries (2011, 2014), Mazzoli (2022), Turan (2016), and van de Grift (2017). Meta-analysis was conducted with the BIS primary subscale and the BUT-A subscale of these studies. There was considerable variation in how body image was measured and therefore a decision was made to perform a meta-analysis grouped by measures as a way of ensuring some homogeneity. As studies reported on multiple populations within the study (e.g., MTF, FTM, Mixed), each population was treated as a separate study in meta-analysis.

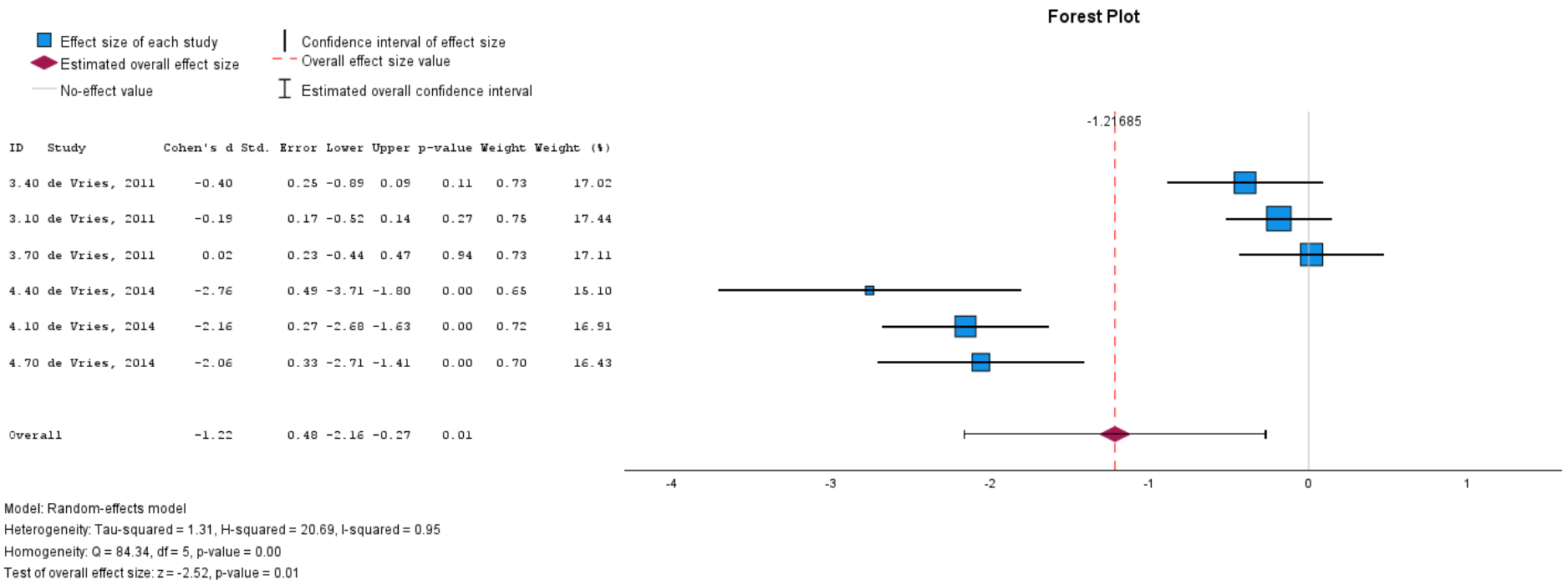
Body Image measured by BIS

The BIS primary meta-analysis consisted of two studies de Vries (2011, 2014). These two studies explored six populations measuring change in body image with the BIS primary measure which showed an effect score of -1.217 (95% confidence interval −2.16 to −0.27; I2=95.2%; figure 2). This was statistically significant (p = .012). There

was considerable heterogeneity between the studies (Q=84.339, *df*=5, *p* = <.001). Inspection of the funnel plot shown in figure 3 showed likely publication bias.

