

# Effect of Sex Reassignment Surgery on Satisfaction and Quality of Life: A Systematic Review

## *Cinsiyet Değişirme Ameliyatının Memnuniyet ve Yaşam Kalitesine Etkisi: Sistemik Gözden Geçirme*

Özge Sıla Başpınar<sup>1</sup>, Cennet Şafak Öztürk<sup>1</sup>

<sup>1</sup>Aydın Adnan Menderes University, Aydın

### ABSTRACT

Gender dysphoria refers to a feeling of awkwardness or discomfort in an anatomically compatible gender role and a desire to have a body of the opposite sex, as well as the negative emotion associated with marked incompatibility between the sex they have and their experienced or expressed gender. It is known that sex reassignment surgeries cause critical changes in the lives of individuals with gender dysphoria. For this reason, it is thought that it is important to follow up individuals before and after surgery. In this systematic review study, it is aimed to examine the effect of sex reassignment surgery for individuals with gender dysphoria on body and sexual satisfaction and quality of life. The framework of the research question was created on the basis of PICOS steps. PubMed, PsycARTICLES and ULAKBİM databases were used in the literature review. The review is based on studies that measure body and sexual satisfaction and quality of life before and after sex reassignment surgery. The study was created using the preferred reporting elements for the PRISMA Statement checklist. The publication year range of the articles evaluated within the framework of inclusion and exclusion criteria among the total articles reached is 2014-2022. The studies were examined in two separate groups: studies on body and sexual satisfaction and studies on quality of life. After examining the articles, it was concluded that sex reassignment surgery increases the body and sexual satisfaction of individuals as well as enhancing the quality of life.

**Keywords:** Gender dysphoria, sex reassignment surgery, quality of life, body satisfaction

### ÖZ

Cinsiyet disforisi, anatomik olarak uyumlu cinsiyet rolünde bir gariplik veya rahatsızlık hissi ve karşı cinsten bedene sahip olma arzusu ile birlikte, sahip oldukları cinsiyet ve deneyimlenen veya ifade edilen cinsiyetleri arasındaki belirgin uyumsuzluk ile ilişkili olumsuz duyguyu ifade eder. Cinsiyet değiştirme ameliyatlarının cinsiyet disforisine sahip olan bireylerin yaşamında kritik düzeyde değişimlere yol açtığı bilinmektedir. Bu nedenle de bireylerin ameliyat öncesi ve sonrası takibinin yapılmasının önemli olduğu düşünülmektedir. Bu sistemik gözden geçirme çalışmasında cinsiyet disforisi olan bireylere yönelik uygulanan cinsiyet değiştirme ameliyatının beden ve cinsellik memnuniyetine ve yaşam kalitesine etkisinin incelenmesi amaçlanmaktadır. Araştırma sorusunun çerçevesi PICOS basamakları temelinde oluşturulmuştur. Alanyazın taramasında ise PubMed, PsycARTICLES ve ULAKBİM veri tabanları kullanılmıştır. Cinsiyet değiştirme ameliyatı öncesi ve sonrasında beden ve cinsellik memnuniyetine ve yaşam kalitesine ilişkin ölçüm alan çalışmalar temel alınmıştır. Çalışma PRISMA Bildirgesi ölçütleri için tercih edilen raporlama öğeleri kullanılarak oluşturulmuştur. Ulaşılan tüm çalışmalar içerisinde dahil etme ve dışlama kriterleri çerçevesinde değerlendirilen makalelerin yayın yılları aralığı 2014-2022'dir. Ulaşılan çalışmalar beden ve cinsellik memnuniyetine ilişkin çalışmalar ve yaşam kalitesine ilişkin çalışmalar olmak üzere iki ayrı grupta incelenmiştir. İncelenen makaleler doğrultusunda cinsiyet değiştirme ameliyatının bireylerin bedensel memnuniyeti ve cinsellik memnuniyetini arttırdığı ayrıca yaşam kalitesini artırdığı sonucuna ulaşılmıştır.

**Anahtar sözcükler:** Cinsiyet disforisi, cinsiyet değiştirme ameliyatı, yaşam kalitesi, beden memnuniyeti

## Introduction

Gender dysphoria is a term introduced by Fisk (1973) and used to express the desire to change gender of individuals who are uncomfortable with their biological sex (Zucker and Brown 2014). It refers to a sense of awkwardness or discomfort in an anatomically compatible gender role and a desire to have the body of the

opposite sex (or at least 'parts' of that body) with negative emotion attached to apparent incompatibility between their sex (often referred to as birth sex) and their experienced or expressed gender (Weissler et al. 2018).

Discussions on the definition of gender dysphoria started with the Diagnostic and Statistical Manual of Mental Disorders-IV (Fourth Edition -DSM-IV). The diagnosis name Gender Identity Disorder in DSM-IV was changed to Gender Identity Dissatisfaction with various diagnostic criteria changes in DSM-5. Changed diagnostic criteria are; (a) Distinguishing the diagnosis of gender dysphoria from sexual dysfunctions and paraphilias and placing them in a separate department; (b) change in criterion A, including the specification of the 6-month duration criterion; (c) combining criteria A and B in the DSM-IV-TR; (d) For children, desiring to be of the other sex as a necessary indicator for the diagnosis of gender dysphoria; (e) Adding more detailed diagnostic criteria for adolescents and adults than the DSM-IV-TR and adding criteria for children; (f) Eliminating the determinant of sexual attraction for adolescents/adults; (g) including a subtype associated with the presence (or absence) of a sex developmental disorder; and (h) including a "post-transition" descriptor (for adolescents/adults) (APA 2013). The inclusion of the concept of "post-transition" was created by the observation that many individuals no longer meet the criteria for gender dysphoria after transition, however they need ongoing hormone therapy, further surgery, occasional psychotherapy or counseling sessions to assess the desired sex and social consequences of the transition (Zucker et al. Brown 2014).

When it comes to treatment methods; approach in children mostly includes psychosocial support (Zucker and Brown 2014). In adolescents, suppressed hormone therapy is administered in addition to psychosocial treatment (Becker et al. 2018, Becker-Hably et al., 2021). Whereas in adults, hormone therapy is followed by sex reassignment surgery (Beckwith et al. 2017, Weissler et al., 2018). Treatment guidelines for adults have long adhered to The World Professional Association for Transgender Health (WPATH ) Guidelines for Psychological Practice with Transgender and Gender Nonconforming Persons, which do not require a diagnosis for medical intervention but consider it sufficient for gender dysphoria to be well-documented and persistent. According to the WPATH booklet of mental health professionals: (a) To diagnose gender dysphoria and to inform the person about treatment options, (b) To evaluate comorbidities, (c) To determine whether the person is ready for interventions and to prepare the person for the process, (d) To prepare and direct the person for hormone therapy and surgical intervention when appropriate conditions occur, (e) To provide psychological support to the person and, if necessary, to their family and relatives regarding the treatment process, coming out process and expectations (APA 2015).

