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ORIGINAL ARTICLE

Psychological intervention in women with Mayer-Rokitansky-Küster-Hauser syndrome after artificial vaginoplasty: a prospective study

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Abstract

Introduction and hypothesis The negative psychological impact on women with Mayer-Rokitansky-Küster-Hauser (MRKH) syndrome is long-lasting, resulting from not only the disease itself, but also the cumbersome and painful treatment process. However, little is known about the postoperative psychological status of these patients and related interventions to improve mental health. Here, in our study, we postulated that mental disorders exist in MRKH patients with a surgical neovagina and that psychological intervention will be helpful.

Methods Thirty MRKH women who had undergone vaginoplasty were enrolled. All patients had received psychological interventions since February 2020. Depression and anxiety questionnaires prior to and 2 weeks after the final intervention were recorded.

Results Before intervention, among 30 MRKH patients after artificial vaginoplasty, the median depression score was 6.00 (25th/75th percentile, 0.00/7.00), and the median anxiety score was 4.00 (25th/75th percentile, 1.00/7.00). After intervention, women's depression ($p < 0.001$) and anxiety ($p < 0.001$) scores significantly decreased. The median depression score was 0.00 (25th/75th percentile, 0.00/3.00), and the median anxiety score was 1.00 (25th/75th percentile, 0.00/3.25). Furthermore, stratified analysis found that the depression ($p = 0.029$) and anxiety ($p = 0.019$) scores both improved when intervention was performed within 12 months postoperatively.

Conclusions MRKH patients are at a great risk of depression and anxiety problems after artificial vaginoplasty. Early psychological intervention can alleviate these symptoms. Ongoing psychological support was needed to eliminate emotional burden during MRKH treatment, and further study is sorely needed to identify its appropriate timing and method.

Keywords MRKH syndrome · Psychological support · Depression · Anxiety

Abbreviations

MRKH syndrome	Mayer-Rokitansky-Küster-Hauser syndrome
PHQ-9	Nine-item Patient Health Questionnaire
GAD-7	Seven-item Generalized Anxiety Disorder scale

Introduction

Mayer-Rokitansky-Küster-Hauser (MRKH) syndrome is a rare congenital malformation affecting 1 in 4000–5000 females [1]. The major manifestation of the disease is embryonic underdevelopment of the Mullerian duct, with resultant agenesis or atresia of the vagina, uterus or both. Primary vaginal elongation by dilation is the first-line approach in

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most patients, with surgery only for those for whom dilator therapy was unsuccessful or who prefer surgery [2].

The diagnosis of MRKH syndrome poses significant and lasting threats to patients' mental health [3, 4]. Existing data revealed that up to 75% of MRKH patients showed depressive symptoms [5], and 24.1% had moderate to severe anxiety [6]. Other symptoms include body image disturbances, feelings of incompleteness and doubts about female identity [6]. The most common psychological impacts have been associated with negative self-evaluation of femininity, neurotic personality and female sexual dysfunction [5, 6]. Current studies have proposed that the cumbersome and painful treatment process may also account for this [7, 8]. For instance, persistent vaginal dilation is important after a surgical neovagina creation to prevent significant neovaginal stenosis and contracture [2]. However, it is an uncomfortable experience, coupled with being an unpleasant reminder of being abnormal, which probably reduces patients' compliance and further aggravates of MRKH patients' mental health [7].

Although psychological interventions have been recommended in consensus by both American and Chinese studies [2], little is known about interventions that aim to improve the mental health in MRKH patients. The evidence of incidence of and associated factors causing psychological problems for MRKH patients is not well established, while postoperative data on continuous follow-up are also lacking. Therefore, in this study, we aimed to describe the postoperative depression and anxiety status of MRKH patients and investigate the efficacy of psychological support to improve their mental health. We hypothesize that postoperative mental disorders exist in MRKH patients, and psychological intervention will be helpful.

