

Development and validation of the multidimensional vaginal penetration disorder questionnaire (MVPDQ) for assessment of lifelong vaginismus in a sample of Iranian women

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Background: Vaginismus is considered as one of the most common female psychosexual dysfunctions. Although the importance of using a multidisciplinary approach for assessment of vaginal penetration disorder is emphasized, the paucity of instruments for this purpose is clear. We designed a study to develop and investigate the psychometric properties of a multidimensional vaginal penetration disorder questionnaire (MVPDQ), thereby assisting specialists for clinical assessment of women with lifelong vaginismus (LLV). **Materials and Methods:** MVPDQ was developed using the findings from a thematic qualitative research conducted with 20 unconsummated couples from a former study, which was followed by an extensive literature review. Then, during a cross-sectional design, a consecutive sample of 214 women, who were diagnosed as LLV based on Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV-TR criteria completed MVPDQ and additional questions regarding their demographic and sexual history. Validation measures and reliability were tested by exploratory factor analysis and Cronbach's alpha coefficient via Statistical Package for the Social Sciences (SPSS) version 16. **Results:** After conducting exploratory factor analysis, MVPDQ emerged with 72 items and 9 dimensions: Catastrophic cognitions and tightening, helplessness, marital adjustment, hypervigilance, avoidance, penetration motivation, sexual information, genital incompatibility, and optimism. Subscale of MVPDQ showed a significant reliability that varied between 0.70 and 0.87 and results of test-retest were satisfactory. **Conclusion:** The present study shows that MVPDQ is a valid and reliable self-report questionnaire for clinical assessment of women complaining of LLV. This instrument may assist specialists to make a clinical judgment and plan appropriately for clinical management.

Key words: Clinical assessment, Clinical psychology, Cognitions, Reliability, Self-report measure, Vaginismus, Validation, Women

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INTRODUCTION

Vaginismus has been defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM) IV-TR as "recurrent or persistent involuntary spasm of the musculature of the outer third of vagina, which interferes with intercourse."^[1] An international consensus committee has recommended that "persistent difficulties to allow vaginal entry of a penis, a finger, and/or any other object, despite the woman's expressed wish to do so, should be considered as revised criteria." Obviously, any structural or other physical abnormalities must be ruled out.^[2] In the current version of the DSM-V it is combined with other

variations of penetration disorders under the umbrella of the genito-pelvic penetration/pain disorders (GPPPD), the following dimensions have been defined for its diagnosis: 1. inability to have vaginal intercourse/penetration; 2. marked vulvovaginal or pelvic pain during vaginal intercourse/penetration attempts; 3. marked fear or anxiety either about vulvovaginal or pelvic pain or vaginal penetration; and 4. marked tensing or tightening of the pelvic floor muscles during attempted vaginal penetration.^[3,4] Despite the recent thorough investigations, little progress has been made in consensus on the definition of vaginismus and an empirical framework for research and clinical practice is lacking.^[2,5]

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According to Masters and Johnson (1970), a reliable diagnosis of vaginismus can be made by a specialist who would carry out a pelvic examination, such as gynecologists. However, mental health professionals can identify vaginismus based on client's self-report.^[3,6] Meanwhile, many psychiatrists and gynecologists are reluctant to carry out a diagnostic pelvic exam because of the fear in women; many vaginismus patients are diagnosed based on their self-report in achieving vaginal penetration.^[3]

Still, health professionals tolerate some level of tension while facing an unconsummated marriage case.^[7] Lack of a sensitive or specific instrument to evaluate the case can be a reason for their pressure. This lack has been claimed by Binik (2010) that there is no a published instrument or algorithms that translate self-report into DSM-IV-TR definition and GPPPD diagnostic criteria for diagnosis of vaginismus.^[3]

Despite the wide-ranging list of factors (e.g. somatic/biological factors, psychological as well as interpersonal issues) that have been proposed to explain the etiology of vaginismus, and its underlying mechanism, they are still largely unknown.^[8] Few questionnaires have been introduced for the diagnosis of vaginismus,^[3] such as the Golombok Rust Inventory of Sexual Satisfaction (GRISS) and a 5-item vaginismus scale, which are not sufficient to make a DSM-IV-TR and GPPPD diagnosis since they do not confirm pelvic muscle dysfunction during vaginal penetration attempts.^[3,9]

In a recent study, Klaassen and ter Kuile (2010) developed and validated a well-established instrument that assesses vaginal penetration cognitions in a sample of women with vaginismus and dyspareunia.^[10] However, this instrument only investigates catastrophic cognitions that are related to vaginal penetration, and like GRISS, cannot interpret self-report of spasm by vaginismic women to a clinical diagnosis. So, yet there is no empirically based algorithm available on which to base one's clinical judgment about vaginal penetration problem.^[3]

Although many studies have been conducted in other countries about lifelong vaginismus (LLV),^[6,8,9,11-13] there are few studies that have been conducted in this field in Iran.^[14,15] In Iran, like other Middle Eastern countries, young people, particularly women, face strong pressure to marry and to have children after marriage as the main outcome of a successful marriage. Furthermore, a marriage ceremony is expected to include consummation.^[7,16,17] In Iran, premarital and extramarital sexual relations are seriously banned due to religious sanctions.^[18,19]

