



Review

# Review on the Transgender Literature: Where Are We Now and a Step beyond the Current Practice?

Dilini Abeyratne <sup>1</sup>, Gowri Malka Ratnayake <sup>2,\*</sup>, Udai Akalanka Wijetunga <sup>3</sup>, Umesha Wijenayake <sup>1</sup> and Uditha Sirimevan Bulugahapitiya <sup>1</sup>

<sup>1</sup> National Hospital of Sri-Lanka, Colombo 00700, Sri Lanka; diliniabeyratne88@yahoo.com (D.A.); umeshawijenayake@gmail.com (U.W.); udithakaush@gmail.com (U.S.B.)

<sup>2</sup> District General Hospital, Matale 21000, Sri Lanka

<sup>3</sup> Ministry of Health, Colombo 01000, Sri Lanka; udaiwijetunga@gmail.com

\* Correspondence: ratnayakegowri003@gmail.com

**Abstract:** The transgender concept is described as a clinically significant distress due to the incongruity between the experienced gender and assigned gender. A transgender person carries a gender identity that is different from their assigned sex at birth. Transgender people may be binary: male to female (transgender women) or female to male (transgender men) or genderqueer (non-binary, fluid or variable gender expression). The binary concept has been described in transgender population, where the term transwomen is used to describe people assigned male at birth (AMAB) who are recognized as females during gender transition; with the term transmen where they are assigned female at birth (AFAB) and are then recognized as males in gender transition. According to the DSM-5 classification, gender dysphoria is described when a transgender person develops clinically relevant bio-psychosocial suffering. Currently, the transgender population has gained massive public awareness through social media and gained a considerable level of attention globally. Several studies on transgender populations from different parts of the world have shown real discrimination and stigma towards transgender people, which sometimes acts as a barrier to the provision of the required care for them. Lack of access to the required information, legal issues, lack of solutions to fertility problems, financial constraints, and psychological and emotional obstacles, together with risk of sexually transmitted infections, including human immunodeficiency virus (HIV), all make the life of a transgender person more complicated. Testosterone therapy is a hormone-based therapy for transgender men that provides a body image tallying with the favored gender identification, whereas estrogen and androgen-suppressing agents are used in transgender females to produce changes compatible with their required gender identity. Gender affirmation surgery is a broad term, under which the genital reconstruction is described as a major component. Psychological conditions such as depression, substance abuse, suicidal deaths, and sexually transmitted infections, particularly among males having sex with males, are reported at a significantly higher rate among transgender populations. Cardiovascular morbidity is higher among this population, and continuous medical surveillance is warranted. Medical care provision to transgender populations should be handled with great care, while attending to the unmet needs of this population, as this care should extend beyond routine hormonal therapy and gender reassignment surgery.

**Keywords:** transgender; AMAB transgender; AFAB transgender; gender affirmation surgery



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## 1. Introduction

The concept of transgender is described as a clinically-significant distress due to a marked and persistent incongruity between the experienced gender and assigned gender, and related to a continual and strong desire to be another gender and a robust preference to be every other gender [1]. A transgender person carries a gender identity that is different from their assigned sex at birth. Transgender people may be binary: male to female

(transgender women) or female to male (transgender men) or genderqueer (non-binary, fluid or variable gender expression) [2]. Gender binarism categorizes the biological sex and gender into two categories, as masculine and feminine. The binary concept has been described in transgender populations, where the term transwomen is used to describe people “assigned male at birth” (AMAB) who are being recognized as females during gender transition; and the term transmen is used for people “assigned female at birth” (AFAB) who recognize as males in gender transition [3].

Interestingly, many transgender people will fall in to the category of non-binary (taking up neither male-to-female nor female-to-male transgender identities, but having a more neutral or “in between” gender identity) [4]. The term non-binary is used to emphasize a gender identity that cannot be categorized as masculine or feminine, where they could be experienced it as a combination of male and female, neither male nor female, nor something completely independent of notions of conventional gender identities. Non-binary people may have diverse gender identities, such as pangender (two or more genders), bigender (female and male), agender (without any gender), neutrois (neutral or genderless), and many others. According to the 2015 U.S. Transgender Survey (USTS), more than 35% of respondents were recognized as non-binary [5]. A recent Dutch study showed a high prevalence of non-binary populations (18.3%) [3]. According to the DSM-5 classification, gender dysphoria is described when a transgender person develops clinically-relevant bio-psychosocial suffering [6].