Figure 2

BIS Primary

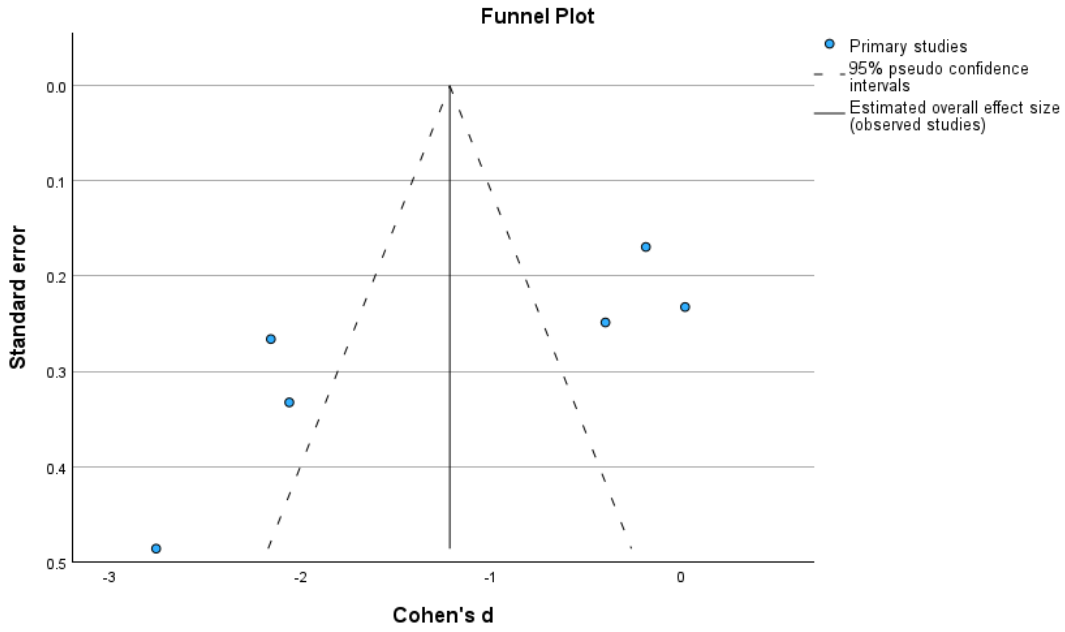


ID	Study	Cohen's d	Std. Error	Lower	Upper	p-value	Weight	Weight (%)
3.40	de Vries, 2011	-0.40	0.25	-0.89	0.09	0.11	0.73	17.02
3.10	de Vries, 2011	-0.19	0.17	-0.52	0.14	0.27	0.75	17.44
3.70	de Vries, 2011	0.02	0.23	-0.44	0.47	0.94	0.73	17.11
4.40	de Vries, 2014	-2.76	0.49	-3.71	-1.80	0.00	0.65	15.10
4.10	de Vries, 2014	-2.16	0.27	-2.68	-1.63	0.00	0.72	16.91
4.70	de Vries, 2014	-2.06	0.33	-2.71	-1.41	0.00	0.70	16.43
Overall		-1.22	0.48	-2.16	-0.27	0.01		

Model: Random-effects model
Heterogeneity: Tau-squared = 1.31, H-squared = 20.69, I-squared = 0.95
Homogeneity: Q = 84.34, df = 5, p-value = 0.00
Test of overall effect size: z = -2.52, p-value = 0.01