Like other conservative societies, in Iran also, vaginismus is considered as a woman's failure in the sexual encounters.^[19,20] This contextual mindset is associated with a couple's help-seeking behavior or their compliance with therapy.^[7,15] Couples experiencing unconsummated marriage face many problems due to social and family pressures, e.g. consummation of their relationship, having children, threat of divorce and separation, and to seek a remedy for their penetration problem.^[7,15-17] Too often, diagnostic assessment and therapeutic interventions designed to manage this sexual dysfunction rely on multiple invasive gynecological examinations, self-reports, and traditional unidirectional and surgical approaches such as hymenectomy, which fail to place contextual factors at the center of both diagnostic assessment and therapeutic interventions.^[15,20] There is a gap in the literature regarding an instrument which directly takes into account the societal and cultural norms related to sexual intercourse. Furthermore, a multidimensional questionnaire for clinical assessment of women's cognition, sexual behaviors, and relational pattern which may maintain vaginal penetration problem is also lacking, to the best of our knowledge.^[3,10,17]

In a large mixed-methods design, we explored both the nature of couples' views associated with their efforts for first intercourse and the self-identified determinants of experiencing difficulties in the first intercourse. Based on the findings from our formative research, the present paper reports the processes used to develop and validate a questionnaire that focuses on the assessment of cognitions, emotions, and sexual and marital relations, to be used for women with LLV, on which clinicians could base their judgments and plan for appropriate management in women with LLV.

For this purpose, we investigated the psychometric properties of multidimensional vaginal penetration disorder questionnaire (MVPDQ) within a group of Iranian women. So, the factor structure, internal consistency and stability, and the association between the MVPDQ total and subscale scores and demographic data of participants were investigated.

MATERIALS AND METHODS

A mixed-methods study was addressed to develop and investigate the psychometric properties of the MVPDQ. The mixed-methods sequential exploratory design consists of two distinct phases: qualitative followed by quantitative. In the exploratory design with the intent of developing and testing an instrument, the issues arise as to what information is most useful in designing and developing an instrument and what procedures should be used in this process.^[21]

During the first phase which was a qualitative study, data were collected from 20 unconsummated couples at Isfahan Medical University Psychosexual Clinic after obtaining their informed consent and using in-depth interviews, each lasting for 2-3 h. Permission was obtained from the Ethical Committee of Mashhad University of Medical Sciences to conduct the research (Code: 900983). The findings from the first phase and an extensive literature review were used to develop the MVPDQ. The second phase was a quantitative research and MVPDQ was completed by 214 consecutive women with LLV.

Selection of the participants

The study sample consisted of women who were unable to have vaginal intercourse despite several attempts, and diagnosed as LLV based on their sexual history taken by an experienced psychiatrist or sexologist. Consecutive participants were selected if it was the first time permanent marriage,¹ and they were never being diagnosed with a psychological problem, never being diagnosed with an abnormal hymen which was revealed during the initial assisted self-examination of the external genitalia, and never reported the history of pregnancy.

Participants were recruited through general physician and gynecologist referrals and web-based advertisement to Isfahan Medical University Psychosexual Clinic and three private sex therapy clinics (two in Isfahan and one in Tehran). The advertisement invited women who were "unable to have vaginal intercourse." Website users who complained of unconsummated marriage were interviewed over the telephone by the first author (MM) to be enrolled for the study. Then, after obtaining informed consent from the participants and informing them about the objectives of the study and their rights as participants, the subjects were asked to come to Isfahan Medical University Psychosexual Clinic to sign the consent form and complete the questionnaire.

All participants were screened by one of the two psychiatrists and diagnosed based on DSM-IV-TR vaginismus diagnostic criteria. After full evaluation for eligibility, participants and partners were asked to complete the questionnaires, without mutual discussion in the research center. Totally 216 couples [108 couples from Isfahan and 108 couples from other parts of Iran (e.g. Tehran, Mashhad, Ghesm, Sari, Larestan, Khansar, Mahshahr, Gorgan, Zahedan)] entered the study. Two of the couples were excluded because only the woman

partners had completed the questionnaire. The partner version of MVPDQ was also completed by the partners and validated through another study, which will be published elsewhere.

Ethical aspects

The ethical permission was approved by the Ethical Committee of Mashhad University of Medical Sciences (letter no.: 511/1313).

Questionnaire development

Qualitative thematic analysis of interviews with 20 unconsummated couples from the first phase of the study, which was followed by an extensive literature review, resulted in a pool of 208 candidate items. Clarity and relevance of generated items were assessed by the research team and two sequential expert panels, and 119 items that were considered as unrelated and repeated items were eliminated. Then, psychometric characteristics of the questionnaire (e.g. content and face validity, factor structure, internal consistency and stability, and construct validity) were assessed in the second phase [Figure 1]. The compiled data were analyzed using Statistical Package for the Social Sciences (SPSS) 16 software, a general statistical software tailored to the needs of social scientists and the general public. First, preliminary item-by-item analysis was conducted for missing data, normality, and linearity on the items of the MVPDQ. Then, internal structure of the study measures was determined using exploratory factor analysis (EFA). Principal component analysis (PCA) was conducted on the items to increase the utility of the instruments in evaluation, and ultimately increase the creditability and efficacy of assessment. Scree test criterion, along with consideration of the degree of clinical interpretability was used to determine the number of factors most suitable for the questionnaire. Cronbach's alpha coefficient was used for examination of inter-item correlation, and Pearson correlations between subscales and the total score were calculated as an internal criterion for validity of the subscales.