Sex reassignment surgeries involve a series of complex interventions, including facial and genital. Vaginoplasty, penectomy and phalloplasty can fall under genital interventions whereas rhinoplasty, jaw restructuring and brow lift could be exemplified as facial interventions (Weissler et al. 2018, Levy et al. 2019, Sayegh et al. 2019). It has been reported that after sex reassignment surgeries performed on individuals with gender dysphoria, individuals' physical, sexual and mental satisfaction increase (Weyers et al. 2009, Wierckx et al. 2011). When focusing on the physical, sexual and mental levels, individuals with gender dysphoria stated that their sexual life satisfaction (Sigurjónsson et al. 2016, van de Grift et al. 2019;) and their quality of life increased (Paudrier et al. 2019) after their surgery. In addition, they stated that after the surgery they were satisfied with their physical appearance (van de Grift et al. 2014, Becker et al., 2018), and that they received positive feedback on their personal relationships and family support (Yıldızhan Özata et al. 2018). On the other hand, another study found that individuals with gender dysphoria after sex reassignment had a significantly higher risk of death, suicidal behavior and psychiatric morbidity compared to the general population (Dhejne et al. 2011). In another study, the causes and rates of complications in 240 surgeries were examined. Complications were observed due to cosmesis and wound dehiscence, and the rate of reoperation was 7.9% (Levy et al. 2019). The reasons for individuals with gender dysphoria to seek therapy include; regretting their transition or transitional surgery, inability to face their regrets and decide how to move on with their lives as well as not knowing how to deal with the ongoing dysphoria related to functional limitations when they have major complications or difficult surgeries (Zucker and Brown 2014).

Although it is known that individuals with gender dysphoria have an increase in their body and sexual satisfaction levels and quality of life after sex reassignment surgeries, it is also known that they experience complications, difficult surgery processes, regret and an increase in death rates. Therefore, since sex reassignment surgeries lead to critical changes in the lives of individuals, it is important to follow up the individuals thoroughly before and after the surgery. In this context, the aim of the study is to systematically review the pre- and post-operative satisfaction levels of individuals with gender dysphoria and to discuss the benefits of sex reassignment surgeries on the basis of mental health.

## Method

In this study, the effects of sex reassignment surgery on individuals with gender dysphoria on their physical and sexual satisfaction and quality of life were examined by comparing preoperative and postoperative measurements. The framework of the research question was formed with PICOS framework (Methley et al. 2009). Population (P), the type of intervention (I), how the measurements were compared (C), the outcome of the studies (O), and the study design (S) were determined in forming the research question within the scope of PICOS framework. Information on forming the research question is shown in the table (Table 1). Only research articles were included in this study, and review articles were used in the introduction and discussion sections. The study was created using the preferred reporting items for the PRISMA Statement criteria (Liberati et al. 2009). The written language of the articles evaluated after scanning PubMed, PsycINFO and the Turkish database Ulakbim are English and Turkish. The last date of scanning is July 2022. Keywords used in the scan are: (1) gender dysphoria and reassignment/affirming surgery, (2) gender dysphoria and mental health, (3) sex reassignment/affirming surgery and mental health.

P: Participant	Individuals with gender dysphoria
I: Intervention	Sex reassignment (confirmation) surgery
C: Comparison	Pre- and post-operative measurements were taken in the same participant group
O: Outcomes	Body, sexual satisfaction and quality of life
S: Study design	A single-group pretest-posttest design

Among the articles accessed, articles in which sex reassignment surgery was used as an intervention, pre- and post-operative measurements were taken in the same participant group, and physical, sexual satisfaction and quality of life measurements were included in the study. Studies with samples in which there was no gender dysphoria and sex reassignment surgery was not considered as the only intervention were excluded from the study. In addition, studies that did not take measurements of mood or measurements from the same participants before and after sex reassignment surgery, which were determined as comparison criteria, were evaluated among the exclusion criteria. In addition, studies with a systematic review or meta-analysis and studies for which the full text could not be accessed were not included. As a result, when repetitive studies, including exclusion criteria, systematic review and meta-analysis were excluded from the 1016 studies reached, the remaining 10 studies were included in the study.

## Results

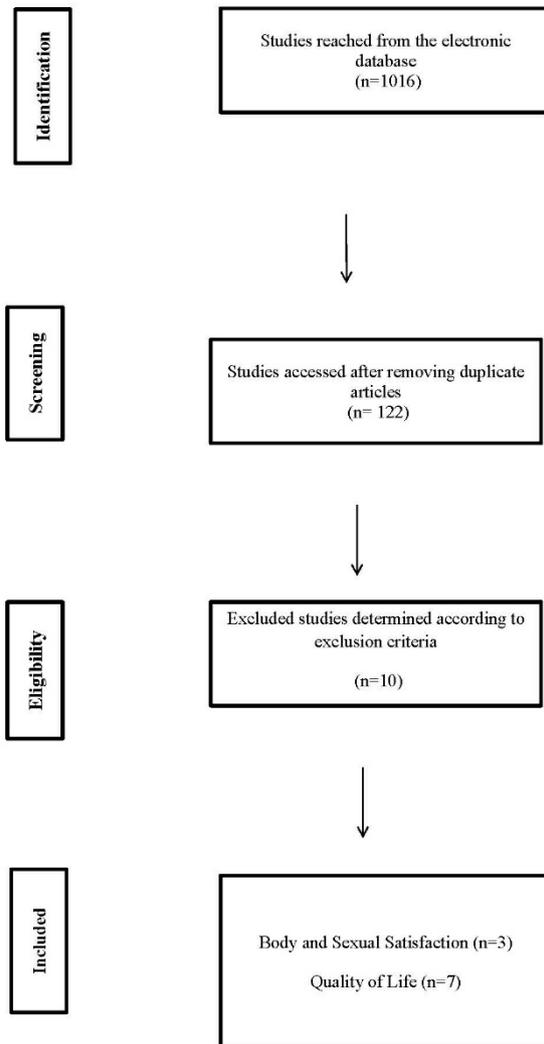
In the systematic review study, the reporting guidelines of the PRISMA framework were followed as much as possible (Liberati et al. 2009), and a PRISMA flowchart containing the studies received was presented (Figure 1). Of the 1016 studies reached, 696 were obtained from the PubMed database, 158 from the PsycARTICLES database, and 152 from the ULAKBİM database. After removing the repeated articles from the accessed studies, it was observed that there were 122 studies covering sex reassignment surgery and mental health. As stated in the exclusion criteria; studies with samples in which there was no gender dysphoria and in which sex reassignment surgery was not used as a single intervention, studies that did not measure mood and studies that did not take measurements before and after sex reassignment surgery from the same participants determined as comparison criteria were excluded from this systematic review; resulting in 10 remaining studies to be included. The research design used in the studies is a single-group pretest-posttest design.

