Article

Negative experiences of Iranian women underwent tubal ligation: A qualitative study

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Abstract

Background: Tubal ligation (TL) with more than 99% effectiveness considered an irreversible contraceptive method among many couples.
Objectives: This study was conducted to identify the challenges and problems of women after tubal ligation (TL) and its physical, psychosocial and familial consequences of this method with a qualitative study.
Methods: This descriptive qualitative study was conducted on 14 sterilized women between the ages of 25 and 40 from March to October 2017 in Rasht, Iran. The participants were selected with a purposeful method. Semi-structured interviews were used to collect data. Qualitative data were analyzed using conventional content analysis.
***Results*:** The experiences of sterilized women were classified into six main themes: dissatisfaction with sexual and marital life, regret, feelings of resentment and physical-emotional damage, menstrual disorder, feelings of low self-esteem and changes in female identity, disruption of social interactions.
Conclusion: Sterilized women experienced a wide range of physical, familial, sexual, and social problems after TL. Therefore, it is necessary to provide effective counseling regarding the positive and negative complications of this method when proposing sterilization.

Implications of this paper in nursing and midwifery preventive care:

- Addressing identified themes like changes in menstrual patterns, emotional damage, dissatisfaction with sexual and marital life, feeling regret, low self-esteem, and disruption of social interactions, healthcare providers can offer counseling, education, and resources to help women make informed decisions.
- Healthcare professionals should strive to create a supportive and non-judgmental environment while respecting women's reproductive health choices and prioritizing their overall well-being.

Introduction

Tubal ligation is a widely used and effective contraceptive method with over 99% effectiveness, utilized by 24% of couples globally and 10.8% of Iranian women, as reported by the WHO in 2019 [1]. This method's popularity stems from its ability to prevent unwanted pregnancies, eliminate the need for hormonal contraception and long-term pill use, and reduce the risk of ovarian and endometrial cancer [1].

Recently, following the increase in the rate of tubectomy, questions have been raised about its complications. For the first time, Williams and colleague described a situation as a post tubal ligation syndrome (PTLS) among sterilized women that include menstrual abnormality, dysmenorrhea, premenstrual distress, and sundry other conditions such as menopausal symptoms, bloating, dyspareunia, chronic vaginitis, cystitis, and need for recanalization [2,3]. In addition to physical problems, psychological disorders are noticeable in these women. Anxiety, depression, mood disorders, regret, fear, and sexual dysfunction are the most common psychological disorders in these women [4-6]. All of these factors can have a negative effect on women's life. Most studies on the influence of sterilization on the diverse aspects of women's lives have been quantitative and empirical, focusing on their sexual and psychological problems [4-6].

Furthermore, conducting a qualitative study is essential for gaining a comprehensive understanding of the issues and challenges faced by sterilized women in Iran. Since the acceptability and perceptions of sterilization can vary based on cultural and societal values, it is important to explore the experiences and perspectives of women in Iran through a qualitative approach. Therefore, this study was conducted to identify the challenges and problems encountered by women after tubal ligation (TL) and to examine the psychosocial and familial consequences of this method using qualitative methods.

Methods

This research is part of the mixed method study using sequential explanation methods, and one with a quan/qual approach. In the first stage, we conducted a quantitative study to assess influential factors of health-related quality of life in women who underwent sterilization. After the quantitative stage, we conducted a descriptive qualitative study of women who underwent sterilization and who scored lower in health-related quality of life. Therefore, most participants in this study had lower scores in the quantitative study.

This descriptive qualitative study was conducted from March to October 2017 to assess the perceptions and experiences of Iranian women following sterilization, and analyzed using conventional content analysis [7]. Content analysis is an in-depth, and rigor method of analyzing collected data, whereby unstructured information is systematically organized into specific categories and themes by the researcher. Through condensation and abstraction of textual data, this approach offers valuable insights and new understandings about the phenomenon being studied [7,8]. Besides, the conventional approach to qualitative content analysis can help obtain information directly without imposing preconceived classes [7,8]. Participant characteristics in this study were as follows: having history of sterilization; being married, and experience of sexual activities; no evidence of intellectual disability; not taking medications that affect women's sexual function; lack of severe mental and other chronic diseases, age between 20 and 40 years old (According to the national population reduction program in the time of study); not being menopause, or pregnant; no history of malignancy, and the low score in quality of life score, measured by SF-12; willing to share their experiences.