The validation of the tools and pilot test

Face and content validity

The face and content validity was assessed by presenting the preliminary 89-item scale to 10 experts in psychology, sexology, reproductive health, urology, and psychiatry. They assessed the content validity ratio (CVR) and content validity index (CVI) calculated for each item. When the CVR was greater than Lawshe's (1975) table for each item, the item was considered as necessary, otherwise it was eliminated. The CVI for each item scale was the proportion of experts who rated the item as a 3 or 4 on a 4-point scale.^[22,23] Respondents indicated their agreement with each item as CVI through three

¹In Iran, permanent marriage is compared with temporary marriage. This form of marriage is a campaign for single men who cannot afford permanent marriage. These men are officially registered their marriage for a short period of time. Both man and woman give official consent for this form of marriage.^[21,30]

items (clarity, relevance, and importance), and items with total scores less than 0.7 were considered as not suitable and eliminated. CVI was calculated based on the formula given below and seven items were eliminated in this phase:

$$CVI = \frac{\text{number of experts giving a rate of "3" or "4"}}{\text{total number of experts}}$$

Then 82-item version of the MVPDQ was presented to 15 participants. Six items were eliminated after this phase because of disagreement of participants and low inter-item correlation. The reliability was obtained through Cronbach's alpha coefficient.^[24] The Cronbach's alpha coefficient for the questionnaire at this stage was 0.78.

The MVPDQ

The final 76-item version of the MVPQ was presented as a self-reporting questionnaire which consisted of 20

visual fear/contraction 10-point self-report scales and a diagram of genital/pelvic area based on Binik's (2010) suggestion, so that the participants could point to where they experienced pain during penetration attempts.^[3] Respondents were also asked to choose the intensity of pain they experienced based on a 4-point scale (0 = no pain, 1 = some pain, 2 = moderate pain 3 = severe pain). Other questions were scored based on Likert scale ranging from 1 to 5 (1 = never, 2 = sometimes, 3 = half of the time, 4 = most of the time, 5 = always), except for marital intimacy which was ranged on a 10-point self-report scale. The measurement was based on the total scores of every dimension. Two questions regarding the last attempt for vaginal penetration and the frequency of attempts during the last 6 months were included, as the diagnostic threshold for vaginal penetration disorder based on Diagnostic Guidelines for the Assessment of Genito-pelvic Pain/Penetration Disorder.^[3] These questions were not included in the factor analysis, but their correlation with the MVPDQ total score was calculated. The MVPDQ is available upon request from the first author.

Construct validity

Exploratory factor analysis (EFA)

Construct validity is the degree to which an instrument measures the construct it is intended to measure.^[25] Initially, we conducted a PCA (eigenvalues > 1) considering the remaining 76 questions. PCA describes the degree to which the items in the instrument relate to the relevant theoretical construct.^[23] Four items which showed a minimum value of communalities, smaller than 0.3, were excluded for factor analysis. These items were: "I'm afraid when penetration fails, my husband will get angry" (0.255), "I'm afraid that penis enters my urethral orifice or anus" (0.170), "when penetration fails, I can't experience orgasm during non-penetrative relations" (0.289), and "there is an abstraction in my vagina" (0.230).

EFA was conducted on the 72-item version of the MVPDQ for reduction of items. After recording of 10-point items as 5-point scales, items with a loading on one factor exceeding 0.3 were considered to belong to a subscale. *Kaiser-Meyer-Olkin* (KMO) index (0.887) and Bartlett's test of sphericity with X^2 of 14097.358 (df = 2556), which were applied for evaluation of adequacy of samples for factor analysis, were significant ($P < 0.0.1$).

RESULTS

Participants

Detailed demographic and diagnostic characteristics of the participants are reported in Table 1 and 2. All women with vaginismus reported a history of previous treatment and referral for treatment to midwives/gynecologists, urologists,