Figure 3

BIS Primary Funnel Plot

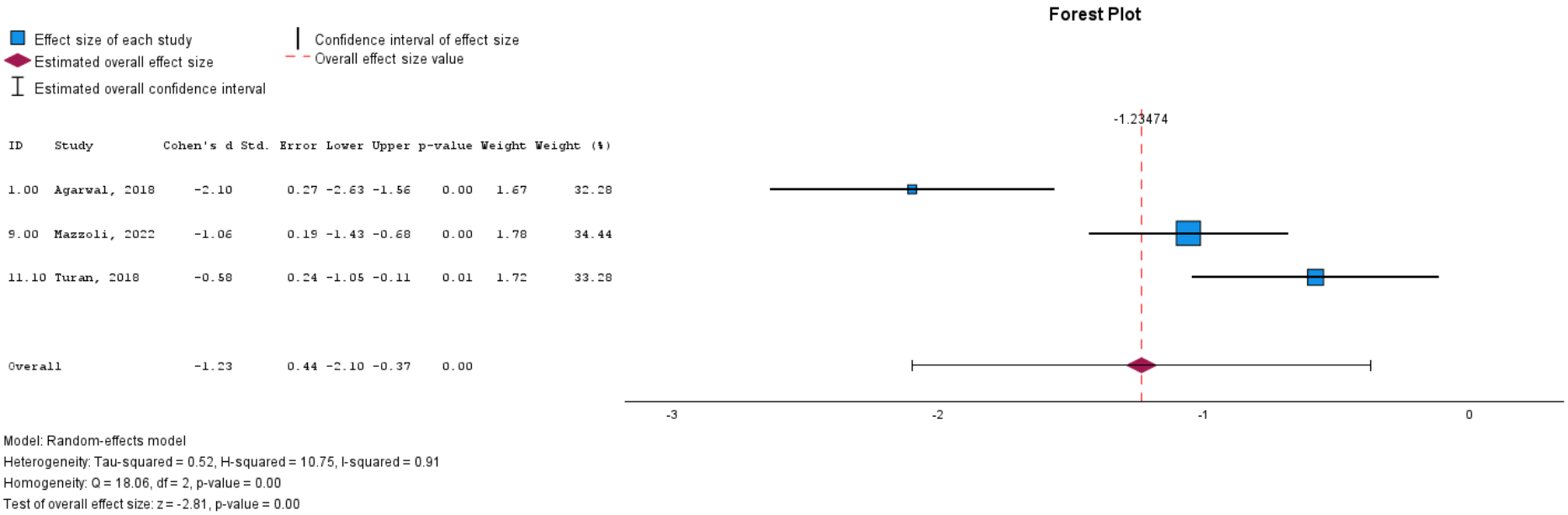


Body Image measured by BUT-A

The BUT-A meta-analysis consisted of three studies: Agarwal (2018), Mazzoli (2022), and Turan (2018). These three studies explored two populations measuring change in body image which showed a mean effect score of -1.235 (95% confidence interval −2.096 to −0.373; I2=91%; figure 4). This was statistically significant (p = .005). There was considerable heterogeneity between the studies (Q=18.06, df=2, p = <.001). Inspection of the funnel plot in shown in figure 5 showed likely publication bias.

Figure 4

BUT-A

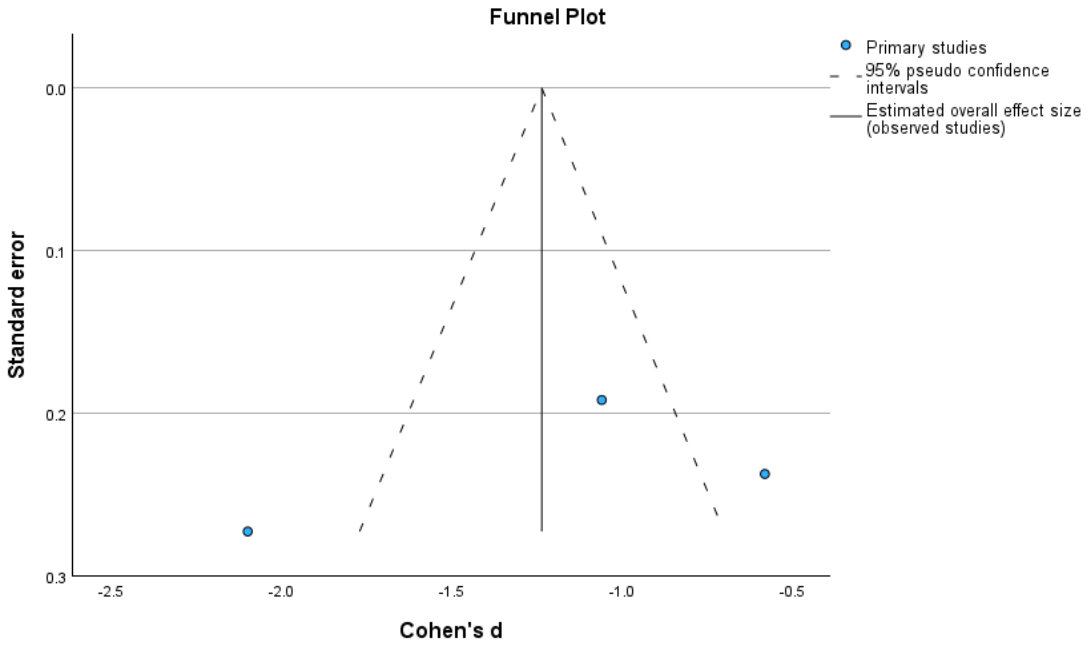


ID	Study	Cohen's d	Std. Error	Lower	Upper	p-value	Weight	Weight (%)
1.00	Agarwal, 2018	-2.10	0.27	-2.63	-1.56	0.00	1.67	32.28
9.00	Mazzoli, 2022	-1.06	0.19	-1.43	-0.68	0.00	1.78	34.44
11.10	Turan, 2018	-0.58	0.24	-1.05	-0.11	0.01	1.72	33.28
Overall		-1.23	0.44	-2.10	-0.37	0.00		