Although there was no study with a control group for the included studies, attention was paid to the randomized selection of participants, the same intervention, and the comparison of before and after sex reassignment surgery which was determined as a single intervention. As a result, the publication years of the articles reached within the framework of inclusion and exclusion criteria were between 2014-2022. Studies were conducted in 8 different countries; Denmark, America, Iran, Netherlands, Germany, Switzerland, Brazil, Thailand. All available studies are in English. The research design used in the studies reached is a single-group pretest-posttest design, while the statistics used are ANOVA and t-test that are based on the difference between means, and regression analyzes that are based on measuring the relationship between variables.

## Overall Characteristics of Studies

Although quantitative measurements generally take place in the studies, in the study of van de Grift et al. (2017), it was seen that semi-structured interviews of the psychologist included in the study were used. In addition, when the number of participants was evaluated, it was observed that the number of participants was generally

low, except for the study conducted by Simonsen et al. (2015) with 104 participants. The studies were examined in two different groups: studies on body and sexual satisfaction and studies on quality of life. Summary of the studies on body and sexual satisfaction is presented in Table 2, and summary information of studies on quality of life is presented in Table 3.



**Figure 1. Flowchart of the study**

### *Research on Body and Sexual Satisfaction*

There are 3 studies in which measurements of body satisfaction and sexual satisfaction were taken. In all of the evaluated studies, it was observed that the satisfaction levels of individuals with gender dysphoria increased after sex reassignment surgery. (van de Grift et al. 2017, Agarwal et al. 2018, Zavlin et al. 2018).

In the study conducted by van de Grift et al. (2017) with 21 female-born participants who applied to VU University Medical Center in the Netherlands between 2011 and 2015 for sex reassignment surgery, the participants were observed in the hospital for 5-7 days before and after the operation. They were evaluated at the third week and 3, 6, and 12 months after hospital discharge. Evaluations were made at outpatient clinics by urologists, plastic surgeons and psychologists. Data were obtained through scales used to assess participants' motivations and psychosexual outcomes, and through semi-structured interviews by the psychologist. Considering the findings of the study; although problems emerged after the surgery of the participants, the strongest motivations for penile surgery were identified as verifying the identity of the person, enabling sexual intercourse and being able to use the toilet while standing. Another post-operative finding is that the participants reported being more sexually active (masturbating and with a partner) and using their genitals more frequently during sexual intercourse than before surgery. In other words, it was found that the participants were

more satisfied with their bodies and sexual lives after the sex reassignment surgery compared to before (van de Grift et al. 2017).

<b>Table 2. Research on body and sexual satisfaction</b>				
<b>Study</b>	<b>Participants</b>	<b>Method</b>	<b>Instruments</b>	<b>Results</b>
van de Grift et al., 2017	21 female-born participants who applied to VU University Medical Center in the Netherlands between 2011 and 2015 for sex reassignment surgery	The participants were observed in the hospital for 5-7 days before and after the operation. They were evaluated at the third week and 3, 6, and 12 months after hospital discharge. Evaluations were made at outpatient clinics by urologists, plastic surgeons and psychologists. Data were obtained through scales used to assess participants' motivations and psychosexual outcomes, and through semi-structured interviews by the psychologist.	-Satisfaction With Life Scale (SWLS), -Body Image Scale, Rosenberg Self-Esteem Scale, -The Hospital Anxiety and Depression Scale	-Although problems emerged after the surgery of the participants, the strongest motivations for penile surgery were identified as verifying the identity of the person, enabling sexual intercourse and being able to use the toilet while standing. -Another post-operative finding is that the participants reported being more sexually active (masturbating and with a partner) and using their genitals more frequently during sexual intercourse than before surgery.
Agarwal et al., 2018	42 participants who were female at birth and had chest wall reconstruction performed by a single surgeon in the United States between April 2015 and June 2016 as part of female-to-male transition surgery	-Participants in the study were contacted via e-mail using the REDCap database program, -The survey scales were sent twice; one to two weeks before the surgery and six months after the surgery.	BREAST-Q- Breast Reduction/Mastopexy Module, -Body Uneasiness Test (BUT-A)	- From the BREAST-Q, significant improvements were observed postoperatively compared to preoperatively in the areas of breast satisfaction, psychosocial well-being, sexual satisfaction and physical well-being. - From the BUT-A scale, significant improvement in body image, avoidance, compulsive self-monitoring, and depersonalization was observed postoperatively compared to preoperatively.
Zavlin et al., 2018	40 male birth sex participants who applied to a surgery clinic in Germany between 2012 and 2014 for sex reassignment surgery.	-Participants were divided into 2 groups: the early onset group (17 years and below the age of onset of gender dysphoria) and the late onset group (18 years and above the age of onset of gender dysphoria). - The participants were operated for the second time 6 months after the operation for reasons such as scarring and breast enlargement. Demographic data, partner history, quality of life parameters, sexual orientation, and sexual history were compared with data obtained from participants before and 1 year after surgery.	Questions on Life Satisfaction and Body Image (FLZM), Freiburg Personality Inventory, Rosenberg Self-Esteem Scale, Patient Health Questionnaire	- It was found that the early-onset group had earlier sex reassignment surgery compared to the late-onset group, but no difference was observed between the two groups in terms of other demographic data. - It as observed that depressive symptoms decreased in both groups after operation compared to the preoperative period. - Considering the sexual partner preferences, it was observed that the early-onset group preferred men more, while the late-onset group preferred both men and women. - Although there was no difference between the two groups in terms of body image, in general, it was found that their satisfaction with their body image increased after surgery.