Attendance in the research setting and in-depth semi-structured interviews were used to data collection. Among the sterilized women who attended the eight healthcare centers in Guilan province, 14 of them agreed to be interviewed. Interview was performed in a separate room with the presence of only researcher and participant. No data or new code was generated from the 11th participant, and saturation actually occurred. Participants from different age groups with diverse demographic characteristics were selected to achieve maximum variation, which increased the transferability of data. For each participant, a one-session interview was conducted in locations chosen by the participants and lasted from 35 to 90 min. Women's experiences were assessed by a semi-structured face-to-face interview approach, and each interview was audio taped, and transcribed to form verbatim transcripts. The interviews were initiated by a general and open-ended question of "What are your experiences of tubal ligation" and then were guided by the answers given to each question. In addition, in cases where the subjects had difficulty describing their experiences and the researcher asked more questions for clarity. The following questions were used as in-depth interview guides: 1) "what main problems have you encountered after TL, and how did you deal with them? 2) Did you have any consultations or inquiries before having a tubectomy? How are you? 3) Have you noticed a significant change in your menstrual cycle? What change? More explain 4) Do you have any changes in your feelings about yourself after tubectomy? How do you feel? 5) Can you tell me about the impact of the mentioned problems with your sense of health and well-being?" Also, to deepen the interviews, some questions were asked from participants, such as what do you mean? Is it possible to explain more? Why? How? If you have anything to add please let me know. In addition, during or at the end of the interview, by emphasizing the salient points or a summary of the participants' answers, an attempt was made to confirm the accuracy of the data and to help increase the validity of the results. The data

analysis simultaneously initiates with their collection so that immediately after each interview, the interviews were transcribed. Qualitative data analysis was done in MAXQDA2020. The Granheim and Lundman approach was used for data analysis. It also known as the method of constant comparative analysis, is a widely used approach in qualitative studies. It involves systematically comparing and analyzing data to identify patterns, themes, and categories. This approach emphasizes constant comparison between data, codes, and categories to refine and develop theoretical insights. It is a dynamic and iterative process that allows for the emergence of new concepts and theories from the data. Each transcription was then repeatedly read by all researchers to obtain a whole understanding of them and finding out the familiarization and significant areas of units. The initial codes were extended after the encoding of meaning units. Then, codes were carefully read and re-read to find similarities and differences, and the same codes were merged and grouped based on a similar concept to form a sub-category. Subsequently, the subcategories were compared with each other using the inductive method, and combined in case of similarity, and thus leading to the appearance of the main categories. Table 2 shows an example of the analysis process.

The trustworthiness of results was ensured according to the four recommended criteria proposed by Guba and Lincoln, including, credibility, dependability, confirm ability, and transferability [9]. To make the results credible, prolonged engagement and member checking was used, by which, the transcript and extracted codes alongside the explanations of each category and theme were returned to each participant to confirm their accuracy. To ensure the confirm ability and dependability of the results, external checking, and peer debriefing were used, by which, two expert qualitative analysts separately reviewed and rechecked all transcripts, codes, and themes, and there was a high agreement (over 82%) between the extracted results.

Results

The majority of the participants were in the age range of 35-40 years old (64.29 %), had a diploma (42.86 %), were employed (71.43 %) and were home owners (78.57 %). Most of the women participating in the study had a male child (42.86 %), had more than two children (50 %), and were 30 to 34 years old at the time of TL (50 %) (Table 1).

Table 1: The participants' demographic data

Variables		Number (percent)
Age	30-34 years	5 (35.71)
	35-40 years	9 (64.29)
Age at the time of TL	20-24	1 (7.14)
	25-29	4 (28.57)
	30-34	7 (50)
	35-40	2 (14.28)
Educational level	Under diploma	4 (28.57)
	Diploma	6 (42.86)
	University education	4 (28.57)
Job	Housewife	4 (28.57)
	Employment	10 (71.43)
Housing status	Homeowner	11 (78.57)
	Tenant	3 (21.43)
Child gender	Female	3 (21.43)
	Male	6 (42.86)
	Both	5 (35.71)
Number of children	One	2 (14.29)
	Two	5 (35.71)
	More than two	7 (50)

The experiences of sterilized women were classified into six main themes: 1) dissatisfaction with sexual and marital life, 2) regret, 3) feelings of resentment and physical-emotional damage, 4) menstrual disorder, 5) feelings of low self-esteem and changes in female identity, 6) disruption of social interactions (Table 2).