The term “Transsexualism” was initially presented in the International Classification of Diseases (ICD)-9 in 1975 and in DSM-III (diagnostic and statistical manual of mental disorders, third edition) in 1980. DSM-III also mentioned a “Gender Identity Disorder of Childhood” (GIDC) [2]. ICD 10 used the term transsexualism. Gradual evolution lead to changing the DSM-IV terminology of gender identity disorder (GID) [7] into the gender dysphoria (GD) that appeared in 2013 edition of the DSM-5, replacing the term “transsexualism”. The transgender population has evolved over many decades, and has finally come to a point where the world accepts that they are a multitalented group of people who have the ability to shine in the world. Currently, they have gained massive public awareness through social media and a considerable level of attention around the world.

Several studies on transgender populations from different parts of the world have shown real discrimination and stigma towards transgender people, which sometimes acts as a barrier to provision of the required care for them. Lack of access to required information, legal issues, lack of solutions to fertility problems, financial constraints, and psychological and emotional obstacles, together with risk of sexually transmitted infections, including human immunodeficiency virus (HIV), all make a contribution to making the life of transgender people difficult [8].

This has grown to be a treasured subject matter for dialogue in the modern-day era, as there is a lot that those human beings assume and desire from medical care providers beyond the routine hormonal therapy and gender reassignment surgery. The current literature indicates that transgender people, particularly before gender reassignment surgery, are at increased risk of suicide. This overview focuses on diverse elements of transgender people, in relation to associations, comorbidities, and available treatment options, with new advances and social aspects of these people.

## 2. A Step Back: Digging Out the History of the Transgender Population

Going back to the history of transsexualism, the terms transvestites and transsexuals were marked by Magnus Hirschfeld (1868–1935), a famous German sexologist, who developed the Institute for Sexual Science in 1919 in Berlin. This was later destroyed by the Nazis in 1933 [9].

The term “transgenderism” was introduced by the Virginia Prince [10]. Harry Benjamin became the main character in transgender health, introducing sex reassignment surgery, and the International Gender Dysphoria Association changed its name after him [9]. The phrase transsexualism became well known after Benjamin’s writing of “The

Transsexual Phenomenon”, even though it was originally described by Hirschfeld in 1923; giving recognition to the group of people who needed a life which is different from their designated gender [11]. The American Psychiatric Association introduced the term gender dysphoria to define people who are not comfortable with their assigned gender [4]. The World Health Organization’s ICD-10 has the term transsexualism, while World Health Organization’s ICD-11 used “gender incongruence” [12]. The Harry Benjamin International Gender Dysphoria Association (HBIGDA) was established in 1979. This is called the World Professional Association for Transgender Health (WPATH) in current practice. It is a multi-disciplinary organization involved in the study and treatment of gender identity disorders.

Hormonal based treatment has been a reality since the introduction of testosterone in 1935 and diethylstilbestrol in 1938. Surgical approaches to gender reconstruction came into practice in the second half of the 20th century. The literature gives much evidence for using the term transgender in different ancient stories in different parts of the world. One such thrilling instance is the phrase cross-gender behavior used within the Mahabharata and Ramayana.

The Institute of Medicine (IOM) released a landmark assertion in 2011, on the health of lesbian, gay, bisexual, and transgender (LGBT) people, demonstrating the need for research related to transgender health [13].

### 3. Varying Prevalence with Case Definition

Despite the subject of transgender gaining recognition, positive epidemiological traits of this transgender population nonetheless remain undiscovered [14]. The prevalence of the transgender population varies with the case definition used to define it.

A meta-analysis by Arcelus and colleagues with a self-reported transgender population, identified the prevalence of transsexualism as 4.6 in 100,000 individuals; 6.8 for trans women and 2.6 for trans men [15]. The majority of other studies have documented the prevalence through the use of surgical or hormonal therapy for transgender-related matters, showing a prevalence of 1 to 30 per 100,000 individuals [16].