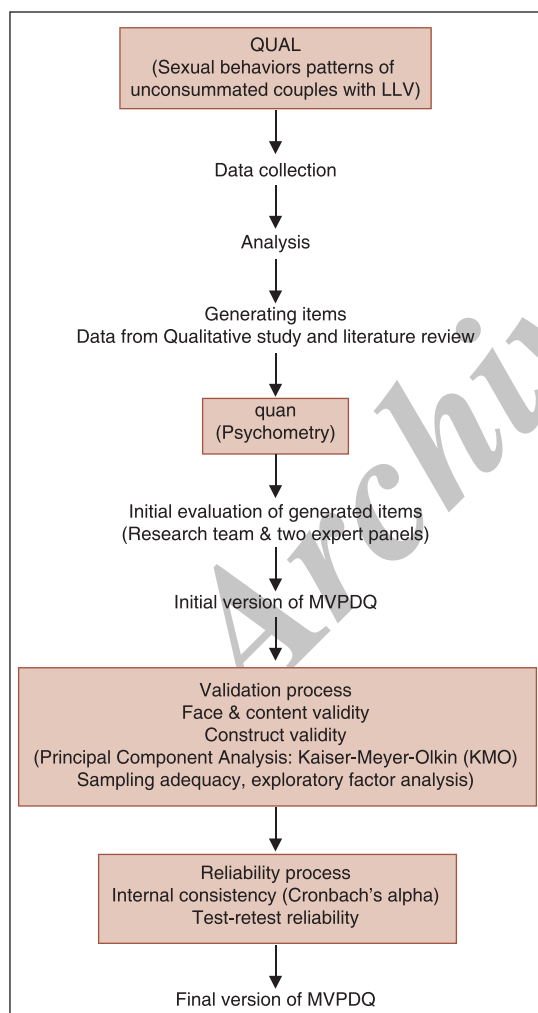


Figure 1: A model for validation of MVPDQ

²Some of the Iranian families strongly believe in superstitious power which "locks the groom's sexual ability" and disables him to erect or penetrate.^[26]

psychiatrists, consultants, or magicians.¹ The most reported phobias by the participants were blood phobia (50.5%) and injection phobia (43.9%).

Exploratory factor analysis

The final MVPDQ included nine subscales which explained a total of 52.52% of the amount of variances [Table 3]. The Scree plot graph also showed inflexion on the curve (>1) after nine-factor solution for the MVPDQ [Figure 2].

Mean values and standard deviations for subscale scores of the MVPDQ are summarized in Table 4.

Subscale one was “catastrophic cognitions and tightening,” which accounted for 12.19% of the total variance, included 32 items, and reflected the fear cognitions and pelvic muscle dysfunction that women experienced during attempts for vaginal penetration [mean (SD) = 104.53 (24.38)]. A high

score indicated high level of fear and marked tightening of the pelvic floor muscles.

The second subscale was interpreted as “helplessness” which contained items (items 33–51) about negative emotional and interpersonal reaction on failed attempts at vaginal penetration, and the mean score and SD were 56.91 and 15.72, respectively. This subscale accounted for 9.62% of the total variance of MVPDQ.

Items regarding marital satisfaction, sexual adjustment, and marital intimacy were loaded in the third subscale which accounted for 6.98% of the total variance of MVPDQ. The item “My husband feels hopeful about treatment” was also loaded in this subscale, which was interpreted as “marital adjustment.”

The avoidance behaviour and postponing attempts for vaginal penetration were interpreted as “avoidance” subscale and accounted for 5.19% of the total variance of the questionnaire. The fifth subscale accounted for 4.65% of the total variance of MVPDQ and was interpreted as “penetration motivation.” This subscale consisted of the items which postulated positive cognitions about vaginal penetration, and two items regarding fear of pregnancy and relatives’ pressure for pregnancy were also loaded in this subscale. The last four subscales of MVPDQ accounted for 3.93%, 3.52%, 3.26%, and 3.03% of the total variance, respectively.

The sixth subscale was interpreted as “sexual information” which included three items regarding information about penetration mechanism and female and male genitalia. Two items regarding “switch off,” which means vagina getting dry during penetration attempts and failed penetration despite vaginal lubrication, were interpreted as “hypervigilance.”

Positive attitudes about future and hope for treatment were loaded in a subscale, which was named as “optimism.” Also, negative beliefs about genitalia, e.g. too narrow vagina,

Table 1: Subjects' characteristics for women with vaginismus (N = 214)

	Mean (SD)
Age of the woman (years)	27.98 (4.26)
Age of the partner (years)	31.27 (4.34)
Duration of relationship (months)	50.20 (32.82)
Duration of treatment (months)	20.49 (28.11)
Duration of dating (months)	13.73 (10.29)
Duration of marriage (months)	36.36 (36.759)
Duration of complaint (months)	31.31 (31.79)
Education	n (%)
Secondary	5 (2.3)
Higher	58 (27.1)
University	151 (70.6)
Marriage type	n (%)
Traditional	113 (52.8)
Traditional familial	55 (25.7)
Dating and premarital relationship	46 (21.5)
Previous treatment	n (%)
Midwife/gynecologist	
Yes	185 (86.4)
No	29 (13.6)
Psychiatrist	
Yes	85 (39.7)
No	129 (60.3)
General practitioner	
Yes	33 (15.4)
No	181 (85.1)
Urologist	
Yes	56 (26.2)
No	158 (73.80)
Consultant/sexologist	
Yes	94 (43.9)
No	120 (56.1)
Magician/augur	
Yes	38 (17.7)
No	176 (82.3)

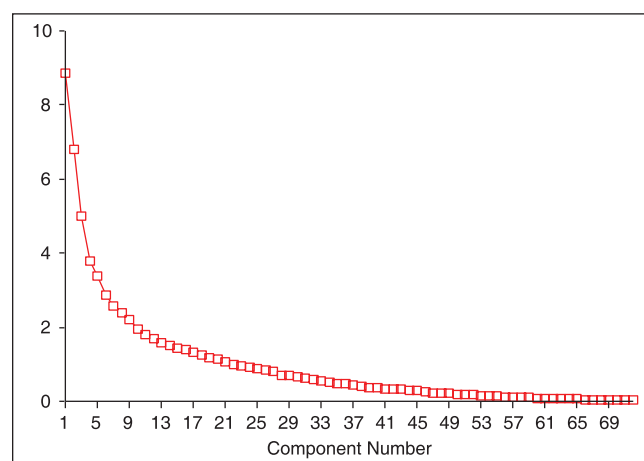


Figure 2: Scree plot

Table 2: Diagnostic characteristics of women with vaginismus (N = 214)**Pain site during (attempts at) vaginal penetration****(point on diagram — participants could choose more than one site)**