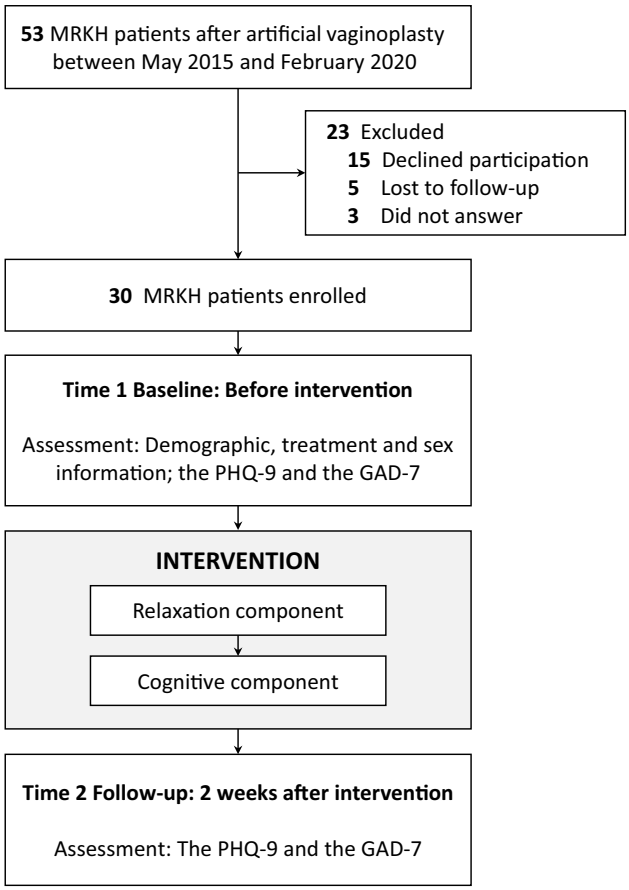

Fig. 1 Participant flow diagram and assessment schedule

Materials and methods

Participants

Patient recruitment occurred during a 4-month period from October 2019 to February 2020. Figure 1 shows the participant flow in the study. A total of 53 eligible patients had an artificial vaginoplasty for MRKH syndrome. Of these, 15 declined participation, 5 were lost to follow-up, and 3 did not answer. The final sample consisted of 30 women (56.6%) who had finished artificial vaginoplasty for MRKH syndrome at the Obstetrics and Gynecology Hospital of Fudan University between May 2015 and February 2020. Eligible patients were those women (< 50 years old) who were able to read and complete questionnaires. Patients reporting preexisting psychiatric disorders (e.g., schizophrenia, depression, personality disorders, etc.) or another comorbid disease that could interfere with study procedures were excluded.

Procedure and materials

Patients meeting the eligibility criteria received an invitation describing the study with contact information for the researcher (X.H.L). Interested patients were given further information when they contacted the researcher, and those who agreed to participate signed the informed consent form. Each participant then received instructions on the timing and method of online data collection.

The study protocol and assessment schedule for the study are shown in Fig. 1. The baseline assessment (Time 1: T1) occurred before intervention. The assessment comprised demographic, treatment and sex information as well as psychological questionnaires. The follow-up assessment (Time 2: T2) occurred 2 weeks after the end of the intervention with a psychological questionnaire. The assessments and intervention protocol are described here.

Time 1

The Time 1 (T1) baseline assessment took place before the intervention. Information on patient demographics (e.g., age, residence, highest education, income), treatment (e.g., age at surgery, date of surgery, surgical materials, dilation frequency) and sexual activity (e.g., whether the patient had sex after surgery, time from onset of surgery to sexual intercourse, sexual frequency in the last 3 months) was collected, followed by completion of depression and anxiety questionnaires.

The Nine-item Patient Health Questionnaire (PHQ-9) was used to assess depression status [9]. This is a widely utilized screening tool for depression and depressive symptoms in clinical settings. Eight items of the PHQ-9 evaluate how often the patients have suffered from depressive symptoms over the past 2 weeks, and the last item is on the frequency of thoughts about hurting themselves during the past 2 weeks. The response options are on a 4-point Likert scale (0 = not at all, 1 = several days, 2 = more than half of the days and 3 = nearly every day), with higher scores indicating higher levels of depressive symptoms. A score ≥ 5 is indicative of having depressive symptoms; 5–14 represents mild to moderate depression, and 15–27 represents moderate to severe depression.

The Seven-item Generalized Anxiety Disorder Scale (GAD-7) was used to assess anxiety status [10]. It includes seven questions about the level of anxiety over the past 2 weeks based on a 4-point Likert scale (0 = not at all, 1 = several days, 2 = over half of the days, 3 = nearly every day). The total sum scores range from 0 to 21: 0–4 indicates no anxiety, 5–9 represents mild anxiety, 10–14 represents moderate anxiety, and 15–21 represents severe anxiety.

Intervention protocol: Due to the COVID-19 pandemic, this psychological intervention was conducted by telephone. Immediately after enrollment, participants were mailed a self-made instructional video for vaginal dilation and a manual for self-regulation that covered five topics: daily routine, diet and exercise, positive thinking, self-assurance and family support. The psychological intervention comprised a relaxation and a cognitive component to help women adapt to wearing the postoperative dilator and psychological transformation.