Table 2: A summary of themes, categories, and sub-categories emerged from the data

Theme	Categories	Sub categories
Dissatisfaction with sexual, and marital life	Difficulty and unpreparedness for sexual intercourse	▪ Feeling inadequate natural lubrication during sex ▪ Experience physical discomfort and pain during sex ▪ Lack of desire and physical unpreparedness due to heavy menstrual bleeding
	1.unmet sexual or marital needs	▪ Improper behavior when her husband expresses sexual desire ▪ Women's unwillingness to have sexual intercourse despite desire
	2. 3. occurrence of marital communication problems	▪ Reluctant acceptance of sex ▪ Sexual dysfunction ▪ difficulty in sexual satisfaction ▪ lack of desire to have sex due to mental problems.
Regret	due to facing physical and mental problems	▪ Regret due to facing physical problem ▪ Regret due to facing mental disorder
	4. justification of regret due to economic factors	▪ Regret due to improving economic conditions ▪ Regret due to buying housing
	5. intensification of regret due to desire to achieve pregnancy	▪ insufficient number of children ▪ desire to get pregnant again
	6. justification of regret due to lack of counseling by health care provider	▪ Lack of sufficient information due to the lack of appropriate counseling from healthcare providers to choose the best method of contraception ▪ The lack of appropriate counseling about the possible side effects of this method
	guilt and remorse for having a tubectomy.	▪ Feeling guilty for not being able to respond to their children's request to have another child ▪ Feelings of guilt and remorse
Feelings of resentment and physical-emotional damage	7. encounter with physical pain	▪ Occurrence of physical pain during menstruation ▪ Occurrence of non-menstrual pain
	mood swings and anxiety following menstrual disorders	▪ Anxiety disorder following menstruation ▪ The tendency to isolation due to heavy menstrual bleeding.
Menstrual disorder	Changes in menstrual pattern	▪ Irregularity in menstrual cycle ▪ Menorrhagia ▪ Metrorrhagia ▪ Prolonged duration of menstrual bleeding
Feelings of low self-esteem and changes in female identity	feelings of impairment due to the inability to achieve pregnancy	▪ Sense of feeling defective due to inability to achieve pregnancy ▪ Taking refuge in other things to escape from thinking about the inability to be fertile
	lack of self-confidence	▪ Lack of confidence in facing everyday problems and dealing with others,
	Changes in body image	▪ Changes in the body image ▪ Feeling of aging
Disruption of social interactions	Tendency to seek isolation following TL	▪ Low communication and interaction with others ▪ Not leaving home, and the tendency to isolate from others

Theme 1: Dissatisfaction with sexual, and marital life

Dissatisfaction with the quality of sexual and marital life is one of the main extracted themes that express another dimension of women's perception after TL. This theme expresses difficulty and unpreparedness for sexual intercourse, unmet sexual or marital needs follow TL, and the occurrence of marital communication problems, which is extracted from the following subcategories: feeling inadequate natural lubrication during sex, experience physical

discomfort and pain, lack of desire and physical unpreparedness due to high menstrual volume, Improper behavior when her husband expresses sexual desire, women's unwillingness to have sexual intercourse despite desire, reluctant acceptance of sex, sexual dysfunction, difficulty in sexual satisfaction, and lack of desire to have sex due to mental problems. This theme suggests that the quality of sexual and marital life of women after TL is affected.

One participant said regarding the lack of adequate lubrication during sexual intercourse:" my vagina does not get wet during sex. This is what made me feel pain during intercourse". (P1, 32 years, 3 years after TL). Insufficient lubrication during sexual intercourse is a factor that has a direct effect on the other dimensions of sexual function. Another woman talked about this problem: "I don't get so wet when I sleep with my husband that this has made me reluctant. Because I am always in pain and annoyed and my husband gets nervous about me" (P10, 35 years, 4 years after TL).