Vulva as a whole	<i>n</i> (%)
No	188 (87.8)
Some pain	9 (4.2)
Moderate pain	12 (5.6)
Severe	5 (2.4)
Fourchette and vaginal introitus	<i>n</i> (%)
Moderate pain	99 (46.3)
Severe	115 (53.8)
Clitoris	<i>n</i> (%)
No	171 (79.5)
Some pain	14 (6.5)
Moderate pain	26 (12.1)
Severe	3 (1.4)
Urethral orifice	<i>n</i> (%)
No	170 (79.4)
Some pain	3 (1.4)
Moderate pain	32 (15.0)
Severe	9 (4.2)
I heard dreadful stories about the first sexual intercourse	<i>n</i> (%)
Yes	173 (80.8)
No	41 (19.2)
I heard that sexual intercourse will be painful a long time after the first experience	<i>n</i> (%)
Yes	173 (80.8)
No	41 (19.2)
When did you and your partner attempt for vaginal penetration for the last time?	
Mean (SD)	21.36 (15.00) days
How many times you and your partner tried for vaginal penetration in the last 6 months?	<i>n</i> (%)
Never	0 (0)
Less than 5 times	44 (20.6)
5-10 times	41 (19.2)
More than 10 times	129 (60.2)
Penetration problem as the greatest problem in life	<i>n</i> (%)
Yes	193 (90.2)
No	21 (9.8)
Phobias	
Blood phobia	<i>n</i> (%)
Yes	108 (50.5)
No	106 (49.5)
Dentistry phobia	<i>n</i> (%)
Yes	56 (26.2)
No	158 (73.8)
Acrophobia	<i>n</i> (%)
Yes	79 (36.9)
No	135 (63.1)
Insects' phobia	<i>n</i> (%)
Yes	68 (31.85)
No	146 (68.2)
Claustrophobia	<i>n</i> (%)
Yes	24 (11.3)
No	190 (88.7)
Agoraphobia	<i>n</i> (%)
Yes	12 (5.6)
No	202 (94.4)
Injection phobia	<i>n</i> (%)
Yes	94 (43.9)
No	120 (56.1)
Other types of phobia(s) (e.g. zoophobia, hydrophobia, etc.)	<i>n</i> (%)
Yes	79 (36.9)
No	135 (63.1)

Table 3: Validated 72 items of the multidimensional vaginal penetration disorder questionnaire, with factor loadings (≥ 0.3), Mean (SD)

		Component								
	Mean (SD)	1	2	3	4	5	6	7	8	9
Factor 1: Catastrophic cognitions and pelvic floor tightening										
How much you are afraid when your partner attempts to have a full penile penetration?	9.42 (1.21)	0.449								
How much you are afraid when your partner attempts to have partial penile penetration?	8.86 (1.72)	0.399								
How much you are afraid when you watch films/pictures about vaginal penetration/intercourse?	3.13 (3.44)	0.412								
How much you are afraid when you attempt to insert your own finger in vagina?	5.04 (4.30)	0.414								
How much you are afraid when your partner attempts to insert his finger in your vagina?	6.12 (4.13)	0.385								
How much you are afraid when you attempt to watch your genitalia in a mirror?	3.31 (3.77)	0.465								
How much you are afraid when your husband watches your genitalia?	3.98 (3.64)	0.486								
How much you are afraid when you attempt to insert an applicator/vaginal pad in your vagina?	4.57 (4.56)	0.522								
How much you are afraid when a gynecologist attempts to conduct vaginal examination on you?	7.41 (3.58)	0.538								
How much you are afraid when your husband touches your vaginal entrance/introitus?	6.38 (3.71)	0.563								
How much do you experience cramp up when your partner attempts to have a full penile penetration?	9.42 (1.21)	0.373								
How much do you experience cramp up when your partner attempts to have partial penile penetration?	8.86 (1.72)	0.311								
How much do you experience cramp up when you watch films/pictures about vaginal penetration/intercourse?	3.01 (3.44)	0.442								
How much do you experience cramp up when you attempt to insert your finger in vagina?	5.32 (4.34)	0.431								
How much do you experience cramp up your partner attempts to insert his finger in your vagina?	6.32 (4.00)	0.348								
How much do you experience cramp up when you attempt to watch your genitalia in a mirror?	3.41 (3.87)	0.493								
How much do you experience cramp up when your husband watches your genitalia?	3.98 (3.64)	0.564								
How much do you experience cramp up when you attempt to insert an applicator/vaginal pad in your vagina?	4.56 (4.54)	0.523								
How much you do experience cramp up when a gynecologist attempts to conduct vaginal examination on you?	7.61 (3.53)	0.525								

Table 3: Contd...