The study of Agarwal et al. (2018) consists of 42 participants who were female at birth and had chest wall reconstruction performed by a single surgeon in the United States between April 2015 and June 2016 as part of female-to-male transition surgery. Participants in the study were contacted via e-mail using the REDCap database program, and the survey scales were sent twice; one to two weeks before the surgery and six months after the surgery. In the study, significant improvements were observed in breast satisfaction, psychosocial well-being, sexual satisfaction and physical well-being after surgery compared to preoperatively. In addition, significant improvement was observed postoperatively compared to preoperatively in the areas of body image, avoidance, compulsive body-checking, and depersonalization. Therefore, when these results are interpreted, it can be stated that the body satisfaction and sexual satisfaction of the participants increased after the surgery, and the mental well-being of the participants also increased.

Zavlin et al. (2018) conducted a highly comprehensive study. The study included 40 male birth sex participants who applied to a surgery clinic in Germany between 2012 and 2014 for sex reassignment surgery. Participants were divided into 2 groups: the early onset group (17 years and below the age of onset of gender dysphoria) and the late onset group (18 years and above the age of onset of gender dysphoria). The majority of the participants were operated for the second time 6 months after the operation for reasons such as scarring and breast enlargement. Demographic data, partner history, quality of life parameters, sexual orientation, and sexual history were compared with data obtained from participants before and 1 year after surgery. Looking at the findings; It was found that the early-onset group had earlier sex reassignment surgery compared to the late-onset group, but no difference was observed between the two groups in terms of other demographic data. It was observed that depressive symptoms decreased in both groups after operation compared to the preoperative period. Considering the sexual partner preferences, it was observed that the early-onset group preferred men more, while the late-onset group preferred both men and women. In addition, although there was no difference between the two groups in terms of body image, in general, it was found that their satisfaction with their body image increased after surgery. Therefore, it can be said that the physical satisfaction of individuals who underwent sex reassignment surgery due to early-onset and late-onset gender dysphoria increased after the surgery.

When these three studies with participants in the Netherlands, United States and Germany were examined, it was observed that all participants were satisfied with the new aspect of their bodies (van de Grift et al. 2017, Agarwal et al. 2018, Zavlin et al. 2018). It has been observed that, in addition to physical satisfaction, having sexual life and having a more active sexual life increase the psychological well-being of the participants after sex reassignment surgery (van de Grift et al. 2017, Agarwal et al., 2018).

### ***Research on Quality of Life***

There are 7 studies in which measurements of quality of life were taken. Although studies generally show that quality of life improves after sex reassignment surgery compared to before (de Vries et al. 2014, Simonsen et al. 2015, da Silva et al. 2016, Lindqvist et al. 2016, Naeimi et al. 2019, Becker-Hebly et al. 2021, Chaovanalikit et al. 2022) there are also studies with different results (Lindqvist et al. 2016).

The study by De Vries et al. (2014) was conducted with 55 participants, 22 of whom were male at birth, and 33 of whom were female at birth, who applied to the VU University Medical Center in the Netherlands with gender dysphoria in adolescence. In the study, attitudes towards sex reassignment surgery performed after hormone therapy were evaluated. Participants were evaluated in 3 stages: before treatment (mean age 13.6), during the treatment (mean age 16.7), and at least 1 year after their sex reassignment surgery (mean age 20.7 years). Psychological functionality (gender dysphoria, body image, overall functionality, depression, anxiety, emotional and behavioral problems), objective (social and educational / professional functionality) and subjective well-being (quality of life, life and happiness satisfaction) were investigated with the help of scales. It was observed in the findings of the study that psychological functionality increased after the surgery in young adulthood after sex reassignment surgery. The increase in psychological functionality was found to be positively correlated with postoperative subjective well-being. In addition, within the scope of well-being, life and happiness satisfaction were found to be similar to their peers in the general population. In conclusion, it was observed that the clinical protocol of a multidisciplinary team consisting of mental health experts, doctors and surgeons during the suppression of puberty, hormone therapy and sex reassignment surgery increased the well-being in youth who has gender dysphoria.

In the study of Simonsen et al. (2015), a total of 104 participants who had sex reassignment surgery in Denmark between 1978 and 2010 were diagnosed by a psychiatrist according to ICD-8 / ICD-10 criteria. Of these 104 people, 56 had male-to-female transition surgery and 48 had female-to-male transition surgery. In the study,

the effect of sex reassignment surgery on psychiatric morbidity and mortality was evaluated. Psychiatric morbidity and mortality were determined through a retrospective study of 104 transgender people, using data from the Danish Psychiatric Central Research Register and the Cause of Death Register. In the study, participants who had female-to-male (FM) transition surgery had a significantly higher number of overall psychiatric diagnoses before surgery. However, although there was no significant difference in psychiatric morbidity or mortality between those who had undergone male-to-female (MF) and female-to-male (FM) transition surgery, there was a decrease in diagnoses in FM by 12 people as well as an increase in diagnoses in MF by 4 people. In this situation, it is thought that while sex reassignment surgery may reduce psychiatric morbidity for some individuals, it may increase it for others, and the individual differences play a significant role at this point. Considering the psychiatric mortality, it was shown that 10 people died after surgery. Only two deaths were due to suicide and the others were due to diseases such as cancer and heart disease.