Model: Random-effects model
Heterogeneity: Tau-squared = 0.52, H-squared = 10.75, I-squared = 0.91
Homogeneity: Q = 18.06, df = 2, p-value = 0.00
Test of overall effect size: z = -2.81, p-value = 0.00

Figure 5

BUT-A Funnel Plot



Chapter 4: Discussion and Conclusion

There have been numerous studies on body image and gender-affirming healthcare over the past two decades. Body image is a key factor in achieving gender congruence for gender-diverse individuals. Achieving gender congruence is important as it is linked to reduced distress and has been found to reduce the likelihood of needing mental health treatment (Bränström & Pachankis, 2020). This study aimed to provide a concise summary of the impact of gender-affirming healthcare on body image for gender-diverse individuals through a systematic review and meta-analysis. The medical interventions included in this review were hormone suppression, cross-sex hormone therapy, gender-affirming surgery, and mixed interventions.

Results indicated that hormone suppression had no statistically significant impact on body image for both FTM and MTF individuals. When looking at the lack of significant effect of hormone suppression, body image scores slightly increased for MTFs and slightly decreased in FTMs. This change may be linked to the timing of hormone suppression as the included studies that observed this result (de Vries (2011) and Carmichael (2021)) included participants with an average 13.6 years old. Hormone suppression at this age is of concern as average puberty often begins from 8 to 13 years old and often even earlier for biological females (Farello et al., 2019). Therefore, the individuals in these studies may already be experiencing the adverse effects of biological puberty. The effects of biological puberty may explain the lack of effect from hormone suppression on body image satisfaction, given that it would be less effective if the person were already experiencing biological puberty, and possibly be linked to the changes that differed by gender identity. The difference in changes in body image in the FTM group, which had a decrease in body image and the MTF group, which had an increase in body image after hormone suppression, may imply that there is a relationship between binary gender-diverse identities and body image satisfaction.

Body image satisfaction may present differently for gender-diverse individuals depending on gender identity and timing, which may result in variations of experiences concerning specific physical characteristics when receiving hormone suppression. Existing research has indicated that the later the puberty stage before receiving gender-affirming care, the worse mental health outcomes for gender-diverse youth (Sorbara et al., 2020). In comparison, existing research has shown that early access to gender-affirming care has been shown to reduce mental health distress in adults (Nolan et al., 2023). Therefore, there may be a significant impact on early access for gender-diverse youth. Further research is needed to investigate the effect of timing and hormone suppression on body image across different gender identities at an early age (Sorbara et al., 2020).

Results indicated that cross-sex hormone therapy, which includes testosterone or oestrogen and antiandrogen hormone replacement, was found to consistently increase body image satisfaction for both FTM and MTF individuals across studies. Overall, receiving cross-sex hormone therapy aligning with the affirmed gender has a positive impact on body image for binary gender-diverse individuals and may subsequently improve well-being.

Gender-affirming surgery covered in this review included sex reassignment surgery, chest surgery (mastectomy for FTMs), and craniofacial reconstructive surgery for MTFs. There was an increase in body image satisfaction reported after sex reassignment surgery for both FTM and MTF individuals. Chest surgery for FTMs and craniofacial reconstructive surgery for MTFs also positively impacted body image satisfaction across studies. Overall, gender-affirming surgery has a significant positive impact on body image for binary gender-diverse individuals. More research is needed on the impacts of gender-affirming surgery for non-binary gender-diverse individuals, as this cannot be ascertained from this study due to the lack of non-binary participants.

Mixed interventions covered in this review consisted of individuals who received both hormone interventions and gender-affirming surgery. All studies assessing mixed interventions indicated a statistically significant increase in body image satisfaction for both FTMs and MTFs. When looking at the primary, secondary, and neutral sex characteristics, it was found that there were positive impacts on primary and secondary sex characteristics for both MTF and FTM individuals. There was also a positive impact for MTFs on neutral characteristics; however, there was no statistically significant effect on neutral sex characteristics for the FTMs (de Vries et al., 2014).