	Mean (SD)	Component								
		1	2	3	4	5	6	7	8	9
How much do you experience cramp up when your husband touches your vaginal entrance/introitus?"	6.56 (3.48)	0.584								
I'm afraid the penis is locked up in my vagina	2.59 (1.62)	0.374								
I'm afraid that penetration causes a severe tearing/damage in vagina	3.65 (1.39)	0.522								
I'm afraid that my hymen is too thick	3.57 (1.50)	0.425								
I'm afraid that penetration causes severe and unbearable pain in vagina	4.46 (0.88)	0.598								
I'm afraid that penetration causes severe bleeding	3.66 (1.38)	0.474								
I'm afraid that pain caused by penetration will get worse increasingly	3.45 (1.42)	0.449								
I'm afraid if I give control of situation during penetration attempts to my husband	3.57 (1.48)	0.483								
I'm afraid even my hymen is opened	3.31 (1.46)	0.318								
I feel defecation/urination sensation during attempts for penetration	2.52 (1.52)	0.318								
I feel nausea during attempts for penetration	1.93 (1.39)	0.345								
My legs are cramping up during attempts for penetration	4.55 (0.97)	0.493								
I push out my husband during attempts for penetration	3.94 (1.35)	0.414								
Factor 2: Helplessness										
When penetration fails, I'd like to suicide/ do self-mutilation	2.04 (1.41)		0.376							
When penetration fails, I cry	3.62 (1.38)		0.484							
I don't like to meet anyone who knows about my penetration failure	2.76 (1.58)		0.418							
I feel aggression when penetration is not possible	3.47 (1.32)		0.610							
I experience sleep disturbances when penetration fails	3.02 (1.41)		0.609							
When penetration fails, I have no desire to work	3.29 (1.32)		0.602							
I feel no pleasure in my life when penetration is not possible	3.61 (1.21)		0.711							
I lose my concentration when I think about penetration failure	3.46 (1.32)		0.635							
I blame myself when penetration fails	4.15 (1.17)		0.427							
When penetration fails, I/my partner quarrel	2.45 (1.49)		0.542							
When penetration fails, I/my partner reproach and blame each other	2.14 (1.54)		0.494							
When penetration fails, I/my partner use force/violent behavior	1.68 (1.35)		0.538							
When penetration fails, I/my partner threaten each other to disclose to others	1.79 (1.58)		0.456							
When penetration fails, I/my partner consider/threaten each other to divorce/separation	1.73 (1.39)		0.402							
I am afraid when penetration is not successful, our relationship is getting cold	4.03 (1.60)		0.458							
I am afraid when penetration is not successful, my partner starts a new relationship with a new partner	2.09 (1.40)		0.480							

Table 3: Contd...

	Mean (SD)	Component								
		1	2	3	4	5	6	7	8	9
I am afraid when penetration is not successful, we should consider divorce/separation	1.94 (1.40)		0.474							
I am afraid anyone knows that we've failed in penetration	4.03 (1.34)		0.354							
My relatives threaten me to divorce because of penetration failure	1.35 (0.91)		0.311							
Factor 3: Marital adjustment										
I feel happy in my marital life	4.62 (0.85)			-0.493						
My husband considers my sexual needs	4.06 (1.31)			-0.489						
Our relationship is intimate	7.46 (2.46)			-0.452						
My husband feels hopeful about treatment	1.78 (0.97)			-0.404						
Factor 4: Avoidance										
I postpone the penetration attempt when my husband proposes	3.31 (1.45)				0.493					
I and my partner give up penetration attempt when it fails	3.18 (0.47)				0.407					
Factor 5: Penetration motivation										
It will be my most pleasant moment of life, when penetration will be successful	4.28 (1.11)					0.303				
Penetration will result in the climax	3.40 (1.54)					0.350				
I'm afraid that I get pregnant during penetration	2.12 (1.47)					-0.429				
My relatives remind us to have a child	3.54 (1.57)					0.488				
Factor 6: Sexual information										
I know what happens in my body during penetration	2.86 (1.26)						0.607			
I know about anatomy of female genitalia	2.93 (1.07)						0.701			
I know about anatomy of male genitalia	2.89 (1.21)						0.695			
Factor 7: Hypervigilance										
When I attempt for penetration, my vagina gets dry	3.50 (1.46)							0.360		
Penetration fails, even if my vagina gets wet	3.50 (1.60)							-0.332		
Factor 8: Optimism										
I will be successful for penetration	3.46 (1.39)								0.426	
I feel hopeful about treatment	2.54 (1.39)								-0.334	
I and my partner become sexually pleased with non-penetrative sexual intercourse	3.98 (1.32)								0.306	
Factor 9: Genital incompatibility										
My vagina is too narrow for penetration	3.54 (1.48)									0.349
My vagina is different from others	2.78 (1.54)									0.397
My husband's penis is too big for my vagina	3.07 (1.56)									0.394

Mean and SD were calculated before recoding to 5 points; SD = Standard deviation; N = 214

too big penis, and a different vagina, were loaded in the last subscale named as "genital incompatibility." Pearson correlations between the MVPDQ subscales were calculated as an internal criterion for the validity of subscales. The results indicated that there existed a correlation among items and the total score of that dimension. The highest correlation was found between "catastrophic cognitions and tightening" subscale and the total MVPDQ scores. The marital adjustment

subscale yielded the lowest and a negative correlation with the rest of the dimensions (-0.138) [Table 5].