**Table 3. Research on quality of life**

Studies	Participants	Method	Instruments	Results
de Vries et al., 2014	55 participants, 22 of whom were male at birth, and 33 of whom were female at birth, who applied to the VU University Medical Center in the Netherlands with gender dysphoria in adolescence.	Participants were evaluated in 3 stages: before treatment (mean age 13.6), during the treatment (mean age 16.7), and at least 1 year after their sex reassignment surgery (mean age 20.7 years). Psychological functionality (gender dysphoria, body image, overall functionality, depression, anxiety, emotional and behavioral problems), objective (social and educational / professional functionality) and subjective well-being (quality of life, life and happiness satisfaction) were investigated with the help of scales.	Adult Behavior Checklist (ABCL), Adult Self-Report (ASR), Beck Depression Inventory (BDI), Body Image Scale (BIS), Child Behavior Checklist (CBCL), Children's Global Assessment Scale (CGAS), Subjective Happiness Scale (SHS), Spielberger's Trait Anxiety Scale (STAI), Satisfaction With Life Scale (SWLS), Spielberger's Trait Anger Scale (TPI), Utrecht Gender Dysphoria Scale (UGDS), Youth Self-Report (YSR)	<ul style="list-style-type: none"> <li>- It was observed in the findings of the study that psychological functionality increased after the surgery in young adulthood after sex reassignment surgery.</li> <li>- The increase in psychological functionality was found to be positively correlated with postoperative subjective well-being.</li> <li>- Within the scope of well-being, life and happiness satisfaction were found to be similar to their peers in the general population. In conclusion, it was observed that the clinical protocol of a multidisciplinary team consisting of mental health experts, doctors and surgeons during the suppression of puberty, hormone therapy and sex reassignment surgery increased the well-being in youth who has gender dysphoria.</li> </ul>
Simonsen ve ark., 2015	A total of 104 participants who had sex reassignment surgery in Denmark between 1978 and 2010 were diagnosed by a psychiatrist according to ICD-8 / ICD-10 criteria.	<ul style="list-style-type: none"> <li>- Psychiatric morbidity and mortality were determined through a retrospective study of 104 transgender people, using data from the Danish Psychiatric Central Research Register and the Cause of Death Register.</li> <li>- Of these 104 people, 56 had male-to-female transition surgery and 48 had female-to-male transition surgery.</li> <li>- Morbidity rates were obtained with data from the electronic system.</li> </ul>	<ul style="list-style-type: none"> <li>International Classification of Diseases -8 (ICD-8)</li> <li>International Classification of Diseases- 10 (ICD-10)</li> </ul>	<ul style="list-style-type: none"> <li>- Participants who had female-to-male (FM) transition surgery had a significantly higher number of overall psychiatric diagnoses before surgery.</li> <li>- There was no significant difference in psychiatric morbidity or mortality between those who had undergone male-to-female (MF) and female-to-male (FM) transition surgery</li> <li>- There was a decrease in diagnoses in FM by 12 people as well as an increase in diagnoses in MF by 4 people. In this situation, it is thought that</li> </ul>

				<p>while sex reassignment surgery may reduce psychiatric morbidity for some individuals, it may increase it for others, and the individual differences play a significant role at this point.</p> <ul style="list-style-type: none"> <li>- Considering the psychiatric mortality, it was shown that 10 people died after surgery. Only two deaths were due to suicide and the others were due to diseases such as cancer and heart disease.</li> </ul>
da Silva et al., 2016	47 male birth sex participants who were diagnosed with gender identity disorder according to DSM IV criteria, who had gender dysphoria and requested sex reassignment surgery in Brazil between 2000 and 2006.	<ul style="list-style-type: none"> <li>- Participants were diagnosed with gender identity disorder according to DSM IV criteria.</li> <li>-Measurements were taken before and after 1 year of surgery to assess quality of life.</li> <li>- Some of the participants received additional interventions aimed at addressing functional or aesthetic concerns and resolving the complications of the original procedure.</li> <li>- Participants participated in supportive group therapy sessions for at least 1 hour once a week or biweekly for 2 years.</li> </ul>	World Health Organization Quality of Life Assessment (WHOQOL-100)	<ul style="list-style-type: none"> <li>- It was found that the participants showed improvement in psychological and social aspects but they had lower scores in terms of physical health and independence.</li> <li>- The psychological and social improvement in the participants who received additional intervention was lower than the participants who did not receive additional intervention.</li> <li>- It was observed that sex reassignment surgery increased the quality of life in the psychological and social areas in general.</li> </ul>
Lindqvist et al., 2016	17 male-born participants who applied to Karolinska University Hospital in Switzerland between 2003 and 2015 for sex reassignment surgery.	<ul style="list-style-type: none"> <li>- Measurements were taken from the participants in 4 different time periods (pre-operation / 1st year after operation/ 3rd year after operation/ 5th year after operation).</li> <li>-Although 190 people were reached at the beginning, the last 17 people completed all 4 measurement points due to reasons such as death, moving, being abroad, and inaccessibility.</li> </ul>	Short Form-36 Health Survey (SF-36)	<ul style="list-style-type: none"> <li>- When the preoperative and postoperative findings were compared, it was found that the quality-of-life scores were lower 5 years after the surgery, but it did not make a statistically significant difference. This decline was considered consistent with the decline in the general population.</li> <li>- As a result of the study, although quality of life scores increased in the first year after surgery compared to before, it was observed that quality of life scores decreased in the long term.</li> </ul>

Naeimi et al., 2019	42 female-born participants diagnosed with gender dysphoria who were referred to Tehran University of Medical Sciences Fertility Research Center in Iran for sex reassignment surgery from December 2014 to December 2015	-The Persian version of the 36-item Short Form Health Questionnaire (SF-36) questionnaire, including demographic characteristics such as age, level of education and marital status, education level, and family support, was presented to the participants before and 6 months after the surgery. - The data collected before and 6 months after the surgery were obtained through face-to-face interviews with the participants.	Short Form-36 Health Survey (SF-36)	- Most of the participants reported that they were single and had an acceptable level of family support. - It was observed that the quality of life of the participants, measured before and after the surgery, increased 6 months after the surgery. In addition, although an increase in emotional problems was observed, it was not statistically significant.
Becker-Hebly et al, 2021	75 adolescent and young adult participants (64 female by birth and 11 males by birth) who applied to the Gender Determination Service at the University of Hamburg-Eppendorf Medical Center, Germany, between September 2013 and March 2018. Eleven of the participants, divided into 4 groups (10 female at birth and 1 male at birth) had sex reassignment surgery.	Those participants consist of 4 groups; 21 did not receive any medical intervention, 11 received puberty suppression therapy, 32 received hormone therapy, and 11 (10 women and 1 man by birth) who have undergone sex reassignment surgery after hormone therapy. -Measurements of 11 participants in the sex reassignment surgery group were taken preoperatively and at an average of 2 years after surgery (6 months to 4 years). - A 20 Euro-voucher was given to the participants to encourage participation.	-Youth Self Report (YSR) -Adult Self Report (ASR) -The Children's Global Assessment Scale (CGAS) -Kidscreen-27 -SF-8	- In the study, statistically significant results were not obtained when the measurements before and after sex reassignment surgery were compared with the norm group, but it was observed that the quality of life increased and internalization and externalization problems decreased after the surgery compared to the preoperative period. - The post-operative psychosocial health scores of those in the sex reassignment surgery group were found to be closer to the norm group than the preoperative scores. -In clinician evaluations, it was stated that their functionality was better after surgery.
Chaovanalikit et al., 2022	37 participants with female birth sex who applied to the Thailand Lerdsin Hospital Plastic and Reconstructive Surgery Unit between January 2018 and December 2020 were included	41 participants who were diagnosed with gender dysphoria according to DSM-5 and ICD-11 by 2 psychiatrists were reached. Measurements were taken before and 6 months after the vaginoplasty surgery from 37 of the participants who completed the scale set.	-WHO Quality of Life Brief Questionnaire in Thai -Rosenberg Self-Esteem Scale -Patient Health Questionnaire-9	- It was found that the quality of life and self-esteem of the participants increased and their depressive symptoms decreased after the male-to-female transition surgery. - It was also concluded that the participants who showed mild depressive symptoms before the operation did not show depressive symptoms after the operation. -It was observed that the participants did not have suicidal tendencies before and after the operation..