Studies on the prevalence of transgender people by transgender related diagnoses have demonstrated the use of definitions coming from the International Classification of Disease (ICD) or the Diagnostic and Statistical Manual of Mental Disorders (DSM) for prevalence assessment. Therapy-related and diagnosis-related results of prevalence shows a fundamental disparity in results, whereas the meta-analysis of self-reporting of gender identity has had much less variation. All the above emphasize the significance of sticking to unique case definitions in assessing the prevalence of transgender populations [16]. Based on the work done on CDC’s Behavioral Risk Factor Surveillance System in 19 states, Flores et al. demonstrated a transgender prevalence of 0.56% among US adults (560 per 100,000) [17]. In the 2015, the U.S. Transgender Survey (USTS) revealed that more than 35% of respondents belonged to the non-binary transgender population [5].

When considering the Sri-Lankan experience in the demography of transgender people, there is a scarcity of demographic data based on the general population. There is one study which published its data based on tertiary care center experience, demonstrating 31% AMAB transgender population and 69% AFAB transgender population, with a ratio of 2:1 among AMAB transgender and AFAB transgender populations. Among them, the majority were in the age group of 31–35 years [18]. However, the actual prevalence may have been underestimated, since people may be reluctant to seek medical attention, due to stigma and discrimination [19].

### 4. Therapeutic Aspects with Hormonal Therapy: Pros and Cons

Testosterone therapy is a hormone-based therapy for transgender men that provides a body image tallying with the favored gender identification, whereas estrogen and androgen-suppressing agents are used in transgender females to produce changes compatible with

the required gender identity. As with any other therapies, all of these can be associated with certain adverse effects, and routine monitoring of a particular therapy is warranted.

Standards of care for the transgender population were published by the World Professional Association for Transgender Health (WPATH), which stated that there is a unique pathway of treatment for each individual, including hormonal therapy, surgical management, and care for psychological wellbeing [20].

Testosterone is available in multiple formulations; the most commonly used routes are intramuscular or subcutaneous routes (testosterone enanthate and cypionate). A long-acting formulation of testosterone undecanoate can be given 12 weekly. Subcutaneous implants, and transdermal and buccal preparations are also available. The ultimate target is to bring the testosterone level to the male physiological range. Important changes that patients expect with testosterone therapy is the cessation of menses, which, along with the other changes such as advancing facial and body hair, increased acne, alterations in fat distribution, and improvement in muscle mass, usually occurs within the first 3 months of starting therapy. Voice changes, atrophy of vagina, and enlargement of clitoris occur later [21].

In non-binary AFAB transgender individuals who desire partial masculinization, the dose of testosterone is adjusted to a lower level. When the person requests body composition and voice changes without the need for increase in facial and body hair, testosterone can be combined with 5 $\alpha$ -reductase inhibitors or definitive hair removal. Several studies have shown that finasteride is as effective as spironolactone or flutamide in managing hirsutism. This is due to its ability to block the conversion of testosterone into DHT in the hair follicle [3].

AMAB transgender people who are being treated with estrogen and anti-androgen, will show breast enlargement, slowed growth of body and facial hair, decreased testicular size, decreased sperm production, and decreased terminal hair over time. Gonadotrophin releasing hormone (GnRH) agonists suppress the pubertal progression in adolescents, where sex hormone therapy is usually started by, or at, the age of sixteen years [22]. 17- $\beta$ -estradiol is commonly used, as ethinyl estradiol, being a synthetic estrogen, has been shown to have increased cardiovascular and thrombotic risk [23]. The dosage of estrogen should be two or three times that used in hormone replacement therapy in postmenopausal women, with a goal of serum estradiol of 100–200 pg/mL (or 367–734 pmol/L) [24]. Cyproterone acetate (CPA), spironolactone, or gonadotropin-releasing hormone agonists (GnRH $\alpha$ ) can be used as antiandrogens [25].

Physical changes are a main concern of these people, where hormone therapy plays a critical role in gender affirmation therapy. Hormone therapy is continued in most people, with doses similar to those used in non-transgender people with hypogonadism [26]. Minimum duration of hormonal treatment was not very clear from the published data. However, it was obvious that transgender people benefited both physically and psychologically with this therapy. A prospective longitudinal study demonstrated a reduction of depression in transgender population from 42% to 22% after receiving hormone therapy [27]. Some studies have shown improvements of anxiety, whereas some did not show any improvement with hormone therapy [28]. Data were not convincing about the relationship of suicidal rate and hormone therapy [29]. Quality of life was enhanced in most receiving hormone therapy [21,30,31].

