

ORIGINAL ARTICLE

The Cross-sectional Study on Female Sexual Response Cycle in Malaysian Women: Do They Conform to the Non-Linear Model?

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ABSTRACT

Introduction: The conceptualisation of the sexual response cycle (SRC) has garnered increasing attention, particularly following findings that demonstrate the nonlinearity of Basson's circular model among Malaysian women. This study aimed to explore the correlations between the following key phases of SRC: sexual desire, arousal, orgasm, satisfaction, and sexual pain. **Methods:** Using the Malay version of the Female Sexual Function Index (MFSFI), we applied principal component analysis (PCA) with varimax rotation to analyse the correlation structure of responses from 362 married women in Malacca. Kaiser's criteria guided the determination of factors, primarily focusing on the associations between the SRC domains. **Results:** PCA identified three distinct components with eigenvalues of 5.09, 4.79, and 4.58. The first component revealed a strong correlation among sexual desire, arousal, and lubrication, indicating a shared conceptual framework. The second component grouped orgasm and satisfaction into a separate construct, whereas the third component, sexual pain, formed an independent conceptual structure. These findings align with earlier evidence supporting the nonlinear or circular model of SRC, particularly in the Malaysian context. **Conclusion:** This study underscores the interconnectedness of sexual desire, arousal, and lubrication, suggesting that they belong to a unified framework. This reinforces the notion that SRC among Malaysian women adheres to a non-linear model, as previously demonstrated, further advancing the understanding of female sexual health in this population.

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INTRODUCTION

The female sexual response cycle (SRC) encompasses various psychophysiological phases, including sexual desire, arousal, sexual excitement, and orgasm or satisfaction, similar to the male SRC (1,2). Women

engage in sexual activity for a multitude of reasons, such as expressing intimacy and passion, fostering emotional and physical closeness, and boosting self-esteem and overall well-being. These motivations are influenced by the dynamic interplay between biological, physiological, and psychological factors (3). Typically, the progression from sexual desire and arousal to stimulation intensifies sexual pleasure, culminating in orgasm or satisfaction and ultimately enhancing the overall quality of life (4). Despite significant research on SRC in women, its conceptualisation and definition remain complex and varied. Key terms, such as "sexual desire" and "sexual

arousal", are often integral to describing its phases (5–7). Early conceptualisations of the female SRC were modelled on traditional views that paralleled male sexual responses, assuming that a woman's sexual response was uniformly initiated by sexual drive, encompassing desire, thoughts, and fantasies. These perspectives have historically framed female sexuality through a male-centric lens, limiting our understanding of its unique attributes (8). However, contemporary approaches challenge these assumptions, advocating models that acknowledge the distinctive and dynamic nature of female sexual responses.

Recent debates have focused on contrasting linear SRC models with non-linear frameworks, such as Basson's circular model, which highlights significant differences between male and female sexual responses (5–7). Central to this discourse are the unique patterns of sexual desire and arousal in women and how they differ from those in men (5,7,9,10). In Malaysia, the discussion of female sexuality, particularly sexual desire and related topics, has traditionally been considered taboo. Cultural and societal norms have historically restricted open conversations on these matters in public and academic spaces, contributing to the limited understanding and research in this area (11).

However, in recent years, societal attitudes have shifted as Malaysian women have become more vocal about their rights and experiences related to sexual health. This shift has created an opportunity for medical and health professionals to enhance their understanding of female sexual responses, particularly sexual desire and arousal, which are critical for providing effective therapeutic interventions and addressing issues related to SRC (2,8). Notably, most research on SRC is rooted in Western perspectives, which may not adequately reflect the experiences and cultural context of Asian populations, including Malaysian women. The applicability of models such as Basson's circular SRC to non-Western populations remains an area of significant interest. This study aimed to explore the correlations among various phases of SRC—sexual desire, arousal, orgasm, satisfaction, and pain—among Malaysian women in Malacca to validate the circular, non-linear model of SRC within this unique cultural context.