				- In addition, when the sexual life satisfaction, which is the sub-dimension of the applied quality of life scale, is examined, it was observed that there was an increase in the scores after the operation in comparison with the preoperative state.
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The study conducted by da Silva et al. (2016) consisted of 47 male birth sex participants who were diagnosed with gender identity disorder according to DSM IV criteria, who had gender dysphoria and requested sex reassignment surgery in Brazil between 2000 and 2006. Measurements were taken before and after one year of surgery to assess quality of life. Some of the participants received additional interventions aimed at addressing functional or aesthetic concerns and resolving the complications of the original procedure. Participants participated in supportive group therapy sessions for at least 1 hour once a week or biweekly for 2 years. In the findings of the study, it was found that the participants showed improvement in psychological and social aspects but they had lower scores in terms of physical health and independence. On the other hand, the psychological and social improvement in the participants who received additional intervention was lower than the participants who did not receive additional intervention. As a result of the research, it was observed that sex reassignment surgery increased the quality of life in the psychological and social areas in general.

Lindqvist et al. (2016) investigated the effect of sex reassignment surgery on quality of life with 17 male-born participants who applied to Karolinska University Hospital in Switzerland between 2003 and 2015 for sex reassignment surgery. Measurements were taken from the participants in 4 different time periods (pre-operation / 1st year after operation/ 3rd year after operation/ 5th year after operation). When the preoperative and postoperative findings were compared, it was found that the quality-of-life scores were lower 5 years after the surgery, but it did not make a statistically significant difference. This decline was considered consistent with the decline in the general population. As a result of the study, although quality of life scores increased in the first year after surgery compared to before, it was observed that quality of life scores decreased in the long term.

Naeimi et al.'s (2019) study included 42 female-born participants diagnosed with gender dysphoria who were referred to Tehran University of Medical Sciences Fertility Research Center in Iran for sex reassignment surgery from December 2014 to December 2015. The data collected before and 6 months after the surgery were obtained through face-to-face interviews with the participants. Considering the findings, it was observed that the quality of life of the participants, measured before and after the surgery, increased 6 months after the surgery. In addition, although an increase in emotional problems was observed, it was not statistically significant. The research concluded that sex reassignment surgery increased the quality of life.

The study by Becker-Healy et al. (2021) was conducted with 75 adolescent and young adult participants (64 female by birth and 11 males by birth) who applied to the Gender Determination Service at the University of Hamburg-Eppendorf Medical Center, Germany, between September 2013 and March 2018. Those participants consist of 4 groups; 21 did not receive any medical intervention, 11 received puberty suppression therapy, 32 received hormone therapy, and 11 (10 women and 1 man by birth) who have undergone sex reassignment surgery after hormone therapy. Measurements of 11 participants in the sex reassignment surgery group were taken preoperatively and at an average of 2 years after surgery (6 months to 4 years). A 20 Euro-voucher was given to the participants to encourage participation. In the findings of the study, statistical evaluations were made by making comparisons to the norm group but pre- and post-operative measurements were not statistically evaluated among themselves. Although pre- and postoperative measurements were not evaluated statistically, they were included in this study because of the comparison of pre- and post-operative measurements. In the study conducted by Becker-Healy et al. (2021), statistically significant results were not obtained when the measurements before and after sex reassignment surgery were compared with the norm group, but it was observed that the quality of life increased and internalization and externalization problems decreased after the surgery compared to the preoperative period. The post-operative psychosocial health scores of those in the sex reassignment surgery group were found to be closer to the norm group than the preoperative scores. In clinician evaluations, it was stated that their functionality was better after surgery.

In the study of Chaovanalikit et al. (2022) 41 participants with female birth sex who applied to the Thailand Lerdsin Hospital Plastic and Reconstructive Surgery Unit between January 2018 and December 2020 were

included. However, the study was conducted with 37 participants because 4 participants did not complete the scale set. Measurements were taken before and 6 months after the vaginoplasty surgery from the participants who were diagnosed with gender dysphoria according to DSM-5 and ICD-11 by 2 psychiatrists. It was found that the quality of life and self-esteem of the participants increased and their depressive symptoms decreased after the male-to-female transition surgery. It was also concluded that the participants who showed mild depressive symptoms before the operation did not show depressive symptoms after the operation. It was observed that the participants did not have suicidal tendencies before and after the operation. In addition, when the sexual life satisfaction, which is the sub-dimension of the applied quality of life scale, is examined, it was observed that there was an increase in the scores after the operation in comparison with the preoperative state.

As a result, it was observed that the individuals with gender dysphoria have an increase in quality of life after sex reassignment surgery according to all studies conducted in the Netherlands, Denmark, Brazil, Switzerland, Iran, Thailand and Germany (de Vries et al. 2014, Simonsen et al. 2015, da Silva et al. et al. 2016, Lindqvist et al. 2016, Naeimi et al. 2019, Becker-Hebly et al. 2021, Chaovanalikit et al. 2022). However, in the study of Lindqvist et al. (2016), although there is an increase in the quality-of-life score in the first year of surgery, the lower quality of life scores after 5 years was not statistically significant. This suggests that the quality of life does not have a linear increase in the post-operative period.

## Discussion

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In this systematic review study, the effect of sex reassignment surgery for gender dysphoria on body and sexual satisfaction and quality of life was examined, and in this context, it was aimed to discuss the effect of sex reassignment surgery on mental health. The publication years of the articles reached within the framework of inclusion and exclusion criteria were between 2014-2022. In this direction, 8 articles were examined.

In the DSM-5, unlike the DSM-IV, with the addition of the concept of post-transition for gender dysphoria, the emphasis on the psychological and social consequences of transition after sex reassignment surgery has increased (Zucker and Brown 2014), which shows that more research regarding this area is needed. For this reason, in this systematic review study, the psychological consequences of sex reassignment surgery consisting of body and sexual satisfaction and quality of life, were discussed by including studies in which pre- and post-operative measurements were assessed from the same participant group.