Similar to a recent systematic review, it was found that gender-affirming health care is linked to the improvement in gender dysphoria, body image satisfaction, increased mental health, and improved quality of life (van Leerdam et al., 2023). In addition, similar to van Leerdam (2023), our research found no randomised control trials and was made up of moderate-quality studies. Our findings further support the positive impact of gender-affirming healthcare on body image for binary gender-diverse individuals. Our study does not report any significant differences from existing literature. Overall, our systematic review aligns with existing knowledge in the field that gender-affirming healthcare positively impacts body image for binary gender-diverse individuals.

Limitations

It is important to note that not all gender-diverse individuals require or want all or any medical gender-affirming care, such as hormone therapy or surgery, to affirm their gender (Koehler et al., 2018). Many gender-diverse individuals have unique needs; therefore, this research should be taken cautiously to not generalise to the entire gender-diverse community. There are several critical limitations of this study. The data included in this review was greatly heterogeneous, thus impacting the

strength of the meta-analysis. According to the ROBINS-I risk of bias assessment used in this review, the included studies had moderate to serious risk of bias and should be used cautiously.

Firstly, the population samples have several limitations in several of these studies, such as excluding individuals with comorbid mental health issues. This may reduce the generalisability of these findings as body image is impacted by mental health, and a lack of gender-affirming care has been shown to impact mood and body image negatively. Therefore, the available study samples may not represent the gender-diverse population.

Next, there is a lack of diversity in the current data as these results were derived from nearly all Western samples with mostly white participants. Intersectional considerations such as ethnicity and country of care are essential, as gender-affirming care is not uniform across all gender-diverse individuals or locations, and barriers to access are a key influence on care. Therefore, these findings may not be generalisable to non-western and non-white demographics. Further research is needed to address this gap. In addition, this study specifically included gender-diverse terms to capture more inclusive data outside the gender binary; however, no data that met our inclusion criteria were present for non-binary identities, thus highlighting a significant gap in existing research.

There are several data limitations as well. The results of this small sample size and this study are not representative of the general gender-diverse population. This may impact the true effect size of the findings. Furthermore, the available data was limited as several studies that reported the BIS scores did not report an overall mean score but instead reported per subscale in their results, thus reducing the available data for this study. Access to that raw data may have provided more in-depth analysis; however, that data collection was out of this project's scope. Another

key limitation in the data was that there were no randomised control trials (RCT) in the available data. Future research should expand to RCTs when researching body image and gender-affirming health care.

Next, most of the available data lacks long-term data tracking beyond a few years. It is known that there is a need for longer follow up time after gender-affirming medical care (Pavanello Decaro et al., 2021). Therefore, it may be difficult to determine these medical interventions' long-term efficacy and impact on body image for gender-diverse individuals. Body image perception after the intervention may take time to adjust. Interventions such as hormones may not be able to measure full effect until after several years of continuous hormone use. In addition, body image perceptions after surgical interventions may take time to adjust as well. Gender-affirming surgeries often happen in stages, with periods needed to heal before engaging in the next step. Therefore, measuring the full effect of surgical intervention may also take several months to years to gauge an accurate and full effect on body image. Further research is needed in tracking the long-term outcome of receiving gender-affirming healthcare as there may be implications relevant to mental health, well-being, and quality of life.

Next, a key limitation of the current data was the apparent rigid alignment with the gender binary in all included studies. This is an issue because non-binary and intersex participants were excluded or unrepresented in several studies of the current data. Thus furthering the gap in inclusive care. Future research should consider including non-binary participants while representing them as an independent group in their data. This could be done by implementing inclusive data collection practices in survey designs, analysis of non-binary data as a unique subgroup rather than lumping the data together to binary transgender data, educating research team members on inclusive research practices involving non-binary participants and data, and involving non-binary researchers in the research design and collection process.

Lastly another limitation of the current data is that several studies excluded individuals with previous gender-affirming care. This may be problematic as gender-affirming care is often a staged process that happens over months to years; therefore, this sample may not be generalisable to the general gender-diverse population. Instead, the several of the findings of this review are limited to those who are treatment naïve, though people who have experienced other forms of gender-affirming treatment may also have experienced changes in body image because of this.