Physical discomfort and painful intercourse were another common complaint of women after TL. The severity of this problem is such that women described it as an effective factor in reducing sexual desire. Dyspareunia was also reported when they had to have sex due to prolonged bleeding. These complaints are also mentioned as back pain, abdominal and lower abdominal pain. In this regard, one woman said "I often have pain during sex, I feel like my back wants to break. This pain also makes me less likely to demand sex, and we have sex only whenever my husband wants. I orgasm less. That is why my husband complains about me and sometimes he becomes immoral" (P2, 38 years, 6 years after TL). Also, another woman with a history of tubectomy 4 years earlier said "I don't think there is much difference in my relationship with my husband. I only have pain and annoyance during sex that I was not like this at all before, I was not different in other aspects"(P8, 32 years, 4 years after TL).

In these women, another complaint was the lack of desire and physical discomfort due to a large amount of menstruation. However, prolonged bleeding led to sexual intercourse during this time. This can cause them pain and unpreparedness to have sex. A 31-year-old woman describes her experience "There were times when I was bleeding for 60 or 70 days; I had to sleep with him. I was in pain when I was bleeding. I was very, very annoyed at that time. Honestly, sometimes I want to, but I am scared because I'm menstruating" (P9, 31years, 8 years after TL).

Unmet sexual and marital needs following TL lead to dissatisfaction with the quality of sexual and marital life. These unmet needs were sometimes reported in the form of inappropriate behavior when her husband expressed desire or the wife's unwillingness to start having sex despite the desire. One woman said "Even when he wants a relationship, I do not accept or get angry. He gets angry and gets up and goes out into the yard. When he wants, I do not answer at all and remain silent. Says no? I say "no or I have a headache, or I am sleepy". That is how I reject him. "(P4, 38 years, 6 years after TL).

The occurrence of marital disorders in women after tubectomy occurs in the form of reluctant sexual intercourse, sexual desire disorder, problems in the dimension of sexual satisfaction, and the unwillingness to have sex due to mental problems. Reluctant sexual intercourse was such that despite a long time since the last sexual intercourse, women either did not accept or reluctantly agreed to have sex. One woman said in this regard:" I don't want to have sex, but sometimes when it is too late and he doesn't come to me, I get upset and I feel a little like that." (P4, 38 years, 6 years after TL).

Decreased sexual desire is one of the most common problems in these women. One of the women said about it "In general, if my husband doesn't come to me, I rarely want to have sex. I don't remember exactly the last time that I have the desire, but I think, I saw a movie and I wanted to have a relationship. I did not tell about my desire. He usually comes to me."

Many participants complained of decreased frequency of orgasm as well as sexual dissatisfaction following TL. A 32-year-old woman with a history of TL (3 years ago) said "He's read a lot of books about what to do, and I accept it because of him. I feel pity for him that he wants me to be very satisfied. Most of the time I don't tell him that I don't want to have sex and it is very, very rare for me to be satisfied". Another woman said "We have sex whenever my husband wants. I am less satisfied. This case has caused

my husband to complain about me and sometimes he becomes immoral" (P2, 38 years, 6 years after TL).

Some of these women attributed their lack of sexual desire to psychological changes following TL. They reported feelings of anxiety, boredom, etc. in sexual intercourse with their spouse. "Sometimes I get very anxious, that's when my husband wants to have a relationship with me. I get a heartbeat and don't know why I became like this. It seems that I am never ready for it."

Also, another woman said" Another thing is that I mix sexual relationship with a lot of other things, for example if I'm upset or angry."(P4, 36 years, 6 years after TL). "When he wants sex from me, I say I'm not bored, he doesn't speak, he knows my nerves are weak, but he says you are all bored. I may accept it after a month. I tell myself that if I didn't let him, I would have sinned."(P11, 38 years,8 years after TL).

Considering the higher prevalence of sexual dysfunction in these women, some participants (4 persons) did not report any difference in sexual performance before and after tubectomy.

Theme 2: Regret

Some women expressed remorse after the tubectomy. This theme expresses regret seeking to face physical and mental problems, the justification of regret due to economic factors, intensification of regret due to desire to achieve pregnancy, justification of regret due to lack of counseling by health care provider, and guilt and remorse for having a tubectomy.