The relaxation component refers to relaxation training for the dilator-wearing process. This one-time component was provided by a gynecological clinician (Y.Z) and lasted 45 min. For the preparation phase, participants were instructed to create a comfortable space (e.g., soft music or dim light) that would be helpful to relieve tension during the next phase. Later, participants received instructions on how to carry out mini-relaxation techniques that were specifically designed to reduce anxiety in the moment, for example, when feelings of tension and nervousness might occur before and during dilator insertion procedures. These mini-relaxation techniques consisted of diaphragmatic breathing and progressive muscle relaxation; breathing from 6 down to 0, one number for each breath; tensing a group of muscles while breathing in and relaxing them while breathing out; and working muscle groups in a certain order. For the dilation phase, patients were taught attention shifting, which helps redirect the mind away from uncomfortable emotions.

The cognitive component of the intervention was provided by professional psychological counselors (X.W). This component consists of ten telephone counseling sessions designed to help participants establish correct cognition and social support systems. Each counseling session focuses on a different MRKH-related topic, lasting 25–40 min. The intervention starts with the central life event related to MRKH. Follow-up intervention moves on to female identity, sex and marital relationships, and social relationships. For participants < 18 years old, their parents were invited to join in the counseling. Conservation skills include: (1) supportive listening, (2) problem management, offering support when dealing with general emotional problems, and (3) enhancing relaxation skills with awareness of breathing, meditation and stress management.

Time 2

The Time 2 (T2) follow-up assessment occurred 2 weeks after the end of the intervention. Participants completed the PHQ-9 and the GAD-7, as described earlier.

Statistical analysis

IBM® SPSS® 25.0 statistical package (SPSS Inc., Chicago, IL) was used for statistical analysis. Comparisons between depression and anxiety before and after intervention were made using the Wilcoxon rank sum test for continuous data and the McNemar test for categorical variables. $P < 0.05$ was considered statistically significant.

Ethics

The Ethics Committee of the Obstetrics and Gynecology Hospital of Fudan University approved the present study (2019–136-x).

Table 1 Demographic, treatment and sex information for MRKH patients after vaginoplasty

Demographic, treatment and sex information	MRKH patients ($n=30$) Mean (SD)/*N* (%)
Age (years old)	25.7 (6.9)
Highest education	
Junior high school degree or below	8 (26.7)
High school degree	2 (6.7)
Bachelor's degree	14 (56.7)
Master's degree	5 (16.7)
Doctoral degree	1 (3.3)
Mother's highest education	
Junior high school degree or below	15 (50.0)
High school degree	7 (23.3)
Bachelor's degree	8 (26.7)
Residence	
Rural	15 (50.0)
City	15 (50.0)
Only child	
No	20 (66.7)
Yes	10 (33.3)
Family income (yuan/year)	
30,000–80,000	5 (16.7)
80,000–150,000	4 (13.3)
150,000–300,000	10 (33.3)
300,000–500,000	6 (20.0)
> 500,000	5 (16.7)
Age at surgery (years old)	23.2 (5.6)
Material	
Peritoneal	1 (3.3)
Biological mesh	18 (60.0)
Anti-adhesion film	7 (23.3)
No material was used	4 (13.3)
Year of surgery	
2015	7 (23.3)
2016	5 (16.7)
2017	2 (6.7)
2018	3 (10.0)
2019	6 (20.0)
2020	7 (23.3)
Dilation frequency per week (days)	
0–12 months after surgery	7.0 (0)
13–36 months after surgery	4.7 (1.9)
37–60 months after surgery	0.8 (2.0)
Whether have had sex since surgery	
No	14 (46.7)
Yes	16 (53.3)
Time from onset of surgery to sexual intercourse (months)[a, b]	12.1 (13.8)
Sexual frequency[b]	
> 3 times/month	8 (26.7)
2–3 times/month	4 (13.3)
1–2 times/month	1 (3.3)
< 1 time/month	14 (46.7)
Unknown	3 (10.0)

[a]Interval between surgery and postoperative onset of sexual intercourse

[b]Patients who had not had sex were excluded

Abbreviations: MRKH syndrome: Mayer-Rokitansky-Küster-Hauser syndrome

Results

Demographics, treatment and sex information on women with MRKH syndrome after artificial vaginoplasty

Table 1 lists demographic, treatment and sex information. Participants mostly had bachelor's degrees or above ($n=20$; 66.7%) with a mean age of 25.7 (SD, 6.9) years and were not the only child in the family ($n=20$; 66.7%). The surgery was performed at the mean age of 23.2 (SD, 5.6) years, and the most common material used in surgery was biological mesh ($n=18$; 60.0%). At 0–12 months, 13–36 months and 37–60 months after surgery, the dilator-wearing frequency was 7.0 (SD, 0), 4.7 (SD, 1.9) and 0.8 (SD, 0.8) days per week, respectively.