Many transgender adult males were subsequently shorter than cisgender (non-transgender) adult males, as some degree of feminization occurred at the time of testosterone initiation, where it cannot be fully reversed by outside testosterone therapy [32].

The current literature has a scarcity of data on hormonal therapy protocols for non-binary transgender persons, particularly data regarding their efficacy and safety. The target of hormone therapy in binary AMAB transgender individuals is to have a complete suppression of male sexual features, whereas in non-binary AMAB individuals this target may not be necessary and dosage may be adjusted depending on patients' desire. When non-binary AMAB individuals desire full feminization, variable doses of estrogen can be

used, and for desired de-masculinization, may be treated with estrogens combined with low dosages of cyproterone acetate (10 mg/daily or 25 mg on alternative days) or with 5 $\alpha$ -reductase inhibitors [3].

### 5. How Does a Surgical Team Support the Transgender Population?

Transgender people have gained significant recognition and acceptance by the current society. Several surgical approaches are available for transgender individuals in order to support their desired gender identity.

The Standards of Care of the World Professional Association of Transgender Health (WPATH)—seventh version provides guidance on the surgical approach for people with gender identity disorders. Patients willing to undertake gender reassignment surgery (GRS) need to produce a psychiatric recommendation and a gender specialist/endocrinologist's recommendation confirming continuous hormonal therapy of at least a year [33]. Gender affirming surgery is a broad term, under which genital reconstruction is a major component.

Surgical options for the AFAB transgender population include facial masculinization surgery, subcutaneous mastectomy, total hysterectomy with bilateral oophorectomy, phalloplasty, testicular prostheses, voice surgery, and chondrolaryngoplasty [26]. Genital reconstructive options are mainly in two categories: metoidioplasty, or total phalloplasty. Metoidioplasty is for construction of a neophallus in female to male transgender, with the main aim of providing a genitalia with external male appearance and allowing to void in a standing posture. There are many studies which evaluated the safety and benefit of one stage complete GRS (removal of female external genitalia with metoidioplasty with urethral reconstruction) compared to multi-stage stage procedure with the same complication rates [33]. A neophallus is constructed from the clitoris. Total phalloplasty that develops a neophallus from tissues other than the genital tissue is performed using various flaps, among which radial free forearm and free musculocutaneous latissimus dorsi flaps are popular [34].

Available surgical options for the AMAB ("assigned female at birth") male-to-female transgender population people consist of facial feminization surgery, orchidectomy, vaginoplasty, and breast augmentation. Proper handling of the glans penile along with the nerves and vessels is important for maintaining the sensation of the neoclitoris. Neovagina is created from the penile inversion method which was developed by Burou, 70 years ago, and which is considered the gold-standard in gender reassignment surgery. Free skin grafts and intestinal segments [35,36] are also used for neovaginal formation. Urethral neo-meatus is created as required and formation of labia is done from the remaining scrotal skin. Most commonly encountered complications are related to the rectum and urethra, including urethral strictures and rectal injuries [37].

The most essential factor is cautious counselling of the patient before the surgery, on the grounds that unreal expectations may also result in needless sadness after surgical operation. The available surgical options, with the pros and cons of these procedures, should be thoroughly explained [34].

### 6. Multiple Physical and Psychological Problems: Making the Life of a Transgender Person a Difficult One

Transgender populations in the world have multiple unmet health requirements, which lead to adverse health outcomes compared to age matched non-transgender populations. Apart from this, there are a certain set of comorbidities which are inherently linked with the transgender concept. Many studies have been designed to characterize these issues, even though still there are many gaps still existing.

Comorbid psychological conditions and substance abuse are major problematic areas in the transgender community. The distribution of these disorders varies with the age and race. Apart from the psychological impacts, people with gender identity disorders are at risk of physical harassment from their own family, friends, schoolmates, and unknown people.