Feelings of regret are expressed by participants in different ways and for different reasons. One of the forms of regret is not deciding to have a tubectomy if you go back in time and one of the reasons for women's regret was facing physical problems, including complications such as menstrual disorders and heavy menstrual bleeding. One of the women talked about this: "Even though my third child was unwanted, I would never have TL if time went back, especially because of my heavy periods. I even went to the doctor last year to open my tubes. The doctor told me it was useless and the bleeding would not get better by opening the tube." (P1, 32 years,3 years after TL).

Another group of women stated mental and physical problems, including menstrual disorders, as the reason for their regret. One woman said "It is better not to do it. I say in terms of mental, physical, and menstrual problems. Now I tell myself that once I bleed for 6 days, the next time for 10 days. Also, severe bleeding, severe pain, very severe." (P3, 35 years, 6 years after TL).

Some of these women blamed physical problems such as pain on their regrets. One woman said about this "Tell you what, if I were a health care professional, I would not tell anyone to close their tube .I told him to take the pill or used other contraceptive methods. If she is 22 or 23 years old like me, and she should not have a tubectomy. If she has a tubectomy at a young age, like me, and she will show complications. If someone has a tubectomy at an early age, it may show complications, such as heavy bleeding, abdominal pain, infection, fibroids, and cysts. I am very sorry that I closed my tubes early, because I always have abdominal, and lower abdominal pain, and hut flash. They say that because I am young, these are all side effects of tubal ligation"(P9, 31 years, 8 years after TL).

A 33-year-old woman considers the cause of her regret psychological problems following TL. "I became very sensitive and nervous. I cry and get upset very quickly. If I had a baby, I would have fun with him. I have so many problems, so I am very regretful" (P3, 35 years, 6 years after TL).

Remorse has also been reported due to improving economic conditions and buying housing among women. "Previously, our financial situation was not good, we did not have a house, but now I regret it because our situation has improved. I wish I had not done this then."(P1, 32 years, 3 years after TL).

An insufficient number of children and the desire to get pregnant again were also reported as reasons for regret in women undergoing tubectomy. One woman talked about this "Sometimes I wonder why one should have only one child? I am very upset about this. I was not upset until I was breastfeeding for two years. After that, when I saw a child, I thought to myself, I wish I could have another child. I am very sad that I can no longer have children." (P3, 35 years, 6 years after TL).

Another reason cited by women as a cause of regret was the lack of sufficient information due to the lack of appropriate counseling from healthcare providers to choose the best method of contraception and to explain the possible side

effects of this method. One participant said in this regard: "You know one thing, if there were people who gave more information to women about it and did not keep saying that this method has no side effects and you will be comfortable, many people would not do this."(P2, 38 years, 6 years after TL).

Feelings of guilt and remorse after a tubectomy were reported by women as a cause for regret. These women reported feeling guilty for not being able to respond to their children's request to have another child. "After closing the fallopian tube, I feel very guilty. My daughter keeps telling me to bring me a sister, I am upset by what she says. She says why should I not have a sister. My conscience is distraught. I feel guilty about why God created a healthy person, then she makes herself sick with her own hands. Is God pleased that my child is upset?" (P2, 38 years, 6 years after TL).

Theme 3: Feelings of resentment and physical-emotional damage

This theme expresses the encounter with physical pain, as well as mood swings and anxiety following menstrual disorders, has been extracted from the following categories: occurrence of physical pain during menstruation, the occurrence of non-menstrual pain, anxiety after menstruation, the tendency to isolation due to heavy menstrual bleeding.

One 32-years old woman talked about physical pain during menstruation "On the second or third day of my period, my lower back, especially my legs, hurt a lot. On the second or third day of my period, my lower back, especially my legs, hurt a lot. I was not like that before tubectomy, I was not in so much pain." or another woman said "I have pain in my lower back, lower abdomen, and legs during menstruation. I have pain almost everywhere in my body. I get severe headaches"(P10, 35 years, 5 years after TL).

In some of these women, these pains were not even related to menstruation, and experienced after sterilization only. "Even after my period is over, my back and lower abdomen hurt. There is pain around my navel as well as under my abdomen. I always have some pain in my lower abdomen, which can happen almost once a week. Most of the time, I get tired and bored "(P8, 32 years, 4 years after TL).

Many of these women reported anxiety, irritation, and nervousness due to excessive menstrual bleeding. For example, one of the women said in this regard: "Look, sometimes I get a feeling of stress and anxiety, I sit at home but I'm not calm down. I'm just waiting for bad news to be brought to me. These problems get worse during menstruation. When I see a lot of blood, I get nervous and anxious."