Sixteen (53.5%) participants had had sex postoperatively. Among them, the average time from onset of surgery to sexual intercourse was 12.1 (SD, 13.8) months. Most of them had sex more than three times a month ($n=8$; 26.7%).

Table 2 Comparison of depression and anxiety scores of patients with MRKH syndrome before and after intervention

	Depression score[a]	*P*-value	Anxiety score [b]	*P*-value
	Median (25th, 75th percentile)		Median (25th, 75th percentile)	
Pre-intervention	6.00 (0.00, 7.00)	0.000*	4.00 (1.00, 7.00)	0.000*
Post-intervention	0.00 (0.00, 3.00)		1.00 (0.00, 3.25)	

[a]The depression score was based on the Nine-item Patient Health Questionnaire (PHQ-9)

[b]The anxiety score was based on the Seven-item Generalized Anxiety Disorder (GAD-7) scale

Abbreviations: MRKH syndrome: Mayer-Rokitansky-Küster-Hauser syndrome

Depression and anxiety status before the intervention

As presented in Table 2, among 30 MRKH patients after artificial vaginoplasty, the median depression score was 6.00 (25th/75th percentile, 0.00/7.00), and the median anxiety score was 4.00 (25th/75th percentile, 1.00/7.00). Table 4 presents the depression and anxiety scores at different stages postoperatively (0–12, 13–36 and 37–60 months). The median depression score was 6.00 (25th/75th percentile, 1.50/7.00), 7.50 (25th/75th percentile, 2.25/8.75) and 3.00 (25th/75th percentile, 0.25/4.75), respectively. The median anxiety score was 6.00 (25th/75th percentile, 3.00/8.00), 5.00 (25th/75th percentile, 1.75/6.75) and 1.00 (25th/75th percentile, 0.25/5.50), respectively.

As presented in Table 3, 53.3% ($n=16$) of participants had mild to moderate depression; 40.0% ($n=12$) had mild anxiety; 3.3% ($n=1$) had moderate anxiety, and 3.3% ($n=1$) had severe anxiety.

Table 3 Comparison of depression and anxiety severity of women with MRKH syndrome before and after intervention

Depression/anxiety severity	Number of patients (%)		*P*-value
	Pre-intervention	Post-intervention	
Depression severity[a]			
No depression	14 (46.7)	27 (90.0)	0.000*
Mild to moderate depression	16 (53.3)	3 (10.0)	
Anxiety severity[b]			
No anxiety	16 (53.3)	24 (80.0)	0.005*
Mild anxiety	12 (40.0)	6 (20.0)	
Moderate anxiety	1 (3.3)	0	
Severe anxiety	1 (3.3)	0	

[a]The depression severity was based on the Nine-item Patient Health Questionnaire (PHQ-9)

[b]The anxiety score was based on the Seven-item Generalized Anxiety Disorder (GAD-7) scale

Abbreviations: MRKH syndrome: Mayer-Rokitansky-Küster-Hauser syndrome

Depression and anxiety status after the intervention

As presented in Table 2, after intervention, the depression ($p<0.001$) and anxiety ($p<0.001$) scores were significantly decreased. The median depression score was 0.00 (25th/75th percentile, 0.00/3.00), and the median anxiety score was 1.00 (25th/75th percentile, 0.00/3.25). As presented in Table 3, the depression ($p<0.001$) and anxiety ($p=0.005$) severity was significantly improved. Ten percent of the patients ($n=3$) had mild to moderate depression, and 20.0% ($n=6$) had mild anxiety.

Effect of psychological intervention on MRKH patients at different stages postoperatively

Participants were stratified by postoperative time to identify the effect of psychological intervention at different stages postoperatively. As presented in Table 4, the depression score was significantly improved when intervention was performed 0–12 or 37–60 months after surgery ($p=0.029$; $p=0.017$). The anxiety score was significantly improved when the intervention was performed 0–12 months after surgery ($p=0.019$).