Reliability analysis

The Cronbach's alpha coefficient for the questionnaire as a whole was 0.79 and for the dimensions varied between 0.70 and 0.87. The least Cronbach's alpha coefficient was related to "penetration motivation" (0.70) and the highest

Table 4: Mean and SD of the of the multidimensional vaginal penetration disorder questionnaire total score and subscales

Subscales	Mean (SD)	Min.	Max.
Catastrophic cognitions*	104.53 (24.38)	42.00	156.00
Helplessness	56.91 (15.72)	24	100.00
Marital adjustment*	12.78 (1.68)	9.00	18.00
Avoidance	6.12 (2.59)	2.00	10.00
Penetration motivation	14.24 (2.56)	6.00	20.00
Sexual information	8.70 (3.07)	3.00	15.00
Hypervigilance	7.01 (2.02)	2.00	10.00
Optimism	9.67 (2.22)	3.00	15.00
Genital incompatibility	9.37 (3.44)	3.00	15.00
Total score	218.30 (33.40)	124.00	307.00

*Calculated after recoding 10-point items as 5-points Likert scale; SD = Standard deviation; N = 214

Table 5: Inter-correlation coefficient of the multidimensional vaginal penetration disorder questionnaire subscales with total score and reliability coefficient for each subscale

Subscale	Pearson correlation	Cronbach's alpha
Catastrophic cognitions and spasm	0.846**	0.87
Helplessness	0.573**	0.86
Marital adjustment	-0.138*	0.78
Avoidance	0.291**	0.79
Penetration motivation	0.284**	0.70
Sexual information	0.255**	0.81
Hyper vigilance	0.366**	0.74
Optimism	0.188**	0.74
Genital incompatibility	0.268**	0.84
Total score		0.79

* $P < 0.01$ (two-tailed); ** $P < 0.05$ (two-tailed)

was related to “catastrophic cognitions and tightening” (0.87). The test–retest correlates also indicated that MVPDQ subscales have appropriate levels of stability over a period of 2 weeks for 15 participants (ranged from 0.78 to 0.87).

DISCUSSION

Using accurate measures warranties the dependability and trustworthiness of any research,^[27] especially when exploring complex phenomena and sensitive topics such as sexuality. The results of developing and testing the MVPDQ revealed that it is an accurate instrument to assess LLV in the Iranian population. While LLV has been recognized as an important sexual dysfunction in women, health professionals find it difficult to manage assessing and treating couples with unconsummated marriage, largely because sexuality is highly subjective and often confused with cultural scenarios and religious codes.^[28] This paper reported the psychometric validation of the MVPDQ to assess: 1) catastrophic cognitions and fears regarding vaginal penetration, 2) pelvic muscle

dysfunction and pain during penetration attempts, 3) psychological and relational problems experienced by women when vaginal penetration fails, 4) sexual information about penetration and female and male genital anatomy, 5) hypervigilance and avoidance during vaginal penetration attempts, 6) marital adjustment, 7) optimism and positive cognitions regarding future and treatment, 8) penetration motivation, and 9) negative thoughts about genitals’ compatibility.

Statistical analysis showed the psychometric properties of the MVPDQ are in an acceptable range and include the four dimensions of the proposed Guidelines for the Assessment of Genito-pelvic Pain/Penetration Disorder, i.e. percent of success of vaginal penetration, pain, fear with vaginal penetration, and pelvic floor muscle dysfunction, except for medical co-morbidities with vaginismus.^[3]

As Reissing *et al.* (2004) have stated in their report, “a woman may be able to tolerate a pelvic examination, but not penile penetration.”^[3,12] On the other hand, the health professionals usually involved in assessment of vaginismus rarely have sufficient expertise to diagnose pelvic floor tightening. Also, gynecological confirmation of spasm is waived to avoid causing unnecessary pain or discomfort. So, we need an instrument that translates self-report of pelvic muscle dysfunction during penetration attempts to DSM-IV-TR and then to GPPPD criteria for diagnosis of vaginismus.^[3,4] In this study, the participants reported high levels of fear and pelvic floor muscle dysfunction when penile/finger and other object penetration was tried. They also reported a high level of fear and spasm while they themselves or their husbands watched their own genital in a mirror; they also reported high level of catastrophic cognitions regarding genital incompatibility. These findings are in accordance with Basson *et al.*’s (2004) definition of vaginismus^[29] and indicated that MVPDQS could be used for assessing cognitions and physical muscle dysfunction related to vaginal penetration in women with LLV. Although we had no control group and could not decide if the MVPDQ was able to detect differences between women with and without LLV, a high mean of the reported scores and internal consistency in this subscale are in line with abundant literature in behavioral psychotherapy. It is assumed that “maladaptive catastrophic beliefs regarding vaginal penetration increase a propensity for the fear response and avoidance behavior in women with LLV.”^[10]

In Islamic societies like Iran, successful sexual intercourse is the only condition in which marriage is accepted as consummated.^[30] Beyond a couple’s own instinctive desire for sexual contact, the community’s interest is to reassure a union characterized by the capacity for sexual

satisfaction combined with the potential for producing a new generation.^[31] In this context, traditions focus on confirmation of virginity of a bride and engaging in sexual intercourse at the wedding night may increase the anxiety of women during the first sexual intercourse.^[19,32] Many couples tend to be secretive about their unconsummation. So, following the disclosure of failure in consummating a relationship, the social pressure would be intensive.^[33] As a result, in this study, some of the women with LLV were afraid of disclosure of their unconsummation and possible breakdown of their families following repeated failed penetration attempts.^[14,15,34] The high levels of distress reported by women with LLV regarding this issue support the idea that societal and cultural norms for sexual encounters should be considered during planning for management of LLV.^[31] It is also noteworthy for helping the couples who are silently embarrassed about what they consider a shameful inadequacy,^[33,35] to come out with their penetration problems in early years, during general medical history taking by physicians, so that they benefit from the appropriate treatment referrals.