Theme 4: Menstrual disorder

Studying participants` accounts shows, that TL has adverse effects on the menstrual cycle. Many women reported changes in the menstrual pattern such as irregularity, menorrhagia, or metrorrhagia after TL. The shorter time between periods (polymenorreha) was one of the main problems of these women. This important consequence has been reported in various ways by many women so that one woman says in this regard: "After tubal ligation, my menstrual bleeding starts every 15 to 20 days, it breaks my nerves."(P3, 35 years, 6 years after TL). Another participant said, "After tubal ligation, I had a period twice a month, every twelve to twelve days" (P4, 38 years, and 6 years after TL).

Irregularities in the menstrual period are another notable problem that many women emphasize. In this regard, one of the women said, "I used to have a regular menstrual cycle. I get my period on time every month, but now it is irregular. Sometimes I get my period earlier or later" (P5, 40 years, 6 years after TL). Also, another woman said" "My period has no specific date; sometimes I menstruate at the beginning of the month, sometimes in the middle of the month. I lost its account."

The prolonged duration of menstrual bleeding was another menstrual disorder reported by women after TL. One of the participants talked about these changes "after tubal ligation, my bleeding has been prolonged. Sometimes I bleed for up to 14 days per month" (P5, 40 years, 6 years after TL).

Menorrhagia was another common complaint of women about changing menstrual patterns after TL. In this regard, one of the women said "you do not know how much bleeding I have, sometimes I'm afraid of this high amount of bleeding." Another woman described her bleeding after TL, she said "My bleeding has become very heavy; I have heavy bleeding in the first four days of

menstruation. There are also multiple blood clots, then my back, legs, and lower abdomen hurt." (P12, 36 years, 6 years after TL). In addition, another woman said, "I have so much bleeding so that I cannot even sit or go anywhere" (P9, 31 years, 8 years after TL).

In addition, some people reported passing clots during menstruation that had sometimes large sizes. One participant in describing this problem said this "Blood clots come out in pieces. Sometimes it is so big that I am afraid. I think to myself, where does this come from?" (P1, 32 years, 3 years after TL). In addition, another woman said, "The first 3 days of the period, it comes out in the form of clots. It is countless, the size of a walnut or larger. I will bleed again after the third day, but it is not in the form of a clot"(P4, 40 years, 6 years after TL).

Irregular amount of menstrual bleeding was another problem reported by women after TL. They stated that the amount of menstrual bleeding was sometimes massive and sometimes relatively massive or normal. In this regard, one of the interviewers said, "The amount of my menstrual bleeding is constantly changing. Sometimes you see it is too much, but sometimes it is less but most of the time it is too much." (P1, 32 years, 3 years after TL). Another woman said, "The amount of my bleeding has become irregular. For example, you see for a month that my bleeding is very awful, but another month a little less, not predictable" (P12, 36 years, 6 years after TL).

Another complaint of women was the presence of prolonged spotting at intervals and during the menstrual cycle. These women reported complaints of spotting as a problem that occurred after TL. A woman said, "I have spots for up to 9 days, sometimes up to 12 days. This prolonged spotting bothers me. Every day I think I was cleansed, but then I see that I have spotted." (P5, 40 years, 6 years after TL).

Also, some of these women tend to isolate themselves and stay at home due to the high amount of menstrual bleeding. One woman said in this regard "I don't go anywhere when I am period, I always stay at home. I do not like to be out of the house too much, because I must change frequently my sanitary pad." Also, another woman said "My bleeding was so heavy that two large sanitary pads at a time were not enough. I was bleeding so much that I could not even sit, or go anywhere at all." (P9, 31 years, 8 years after TL).

Theme 5: Feelings of low self-esteem and changes in female identity

This theme expresses a lack of self-confidence, feelings of impairment due to the inability to achieve pregnancy, as well as disturbed body image of oneself, which is extracted from the following subcategories: sense of feeling defective due to inability to achieve pregnancy, taking refuge in other things to escape from thinking about the inability to be fertile, lack of confidence in facing everyday problems and dealing with others, changes in the body image, and the feeling of aging.