When the samples were examined, it was observed that the majority of the studies were conducted with a small number of participants, except for the study conducted by Simonsen et al. (2015) in which number of participants exceeds one hundred. Considering the fact that the prevalence rates of individuals with gender dysphoria who applied to go under sex reassignment surgery in general were as low as 0.002%-0.014% (American Psychiatric Association, 2013), it was expected that the studies were conducted with a low number of participants. Moreover, the fact that the studies were conducted in 8 different countries was thought to be important in terms of evaluating the findings within the scope of different cultures.

When the 3 studies in which the measurements of body and sexual satisfaction were examined, it was seen that all the participants were satisfied with the post-operative state of their bodies (van de Grift et al. 2017, Agarwal et al. 2018, Zavlin et al. 2018). In the studies of van de Grift et al. (2017) and Agarwal et al. (2018), it was observed that with physical satisfaction, their sexual life became more active and they received more satisfaction from their sexual life. In accordance with the definition of gender dysphoria, by creating a difference in body appearance, sex reassignment surgery aims to eliminate or reduce the apparent inconsistency between the experienced and present gender identity. (Weissler et al. 2018). When evaluated on the basis of the studies included, the perceptions of people who goes under surgery also change, and it is thought that they enjoy their sexual life more. In this context, it can be interpreted that sex reassignment surgery increases body and sexual satisfaction, therefore; the mental well-being of individuals with gender dysphoria also increases.

In the study of Simonsen et al. (2015), no measurement of quality of life was taken. However, it was found that the participants had more psychiatric comorbidities before the sex reassignment surgery compared to after the surgery. When discussing the relationship between the number of psychiatric diagnoses and quality of life, it is known that as the number of diagnoses increases, the quality-of-life decreases (Masthoff et al. 2006). From this point of view, the study conducted by Simonsen et al. (2015) was also evaluated in the group of studies measuring the quality of life. Although the quality of life was observed to improve after sex reassignment surgery in all of the studies reviewed (de Vries et al. 2014, Simonsen et al. 2015, da Silva et al. 2016, Naeimi et al. 2019, Becker-Healy et al. 2021, Chaovanalikit et al. 2022), it is noteworthy that this increase is not always linear (Lindqvist et al. 2016). When the studies were examined in general, it was observed that the measurements

related to the quality of life were taken generally in the range of 6-12 months after the surgery. Only Lindqvist et al. (2016) found that although the quality of life increased linearly in the first year, it decreased in the 5th year according to the measurement they took 5 years after the surgery but this did not create a statistically significant difference. Regarding this finding, although the researchers thought that complications that may occur in the later periods after surgery may decrease the quality of life, this decrease was found to be compatible with the general population. Although the increase in quality of life is remarkable in other studies examined, the study by Lindqvist et al. (2016) is the only study evaluating the long-term. When considered in this context, it is important that individuals with post-transition gender dysphoria are followed up with a multidisciplinary evaluation process and offered treatment options that they can reach, when necessary, in order to lead a better quality of life in terms of mental health. As a result, the results of the studies conducted in 8 different countries -the observation that sex reassignment surgery increases the quality of life in individuals with gender dysphoria- suggests that sex reassignment surgery is important in increasing the quality of life of individuals even if different cultures are in question.

Although physical and sexual satisfaction and quality of life increase after the surgery, individuals with gender dysphoria are at higher risk of death and suicidal behavior compared to the general population (Dhejne et al. 2011), and it is a known fact that they have to undergo surgery more than once due to complications (Dhejne et al. 2011). Levy et al. 2019). Breidenstein et al. (2019) evaluated the long-term results by including participants 21 years after the sex reassignment surgery in their study and found that there was no difference in the quality of life in the following years, although the level of satisfaction increased immediately after the sex reassignment surgery. This is consistent with the conclusion that quality of life is variable in the long run, as seen in Lindqvist et al.'s (2016) study from the reviewed studies. Therefore, it is thought that post-operative follow-up should be as important as the decision-making process for sex reassignment surgery.

Considering the limitations of the study, inclusion criteria limited the scope of the study, and the exclusion of studies that did not take preoperative measurements resulted in a small number of studies to be evaluated. In addition, the fact that the research was conducted in English and Turkish languages resulted in the exclusion of studies in different languages. Although there are studies in Turkey that include measurements of quality of life and clinical characteristics after sex reassignment surgery (Turan et al., 2015, Yıldızhan et al. 2018), they were not included in this study due to the lack of preoperative measurements. Therefore, having no studies in Turkey can be considered as a limitation.

## Conclusion

Physical and sexual satisfaction and quality of life increase after sex reassignment surgeries. However, at this point, the relatively small number of longitudinal studies leads to the uncertainty of the long-term effect. Therefore, it is clear that there is a greater need for longitudinal studies rather than cross-sectional studies. In addition, it is thought that a longer-term evaluation will be more beneficial rather than a short-term evaluation that is done before and after surgery. In addition, a more multidisciplinary evaluation and intervention (de Brouwer et al. 2021) including psychologists, psychiatrists, plastic surgeons, urologists, obstetricians, physiotherapists were thought to be very important in the effect of sex reassignment surgery on mental health.

## References

- Agarwal CA, Scheefer MF, Wright LN, Walzer NK, Rivera A (2018) Quality of life improvement after chest wall masculinization in female-to-male transgender patients: A prospective study using the BREAST-Q and Body Uneasiness Test. *J Plast Reconstr Aesthet Surg*, 71:651-657.
- APA (2013) *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Washington DC, American Psychiatric Association.
- APA (2015) *Transgender ve Toplumsal Cinsiyete Uymayan Kişilerle Psikolojik Uygulamalar Kılavuzu* (Çev. Ed.K Başar, Z Akkuş, T Bayındır). Ankara, Ayrıntı Basımevi.
- Becker I, Auer M, Barkmann C, Fuss J, Möller B, Nieder TO et al. (2018) A cross sectional multicenter study of multidimensional body image in adolescents and adults with gender dysphoria before and after transition-related medical interventions. *Arch Sex Behav*, 47:2335-2347.
- Becker-Hebly I, Fahrenkrug S, Champion F, Richter-Appelt H, Schulte-Markwort M, Barkmann C (2021) Psychosocial health in adolescents and young adults with gender dysphoria before and after gender-affirming medical interventions: a descriptive study from the Hamburg Gender Identity Service. *Eur Child Adolesc Psychiatry*, 30:1755-1767.