Abuse, either physically or psychologically, is associated with depression in a temporal relationship. Poverty, involvement of illegal economic pathways, and lack of family/social support all contribute to the vicious cycle of abuse and depression, further complicating the lives of transgender women [38]. A study of the US population showed that the lowest incidence of major depression was observed among black women and the prevalence of depression was increasing with age [34]. In contrast to this study, another recently published study reported that the older transgender population has less chance of depression, which was attributed to better coping skills gained over their life than younger people. The onset of many of these psychiatric problems were related to the beginning of transition of gender identity [39].

Suicidal deaths are reported at a significantly higher rate among transgender populations. A systematic review by McNeil et al. reported a maximum suicidal ideation rate of 83% [40]. Even though the suicidal rates were less than this ideation rate.

The literature states that the increased exposure to physical and sexual violence among transgender individuals may be related to suicidal ideation, suicide attempts, and substance abuse. The entire transgender population is at high risk for physical and sexual violence, which in turn increases the risk of suicide attempt [41].

A large retrospective study, which was performed from 1972 to 2017 with the enrollment of all participants to the Center of Expertise on Gender Dysphoria of the Amsterdam UMC, Vrije Universiteit Amsterdam, The Netherlands, demonstrated that the death risk from suicide was definitely higher in the transgender population than the general population, suicide deaths can occur at all steps of transitioning, but the suicide death risk was stable over time [19].

Notably there are differences in the perception of negative impact and maltreatment among transgender populations. Descriptive studies show that there is a discrepancy among binary vs. non-binary transgender populations to experiencing negative healthcare experiences (39% of binary vs. 24% of non-binary people in USTS). Differences in withholding care due to discrimination were lower in non-binary participants (20%) vs. binary participants (27%) [5].

## 7. Risk of HIV and Other Sexually Transmitted Infections

The current literature on transgender populations has increasingly concentrated on the risk of HIV infection and other sexually transmitted infections (STIs), particularly among transgender females [14]. The youth AMAB transgender population is one of the most impacted groups by the HIV epidemic in the world. Condom-less sex, and more importantly receptive anal sex, association with other sexually transmitted diseases, and the shared use of needles for hormone therapy are some of the factors making them at high risk of acquiring HIV [42]. Recently published data on sexual behavior and sexually transmitted infections (STI) among transgender population suggest the increasing prevalence of STI among trans AFAB individuals, particularly males having sex with males [43].

There are disparities in the level of medical care among transgender women affected by HIV compared to those non-transgender populations who are affected by HIV. This is influenced by many factors. Lack of proper employment, low level of literacy, lower compliance to the antiretroviral therapies, and stigma were some of the observed factors [44].

Various studies have illustrated the different barriers at multiple levels that transgender people face when dealing with HIV related care. Modifications need to be executed at the clinic/institutional stage, in addition to at country-wide stage, in order to maximize the health of young transgender populations with regard to access, availability, and continuity of medical care [14].

## 8. Reproduction

The results of several studies show that many transgender people have a desire for parenting biological children [44]. One study has shown that 54% of transmen had fertility desires at the time of first interview, whereas 37.5% had already desired freezing their

oocytes if they had previously been provided with that facility [45]. Cryopreservation of oocytes and oocyte banking are options for transgender men who have not been subjected to oophorectomy yet, even though vaginal examinations may be troublesome for them. Transgender females can have the option of sperm banking or sperm extraction from the testis [46].

Gestational pregnancy is not possible after a hysterectomy in transgender males; 60 pregnancies were documented in a study of 197 transgender males [11].

All transgender people who engage in sexual activities with existing gonads should have adequate contraception in order to prevent unwanted pregnancies [47]. Many studies have shown higher pregnancy rates in adolescent transgender population compared with their heterosexual population, which demonstrates the spectrum of sexual health risks and vulnerability of young transgender population [48].

Uterus transplantation may be an option in the future for transgender women who desire to have a child. The ethical aspect is governed by justice and equality [49]. So far, there have been 42 uterus transplantations attempted world-wide, with 12 live births [50]. Despite many limiting factors related to anatomical, hormonal, and obstetric concerns, this will be great achievement in transgender care in the near future.