In the term of sense of feeling defective, and inability to achieve pregnancy, one woman said in this regard " "In general, I think I got sick. You know, I feel like now that I can no longer have children, and something is missing in me. I do not know what "(P1, 32 years, 3 years after TL). Some of these women are busy with other things to get rid of these thoughts. One woman said "I keep working because I want to get rid of that anger and stress. For example, when my husband wants to go to the ground, I say I definitely want to come with you. If I had children, I would entertain the children at home. When I am angry and upset, I read the Quran to calm down for a while." (P3, 35 years, 6 years after TL).

Following TL, some women reported changes in their body image. "Sometimes I look in the mirror and see, I got older than my cousins and cousins. When I compare myself with a few years ago or other people, I find myself more depressed and older."(P7, 40 years, 5 years after TL). Furthermore, another participant said " From my body, only my belly feels bigger, but my friends say it's not like that at all, you look very good, but when I go in front of the mirror, I hate my face, and body."(P5, 40 years, 6 years after TL).

The lack of self-confidence in dealing with everyday issues and dealing with others was another problem reported by women after TL. One of the women talks about this:" Some time ago, I was invited by my son's school to the candidate for the Parents and Teachers Association. At now, I do not have the patience to do these things at all. My children were distraught with me and I did not pay any attention to them. Honestly, I get stressed when I think that I must

speak in public. I had been nominated several times before as a selectman by the Parent-Teacher Associations, but now I am not bored anymore." (P2, 38 years, 6 years after TL).

Theme 6: Disruption of social interactions

Another main extracted theme, which represents another dimension of women's perception after TL is disruption of social interactions. This theme, which expresses the tendency to seek isolation following TL, is derived from the following sub-categories: low communication and interaction with others, not leaving home, and the tendency to isolate from others. One of the women spoke about her experience in this regard "For example, sometimes I talk in public and suddenly I forget everything and I do not know what I was saying. It makes me less connected to others, I am at home most of the time and sometimes I go to my sister or mother's house. (P7, 40 years, 5 years after TL). A 32-year-old woman with a history of 4 years of TL said of her desire for isolation: "I do not like to talk to anyone. All in myself, if someone makes a noise, I get nervous, I do not have the patience to make a noise. I like the curtains to be drawn, not too much light in the house. I have not been like this before."

Discussion

Studying Iranians' experiences in this study demonstrates sterilized women have negative experiences regarding the physical, marital, social, and psychological wellbeing. It can lead to feelings such as anxiety, resentment, low self-esteem, changes in sexual, and marital life, as well as female identity. Our findings noted that, changes in menstrual patterns (such as menorrhagia, metrorrhagia, and irregularity) after TL were one of the most common symptoms reported by these women. Moreover, heavy menstrual bleeding, and menstrual irregularity considered as a main cause of regret, and tendency to seek isolation. Further, heavy menstrual bleeding, and long duration of bleeding lead to reduce desire and physical unpreparedness for sexual activity. In line with our findings, Taşkömür et al. study show a higher rate of menstrual irregularity among women that underwent TL [10]. It seems that TL can impair ovarian function by reducing ovarian blood flow, and subsequently, lead to delayed follicle growth and deteriorated ovarian hormonal levels (10). On the other hand, some study shows that women's age at the time of sterilization (especially under 30 years old) is an influential factor in the changes in menstrual patterns [11]. The results of a study in India showed that most women experiences symptoms such as menstrual irregularity, weakness, backache, pain in lower abdomen after a tubectomy [12].

Some women declare that they are regret from your choice, and they would not choose sterilization again if they go back in time. Some of them state physical problems such as pain, and menorrhagia, psychological problem, an insufficient number of children, improving economic conditions, and feelings of guilt and remorse as main cause of regret. Moreover, lack of counseling by the healthcare provider, and not having enough information about the complication of this method was one of the important justification of regret. similar to our result, in a qualitative study in Congo, feeling of guilt (due to disrespect to God's plan for reproduction), regrets and disappointment were more prevalent among these women [13]. Also, previous reports have described some risk factors for regret including young age, making a decision for tubectomy alone, changes in family structure, pre-sterilization counseling, menorrhagia, and psychological factors [14,15].

The results of Dönmez et al study on the view of Turkish and Syrian women regarding sterilization show that These women state factors such as guilt, decreased family authority, and decreased sexual satisfaction as the most important barriers to perform a tubectomy [16].