Implications

This research is intended to help inform those who do want these interventions and those who assist them and improve access to care. This study has focused on gender-diverse populations, including transgender and non-binary individuals' data. This aimed to fill the gap in research by being inclusive of non-binary populations, as these populations are often underrepresented in research and face additional barriers to gender-affirming care due to being outside the gender binary (Burgwal et al., 2019). This study's findings further highlight the underrepresentation of non-binary data reported in gender-affirming healthcare studies regarding body image. Implications for this work may be that this prospective evidence may inform practice and policy in healthcare for gender-diverse individuals. Inclusive practice and care are vital to gender-diverse healthcare and research, as it is still illegal and even criminalised to be transgender in several countries across the world (Chiam et al., 2020). This study strongly recommends further inclusion and research with non-binary individuals in body image and gender-affirming healthcare, as this is a significant gap in current research. Recommendations to healthcare providers are to be aware of the limitations of generalizability of these current findings and be critical in its usefulness for informing one’s practice. Recommendations for

policymakers are that access to gender-affirming care is crucial to the well-being of gender-diverse individuals as our findings show the positive impact on body image.

Future Research

Research has shown that gender-affirming medical interventions have proven effective in improving the mental health and well-being of non-binary gender-diverse individuals (Tordoff et al., 2022). Gender-affirming hormone therapy has been found to not only be effective in increasing mental health well-being but also to contribute to increased body image satisfaction among non-binary individuals (Grannis et al., 2023). It is essential to understand the unique experiences of body image for non-binary individuals, especially in the context of gender-affirming medical care (Huisman et al., 2023). Huisman's (2023) findings emphasise that non-binary individuals generally show lower levels of body dissatisfaction and prefer fewer gender-affirming interventions compared to binary gender-diverse individuals. This suggests a distinct difference in the relationship to body image resulting from gender-affirming medical interventions between non-binary and binary gender-diverse individuals. This highlights the necessity for research that specifically focuses on non-binary gender-diverse individuals, which this further emphasises the inapplicability of our systematic review results to this the non-binary demographic and exhibits the need for more extensive data collection with this population. There is a concerning correlation between barriers to accessing gender-affirming healthcare and adverse outcomes for non-binary individuals, including higher rates of discrimination, diminished quality of life, and increased mental health distress (Kelly et al., 2023). Given the unique challenges faced by non-binary individuals in disclosing their gender identity, accessing care, managing costs, and overcoming familial barriers to care (Kearns et al., 2021), there is a pressing need for expanded research in the realm of gender-affirming healthcare and body image for this population. A crucial gap in the existing body of knowledge is the limited exploration of how gender-affirming medical care specifically influences the body image of non-binary gender-diverse individuals. Despite current evidence supporting the

overall benefits of gender-affirming medical care for non-binary individuals, there is a lack of focused research on its impact on body image. Understanding the nuanced experiences of non-binary individuals in the context of gender-affirming care and body image is essential for informing best practices. Addressing this gap can contribute to improved access to gender-affirming medical care for non-binary individuals by reducing stigma within both the medical community and the general population. Moreover, it can strengthen empirical support for the efficacy of gender-affirming medical interventions which is a crucial factor for influencing policy and insurance decisions that rely on data. In conclusion, while current research highlights the positive outcomes of gender-affirming medical care for non-binary individuals, there is a pressing need for comprehensive studies focusing on the relationship between gender-affirming medical care and the body image experiences of the non-binary gender-diverse population.

Further recommendations for future research include the qualitative exploration of the experiences via different gender identities, especially in the non-binary spectrum. Minute changes in body image were found to differ by gender identity in this systematic review via hormone suppression, which may imply that timing and identity may have unique implications for non-binary identities. This review exclusively included non-randomized studies due to a lack of available RCTs. To ameliorate this issue, future research may consider gathering data from individuals on gender-affirming healthcare wait lists as a means to assess a control group ethically. Furthermore, most of the scales captured in this study were heavily gendered; therefore, considerations of using inclusive language when interacting with non-binary participants is a must. Allowing for open-ended response boxes when gathering data on gender identity for surveys and questionnaires may allow for a more accurate and inclusive account of the participant data. Ideal practice would involve the inclusion of non-binary individuals in the research design process to ensure inclusive and safe practices.

Conclusion

This study has aimed to identify the impact of gender-affirming care and body image by tracking the outcome of gender-diverse individual's body image pre- and post-gender-affirming care. Overall, gender-affirming healthcare has a positive effect on body image for binary gender-diverse individuals, with slight variations based on the type of intervention. This study identified a significant gap in research as there were no studies that reported body image outcomes for non-binary gender-diverse identities. Further inclusive research is needed on non-binary identities in relation to body image experiences, and outcomes of gender-affirming healthcare.

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