Discussion

This prospective study found that after artificial vaginoplasty MRKH patients are at great risk of depression and anxiety problems. The intervention achieved targeted psychological change and relieved the depression and anxiety symptoms. Availability of early psychological support should be recommended after artificial vaginoplasty procedures. To our knowledge, this study is the first psychological intervention

Table 4 Effect of psychological intervention on MRKH patients at different stages postoperatively

Months after surgery (months)	Pre-/post-intervention	Depression score[a] Median (25th, 75th percentile)	*P*-value	Anxiety score[b] Median (25th, 75th percentile)	*P*-value
0–12 ($n=10$)	Pre-intervention	6.00 (1.50, 7.00)	0.029*	6.00 (3.00, 8.00)	0.019*
	Post-intervention	1.50 (0.00, 3.00)		2.00 (1.00, 3.50)	
13–36 ($n=8$)	Pre-intervention	7.50 (2.25, 8.75)	0.083	5.00 (1.75, 6.75)	0.161
	Post-intervention	2.50 (0.00, 4.75)		2.00 (0.00, 4.75)	
37–60 ($n=12$)	Pre-intervention	3.00 (0.25, 6.00)	0.017*	1.00 (0.25, 5.50)	0.178
	Post-intervention	0.00 (0.00, 0.75)		0.00 (0.00, 2.75)	

[a]The depression severity was based on the Nine-item Patient Health Questionnaire (PHQ-9)

[b]The anxiety score was based on the Seven-item Generalized Anxiety Disorder (GAD-7) scale

Abbreviations: MRKH syndrome: Mayer-Rokitansky-Küster-Hauser syndrome

aiming to improve depressive and anxious symptoms of postoperative MRKH patients.

To date, only a few studies have evaluated the mental state of postoperative MRKH patients, and current results are inconclusive. Studies in China involving 141 MRKH patients reported up to three-quarters of patients suffered from depressive symptoms [5] and 24.1% had moderate to severe anxiety [6]; these negative emotions were not associated with MRKH treatment. Another study reached a similar conclusion that anxiety levels were high in MRKH patients, especially for those who had undergone vaginal treatment [11]. However, some studies enrolling MRKH patients with a neovagina claimed that the anxiety and depression states in the MRKH group did not differ from those in the control group [12–14].

Relatively small sample sizes and various psychological measurement methods may be responsible for the discrepancy. Based on the high prevalence of anxiety and depression in our study and data in previous studies, we note that the negative emotional burden has a long-lasting effect on MRKH patients. Furthermore, such feelings could compromise sexual function, quality of life and treatment success. Therefore, for postoperative MRKH patients, psychological evaluation is of great importance.

Psychological interventions have been recommended to address the psychological challenges during MRKH treatment. Previous studies focused on sexual psychology concluded that 8-week e-learning improved sexual function and genital self-image and reduced sexual distress in MRKH patients [15]. Besides, a cognitive-behavioral group intervention based on the negative evaluation of femininity has been performed, and it obtained satisfactory improvements in psychological symptoms on the Symptom Check-List (SCL-90-R) [16]. However, how emotional burdens have been relieved during interventions remains unknown. Our finding enriched previous work and showed that targeted psychological counseling together with dilation guidance could achieve targeted changes (established correct cognition and social support systems) and improve the negative emotions (depression and anxiety).

The main limitation of the study was the small number of participants with MRKH syndrome. One possible reason is that very few patients opt for surgery to create a neovagina. Besides, the enrollment rate is not high. Considering optimistic people are more likely to engage in psychological interventions, the incidence of anxiety and depression may be underestimated. Another limitation is that the time when patients started the intervention ranged from half a month to 5 years. Although it was stratified, the small sample size could not explain the problem sufficiently.

Further research on psychological interventions is sorely needed, especially on the timing and method that can relieve negative emotions and help establish a healthy mindset.

Conclusion

In the current study, after artificial vaginoplasty MRKH patients received psychological interventions. Over time, these patients learned to relax during vaginal dilation and established healthy mindsets and social support systems to decrease their anxiety and depression. Early postoperative psychological interventions should be encouraged in response to patient needs and to achieve better effects.

A diagnosis of MRKH syndrome can lead to a range of negative feelings, with the dilation treatment being a time of great distress for most postoperative patients. The burden of treatment is recognized to be psychologically and physically significant. The toll of this burden includes decreased quality of life, emotional distress, neovaginal stenosis or contracture, and even treatment failure. Hence, further research on psychological interventions is sorely needed to identify its appropriate timing and method.

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Author contributions KQH designed this study; YZ provided personalized gynecological postoperative guidance; XW provided professional psychological consultation and treatment; XHL collected and analyzed data; SYS wrote the manuscript and generated the figure and tables.

Declarations

Conflicts of interest None.

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