As indicated in our results, manifestation of depressed mood, isolation, low concentration, suicidal and self-mutilation thoughts, and self-blame were the most self-reported psychological problems by participants. These findings are in accordance with Robinson's (2004) findings that indicated manifestation of depression and apathetic attitudes, personal distress and psychological problems, self-blame, self-destructive behavior, and mutilation were more common in unconsummated couples.^[34] In our study, participants' helplessness scores showed a significant correlation with duration of marriage and complaints, which indicated that women's emotional adjustment tends to deteriorate when the LLV is continuing. These findings are also consistent with those of Reissing *et al.* (2003) who found that vaginismus patients showed less positive self-schema compared to the women in no-pain group,^[36] and are in line with Klaassen and ter Kuile's (2009) findings which indicated that women with LLV reported higher levels of negative self-image and cognitions about future.^[10]

Although experiencing pain during vaginal penetration is an intimate sexual problem which directly involves the partner, few studies have focused on the investigation of dyadic factors and relationship adjustment in couples with a sexual pain disorder.^[37] As indicated in this study, marital adjustment is a factor which may play a role in planning for management of LLV. This subscale showed a negative correlation with the total score of MVPDQ and helplessness, which may indicate that increase in sexual coherency, marital intimacy, and satisfaction and a positive attitude of husband about treatment might lead to a decline in the

intensity of stress that is experienced by women with LLV. These findings are supported by the idea of Strzempko Butt and Chesla (2007) that "when issues of sexuality and relationship are addressed within the medical environment, women with chronic pelvic pain and their partners would be relieved and feel supported."^[38] So, we suggest the overall relational concerns of unconsummated couples should be addressed during the assessment and planning for management of LLV.

The finding of high levels of avoidance and hypervigilance behavior, e.g. postponing, withdrawal, and dryness of vagina during attempts for vaginal penetration, which were reported by women with LLV in this study, is in accordance with the findings of both Borg *et al.* (2012) and Rissing (2008) which indicated that specific fears about penetration and anticipated pain associated with intercourse and penetration of any object may impact women with vaginismus in a way to keep them stuck in a self-perpetuating spiral of increasing avoidance of anticipated pain.^[2,11] So, our results are in accordance with the findings of Klaassen and ter Kuile (2009) which suggested that vaginismus needs re-conceptualizing as either an aversion or a phobia of vaginal penetration.^[10]

In this study, lower scores of sexual information regarding penetration mechanism and female and male genital anatomy showed a negative correlation with penetration motivation, and a significant correlation with MVPDQ total score and catastrophic thoughts score. This indicated that high level of sexual information might increase positive attitudes about penetration and could moderate catastrophizing cognitions related to vaginal penetration. There were suggestions that lack of or inaccurate/incomplete sex education have been implicated in the development of negative expectations and fears and sexual guilt related to sexuality, vaginal intercourse, and reproductive anatomy.^[2,39,40]

Finally, as these findings indicated, MVPDQ is a valid and reliable measure for assessment of cognitions and psychological and relational problems of women with LLV, and can be implicated in a multidisciplinary management of LLV. But a number of important limitations need to be considered here. First, because we aimed primarily to provide the best treatment to all participants at the appropriate time, some of our participants had already received treatment during the first phase of the study and their answers might have been influenced by the cognitive-behavioral therapy that they had received.

Second, we had no control group including no-pain group and women with dyspareunia, so it cannot be claimed that all nine subscales of MVPDQ were able to

differentiate between women with and without genito-pelvic penetration pain disorders.^[3] Future studies are needed to investigate the divergent and convergent construct validity of MVPQD. Third, the sample size of our study did not meet the rule of thumb of at least five cases for each observed variable,^[41] but indicators of samples' adequacy for factor analysis were found to be satisfactory.

We hope that MVPDQ can balance the need for multiple invasive gynecological examinations and clinical judgments based on self-report of women with LLV. Findings of this study also may assist specialists for implication of an individualized approach at assessment and goal setting for treatment, identifying the personal factors which "interfere" with vaginal penetration or taking action toward "maintaining factors" for the penetration problem.^[2] It is also important to suggest future studies for determination of diagnostic threshold of MVPDQ using larger samples in different subcultures with conservative and liberal sexual norms.

Authors' contributions

MM, EMK, MS, and RLR carried out the design and coordinated the study, participated in most of the experiments, and prepared the manuscript. AY provide assistance in the design of the study, and acquisition, analysis, and interpretation of data. MS coordinated and carried out all the psychological interviews and participated in manuscript preparation. All authors have read and finally approved the content of the article.

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