Furthermore many transgender people have barriers to contraceptive access [51]. A recent study showed the significant difficulties they encounter during sexual relations due to body dissatisfaction, and some transgender people tend to ignore sexuality as a significant part of their lives, even though they used to engage in it [52]. There are misconceptions regarding the effects of testosterone on fertility among AFAB transgender people, who consider it as an effective means of contraception [53].

## 9. What Is Known about Cardiovascular Health among Transgender Populations?

Sex steroid receptors have a significant role in the modulation of cardiovascular risk in non-transgender individuals. Sex steroids may have a role in blood pressure control. On the other hand, it is believed that the hormone therapy used among this population may increase cardiovascular risk in transgender individuals. However, there are still gaps in what is known about cardiovascular outcomes of these transgender populations [54].

The first observational study on hormonal therapy and cardiovascular outcome was published in 1989, demonstrating no difference among crude incidence of myocardial infarction (MI) or mortality over a 4-year follow-up [55].

In transgender people receiving hormone therapy, testosterone has an adverse impact on lipids and lipoprotein concentrations. However, estrogen plus cyproterone acetate showed more favorable lipid parameters [56]. Therefore more favorable alterations in lipid profile were observed in AFAB transgender individuals.

A meta-analysis by Maraka et al. studied the changes in lipids during hormone therapy in transgender individuals. Reductions in high-density lipoprotein-cholesterol (HDL-C) and an increase in low-density lipoprotein-cholesterol (LDL-C) and triglycerides were observed AFAB transgender people, whereas estrogen therapy enhanced the triglycerides in AMAB transgender people. More studies are needed, as this meta-analysis consisted of few, low-quality studies [57].

A recent publication by Banks et al., which included 57-month follow up of 470 transgender people who were started on hormone therapy, stated a sustained elevation of systolic blood pressure, by 2.6 mmHg, among transgender men, and a drop of systolic blood pressure, by 4 mmHg, among transgender women without alterations in diastolic pressure. While, 25% of transgender women had a  $\geq 5$  mmHg rise in systolic or diastolic blood pressure. This is one of the largest and longest observational studies currently available demonstrating the fluctuations in blood pressure after 4 months from initiating hormonal therapy. In the background of all these data, the exact BP target among transgender people is yet to be determined after well-conducted randomized controlled studies [58].

The Behavioral Risk Factor Surveillance System (BRFSS) provides many data on cardiovascular outcomes in transgender people. This included an analysis of myocardial

infarction (MI) among transgender individuals (2014–2017), showing a four-fold increased risk of MI over age matched non-transgender males, which was not seen among transgender women. However, this study had several limitations, such as recall bias and not paying of attention to the effects of hormonal therapy [59]. Contradicting these results, a large observational analysis with a younger cohort by Getahun et al. did not show a significant rise in MI in transgender males [60]. Overall, the available data suggest a higher risk of ischaemic events and cardiovascular risk among transgender populations compared to age-matched non-transgender populations [55].

Although the data remains controversial, the overall analysis of data says that the transgender population is at higher risk of ischemic stroke than an age-matched non-transgender population, particularly related to long-term hormonal treatment with estrogen [61,62]. Apart from the traditional stroke risk factors, these patients had alternative risk factors, such as stimulant use (63%), tobacco use (63%), hepatitis C (63%), human immunodeficiency virus (38%), and prior stroke or transient ischemic attack (25%), which were increased with concomitant estrogen treatment [63].

Other prevalent cardiovascular risk factors among transgender populations include the presence of mental health disorders, substance abuse, smoking, and high prevalence of HIV, which are aggravated by the presence of disparities among health care provision [64].

Venous thromboembolism was a concern among trans AMAB people, which is no longer a major issue, since ethinyl estradiol is no longer recommended. Even though early observational studies showed a 20- to 45-fold higher rate of venous thromboembolism (VTE) in a hormonally treated transgender population [65], current data suggest that VTE is a rare occurrence among hormone therapy receivers, where general thrombophilic screening is not advised [66].

Since lesbian, gay, bisexual, transgender, and queer or questioning (LGBTQ) adults encounter multiple cardiovascular risk factors that are different from their non-transgender heterosexual individuals, the American Heart Association made a scientific statement, in order to identify the gaps between what is known and unknown about cardiovascular outcomes in transgender people, together with the aim of improving scientific studies and care on cardiovascular outcomes among LGBTQ people [67].