- Beckwith N, Reisner SL, Zaslow S, Mayer KH, Keuroghlian AS (2017) Factors associated with gender-affirming surgery and age of hormone therapy initiation among transgender adults. *Transgend Health*, 2:156-164.
- Breidenstein A, Hess, J, Hadaschik B, Teufel M, Tagay S (2019) Psychosocial resources and quality of life in transgender women following gender-affirming surgery. *J Sex Med*, 16:1672-1680.
- Chaovanalikit T, Wirairat K, Sriswadpong P (2022) Quality of life, self-esteem, and depression among thai transgender women before and after male-to-female gender confirmation surgery: a prospective cohort observational study. *Sex Med*, 10: 100533.
- da Silva DC, Schwarz K, Fontanari AMV, Costa AB, Massuda R, Henriques AA et al. (2016) WHOQOL-100 before and after sex reassignment surgery in Brazilian male-to-female transsexual individuals. *J Sex Med*, 13:988-993.
- de Brouwer IJ, Elaut E, Becker-Hebly I, Heylens G, Nieder TO, van de Grift TC et al. (2021) aftercare needs following gender-affirming surgeries: findings from the enigi multicenter european follow-up study. *J Sex Med*, 18:1921-1932.
- de Vries AL, McGuire JK, Steensma TD, Wagenaar EC, Doreleijers TA, Cohen-Kettenis PT (2014) Young adult psychological outcome after puberty suppression and gender reassignment. *Pediatrics*, 134:696-704.
- Dhejne C, Lichtenstein P, Boman M, Johansson AL, Långström N, Landén M (2011) Long-term follow-up of transsexual persons undergoing sex reassignment surgery: cohort study in Sweden. *PloS One*, 6:e16885.
- Levy JA, Edwards DC, Cutruzzula-Dreher P, McGreen BH, Akanda S, Tarry S et al. (2019) Male-to-female gender reassignment surgery: an institutional analysis of outcomes, short-term complications, and risk factors for 240 patients undergoing penile-inversion vaginoplasty. *Urology*, 131:228-233.
- Liberati, A, Altman, DG, Tetzlaff, J, Mulrow C, Gøtzsche PC, Ioannidis JP et al. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *J Clin Epidemiol*, 62:e1-e34.
- Lindqvist EK, Sigurjonsson H, Möllermark C, Rinder J, Farnebo F, Lundgren TK (2017) Quality of life improves early after gender reassignment surgery in transgender women. *Eur J Plast Surg*, 40:223-226.
- Masthoff, ED, Trompenaars FJ, van Heck GL, Hodiamont PP, de Vries J (2006) Quality of life and psychopathology: investigations into their relationship. *Aust N Z J Psychiatry*, 40:333-340.
- Methley AM, Campbell S, Chew-Graham C, McNally R, Cheraghi-Sohi, S (2014) PICO, PICOS and SPIDER: a comparison study of specificity and sensitivity in three search tools for qualitative systematic reviews. *BMC Health Serv Res*, 14:579.
- Naeimi, S, Akhlaghdoust M, Chaichian S, Moradi Y, Zarbati N, Jafarabadi, M (2019) Quality of Life changes in Iranian patients undergoing female-to-male transsexual surgery: A prospective study. *Arch Iran Med*, 22:71-75.
- Poudrier G, Nolan IT, Cook TE, Saia W, Motosko CC, Stranix, JT et al. (2019) Assessing quality of life and patient-reported satisfaction with masculinizing top surgery: a mixed-methods descriptive survey study. *Plast Reconstr Surg*, 143:272-279.
- Sayegh F, Ludwig DC, Ascha M, Vyas K, Shakir A, Kwong JW et al. (2019). Facial masculinization surgery and its role in the treatment of gender dysphoria. *J Craniofac Surg*, 30:1339-1346.
- Sigurjónsson H, Möllermark C, Rinder J, Farnebo F, Lundgren TK (2017) Long term sensitivity and patient-reported functionality of the neoclitoris after gender reassignment surgery. *J Sex Med*, 14:269-273.
- Simonsen RK, Giraldi A, Kristensen E, Hald GM (2016) Long-term follow-up of individuals undergoing sex reassignment surgery: Psychiatric morbidity and mortality. *Nord J Psychiatry*, 70:241-247.
- Turan Ş, Poyraz CA, İnce E, Sakallı-Kani A, Emül HM, Duran A (2015). Cinsiyet değiştirme ameliyatı için psikiyatri kliniğine başvuran transeksüel bireylerin sosyodemografik ve klinik özellikleri. *Turk Psikiyatri Derg*, 26:153-160.
- van de Grift TC, Cohen-Kettenis PT, Steensma TD, de Cuypere G, Richter, Appelt H, Haraldsen IR et al. (2016) Body satisfaction and physical appearance in gender dysphoria. *Arch Sex Behav*, 45:575-585.
- van de Grift TC, Pigot GL, Boudhan S, Elfering L, Kreukels BP, Gijs LA et al. (2017) A longitudinal study of motivations before and psychosexual outcomes after genital gender-confirming surgery in transmen. *J Sex Med*, 14:1621-1628.
- Weissler JM, Chang BL, Carney MJ, Rengifo D, Messa CA, Sarwer DB et al. (2018) Gender-affirming surgery in persons with gender dysphoria. *Plastic and reconstructive surgery*, 141:388e-396e.
- Weyers S, Elaut E, de Sutter P, Gerris J, T'Sjoen G, Heylens G et al. (2009) Long-term assessment of the physical, mental, and sexual health among transsexual women. *J Sex Med*, 6:752-760.
- Wierckx K, van Caenegem E, Elaut E, Dedeker D, van de Peer, F, Toye K et al. (2011) Quality of life and sexual health after sex reassignment surgery in transsexual men. *J Sex Med*, 8:3379-3388.
- Yıldızhan BÖ, Yüksel Ş, Avayü M, Noyan H, Yıldızhan E (2018) Cinsiyet disforisi olan bireylerde cinsiyet değiştirmenin ruh sağlığı ve yaşam kalitesi üzerine etkileri. *Turk Psikiyatri Derg*, 29:11-21.
- Zavlin D, Wassersug RJ, Chegireddy V, Schaff J, Papadopulos NA (2019) Age related differences for male-to-female transgender patients undergoing gender affirming surgery. *Sex Med*, 7:86-93.
- Zucker JK, Brown N (2014) Principles and practice of sex therapy. In *Gender Dysphoria*, 5th. (Eds MY Binik, SK Hall):218-244. New York, Guilford Press.

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