The changes in sexual and marital life after TL were one of the other complications that was reported by many women. Some symptoms such as painful intercourse, menorrhagia, and low lubrication interfere with their sexual activity. However, low desire, and reluctance to sexual intercourse can impress the quality of marital life. The result of one qualitative study reveals that erratic sexual intercourse due to lack of sexual pleasure and/or painful sexual intercourse can deteriorate their marital relationship [13]. There are controversial results regarding the role of sterilization in women's sexual function [17-19]. The impact of sterilization on sexual function can vary from person to person. Some individuals

may experience an improvement in sexual function after sterilization due to a reduction in anxiety about unwanted pregnancy or the discontinuation of other contraceptive methods that may have had side effects affecting sexual function. However, it is also possible that sterilization may have no effect or even potentially negative effects on sexual function for some individuals [20]. Factors such as personal beliefs, psychological factors, relationship dynamics, and overall health can all play a role in determining the impact of sterilization on sexual function [17-19].

The results are similar to those of Jahanian et al. who found that sterilized women have a lower score in the FSFI (The Female Sexual Function Index), especially in the desire, satisfaction, and pain domains [6]. In contrast with our findings, Costello et al. study show no effect of sterilization on sexual function, nonetheless the positive effects of this method were more common than negative [20]. Also, Indrayani et al study reveal that sterilized women had better sexual function, but the quality of life of these women was not significantly different from the non-tubectomy group [21].

The results of our study show that some sterilized women experienced changes in body image satisfaction, self-confidence, and female identity following sterilization. It seems that sterilization as a type of infertility disturbed women's body image. the results from a path analysis show that low self-esteem and body image satisfaction in these women disturbed their quality of life [5]. Alyahya et al study shows that women who have undergone permanent sterilization ver. use OCP (oral contraceptive pill) had a lower level of quality of life [22].

Our finding reveal that sterilization can interfere with social interactions. It's important to note that the extent of disruption of social interactions may vary for each individual and depend on factors such as cultural context, personal relationships, and individual experiences. Its proposed that, sterilization can impact the dynamics within a family, particularly if a partner or family members have differing opinions or expectations regarding future fertility. This can lead to tension, disagreements, or strained relationships, potentially disrupting social interactions [23,24]. Additionally, sterilization being a permanent decision can result in emotional distress or regret for some individuals. This emotional burden can affect self-esteem, confidence, and willingness to engage in social interactions [24].

In our knowledge, the current study is the first qualitative study in the Iranian context regarding women's experiences, and perspectives on sterilization and its results reveal diverse aspects of women's understanding of the negative consequences of sterilization.

This study had certain limitations. For instance, considering the religious and cultural context of the Iranian population, discussions about sexuality are often associated with stigma and shame, making it challenging to gain a comprehensive understanding of women's sexuality. Additionally, some of the findings may be specific to the cultural context and cannot be generalized to all communities

Conclusion

Our results inform healthcare professionals regarding the experiences of sterilized women and the possible negative complications of TL. The findings show that women after sterilization have a wide range of physical, familial, and social problems and consequences, such as menstrual irregularities, feelings of physical and emotional distress, dissatisfaction with the quality of sexual and marital life, disruption of social interactions, and other types of mental and personal disorders, that they are more affected by psychological, and social problems, such as experiencing anxiety and mood disorders, regret, low self-esteem, and changing their female identity. Therefore, it is necessary to provide effective counseling regarding the positive, and negative complications of this method when proposing a sterilization.

Ethical Consideration

The ethics committee of Tarbiat Modares University of Medical Science approved the study protocol (IR.TMU.REC.1396.659). Before entering the study, the participants signed a written informed consent and gave permission to audio-record the interviews. Moreover, participants were ensured of the anonymity and confidentiality of their information, and the right of withdrawal at any time. The researcher also introduced herself at the beginning and the

objectives of the research were clearly stated for them.

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Conflict of interest
The authors declare no conflict of interest.

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Authors' contributions:
Sh.Jahanian: Concept and design of the study, obtaining approval for performing the study, qualitative analysis of the data, sample recruitment, and drafting the manuscript.
S.Youseflu: data analysis, and drafting of the manuscript.
S.Ziaie: Concept and design of the study, Data analysis, and drafting of the manuscript.
S. Mousavi: data analysis, and drafting of the manuscript.
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