## 10. Continuous Medical Surveillance and Support

Transgender males and females need continuous medical surveillance, as they are vulnerable to multiple adverse effects of hormone therapy, which is the same risk as in non-transgender populations receiving hormone therapy.

Breast cancer is a risk in transgender females, after prolonged exposure to estrogen. However, the association of above two factors is controversial, where a cohort of AMAB transgender patients in The Netherlands (1997) documented that hormone treatment does not affect all-cause mortality after 30-year follow-up and incidence of breast carcinoma was the same as the non-transgender male population [68]. Another study from The Netherlands indicated an increased risk of breast carcinoma in transgender females compared to cisgender males, but a lower risk in transgender males than cisgender females, and it was agreed that screening programs for breast cancer in cisgender are acceptable for transgender populations on hormone treatment [69].

Transgender males need a pap smear for cervical cancer screening. Transgender females do not require cervical cancer screening after vaginoplasty, since they do not have a cervix [51]. Theoretically, the prostate gland undergoes atrophy after hormone therapy. Therefore, only a few people have been documented to have prostate cancer in this population [55].

Venous thromboembolism (VTE) is another problem with estrogen therapy, as well as anti-androgen cyproterone acetate which is augmented by smoking. Some studies say that there is a 20-times higher risk of VTE. Transdermal estrogen with a lower risk of VTE is a better option when the patient is not happy to stop smoking [68].



Continuous observation for risk behaviors of sexually transmitted infection (STIs) or HIV is vital. The impact of hormone therapy on cardiovascular (CV) health has not been established. Lifestyle interventions, weight reduction, smoking cessation, avoiding physical inactivity, and controlling blood pressure and blood sugar are recommended, as in general population.

Are they being maltreated by the society and health care providers?

There is sufficient evidence that transgender people are maltreated by both the general public and health care providers. This group of people need medical advice and treatment for the multiple underlying problems that they encounter. High risk of sexually transmitted infections particularly HIV, high prevalence of psychological issues, and certain habits such as smoking and excess alcohol use, increased risk of cardiovascular diseases, requirement for hormonal therapies, and genital reconstructive surgeries are some of the leading reasons for contacting health care providers.

Transgender people encounter many health disparities during their contact with health care systems [69]. Actual or perceived stigma is a major barrier during health care, which will negatively affect the willingness to seek medical advice [70]. Discrimination or the being treated in ways not in keeping with their gender identity may lead to gender dysphoria; and care should be taken to provide health care in a way that alleviates discrimination and dysphoria. Many studies have been undertaken to evaluate the barriers to health care among transgender populations, where most of the data are from self-reporting by transgender individuals themselves. One of the largest studies was the National Transgender Discrimination Survey (NTDS) that was done from September 2008 to March 2009 [71,72].

According to this study, there is real discrimination when dealing with the general public. There were high rates of harassment (78%), physical assault (35%), and sexual violence (12%) at school; severe harassment was seen in 15%, which was enough to leave the school; 19% reported having direct housing discrimination, and one-fifth reported homelessness at some point in their journey, which further increases their vulnerability to mistreatment and abuse, leading to negative health outcomes as a vicious cycle. Moreover, 53% had verbal harassment in public and 22% reported unequal treatment at government sector facilities; 22% had experienced harassment by police, with 16% reporting physical and sexual assault in jail/prison; 57% had family rejection, even though 43% had fairly good connections with their families. Loss of job due to bias, school bullying, physical and sexual assault due to bias, homelessness, loss of relationships with partner or children, and less access to medical services due to bias were some unfortunate instances of stigma and bias. Refused medical care due to their transgender behavior was reported among 19%, while 50% reported the need to teach their doctor about transgender care, which reflected the fact of lack of knowledge among health care providers on transgender issues [73]. Overall, 28% had postponed medical care due to discrimination [71].

In addition to barriers created by the health care providers, there are barriers created by the health care infrastructure, such as by the structure of clinics and medical data record systems, which should be addressed by relevant measures, in order to minimize these problems. The knowledge of staff on the transgender population should be enhanced, in order to eliminate the above barriers. We must accept their willingness for a change and work hard to overcome the inhumanity towards the transgender population.

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