MATERIALS AND METHODS

This study utilised a cross-sectional design conducted between October 1 and November 30, 2021, at three government health clinics in Malacca: Ayer Keroh, Ayer Molek, and Tengker. The study population consisted of female attendees at these clinics who met the inclusion criteria. Eligible participants were females aged 18–60 years, sexually active (defined as engaging in sexual intercourse at least once a month), literate in Malay or English, and willing to provide informed consent. Exclusion criteria included chronic medical conditions (e.g. diabetes mellitus and cardiovascular,

renal, respiratory, cerebrovascular, autoimmune, or urogynecological diseases), malignancy, pregnancy, and being within two months postpartum. Participants with mental health disorders that could influence their sexual functioning were also excluded (12). All the eligible cases were invited to participate in the study without sampling during the study period. Ultimately, 362 participants were included in the analysis. Participants completed a sociodemographic questionnaire that included details about their gynaecological, obstetrical, and sexual activity history. Sexual functioning was assessed using the validated Malay version of the Female Sexual Function Index (MVFSFI), adapted from Rosen's original FSFI and validated for Malay populations by Sidi et al. (13,14). The MVFSFI is a 19-item multidimensional self-report instrument evaluating six domains: sexual desire, arousal, lubrication, orgasm, satisfaction, and pain. A total score of ≤ 55 indicated female sexual dysfunction (FSD), with domain-specific cut-off scores as follows: ≤ 5 (desire disorder); ≤ 9 (arousal disorder); ≤ 10 (lubrication disorder); ≤ 4 (orgasmic disorder); ≤ 11 (dissatisfaction); and ≤ 7 (pain disorder).

All eligible clinic attendees were provided an explanation sheet, and written informed consent was obtained from all participants. Participants with MVFSFI scores suggestive of sexual dysfunction were given choices to be referred to psychiatric clinics for further evaluation. Data analysis was conducted using R Statistical Software (version 4.4.2) and RStudio (version 2024.09.1) (15,16). Descriptive statistics summarised categorical variables as frequencies and percentages, whereas continuous variables were presented as means and standard deviations. Principal component analysis (PCA) with varimax rotation (VR) was performed using the "psych" R package to evaluate the correlation structure of the MVFSFI items. Factors were extracted using Kaiser's criteria, where eigenvalues > 1 indicated new factors. Items with factor loadings ≥ 0.40 were considered significant and retained for analysis, while lower loadings were excluded for clarity.

This study was approved by the National Medical Research and Ethics Committee (MREC) of the National Medical Research Registry (NMRR) (registration number: NMRR-21-1397-60192 [IIR]). Women within two months postpartum were excluded because of the nifas period, during which sexual intercourse is culturally and religiously prohibited among Malay Muslims (11). Mental health conditions known to affect sexual functioning were another exclusion criterion (12).

Sociodemographic and Marital Profile Form

A concise questionnaire was designed to collect the respondents' sociodemographic and marital details. The form included items such as the participant's name, age, educational background, employment status, monthly household income, medical and menstrual history, marriage duration, husband's age, number of children,

and frequency of sexual activity.

RESULTS

A total of 368 respondents were recruited, of whom 362 completed the questionnaire, yielding a response rate of 98.4%. The majority of the participants were younger than 40 years (n=265, 73.2%), of Malay ethnicity (n=333, 92.0%), and adhered to Islam (n=335, 92.5%). More than half had a tertiary education (n=203, 56.1%), were employed (n=261, 72.1%), and belonged to the B40 economic group (n=207, 57.2%). Most respondents were non-smokers (n=357, 98.6%) and abstained from alcohol consumption (n=358, 98.9%). Regarding gynaecological history, the mean age of menarche was 12.5 years (SD = 1.2), with 42.8% (n=155) reporting menarche at age 12. Most respondents were married (n=356, 98.3%) and reported a sexual frequency of once or twice per week (n=271, 74.9%). A minority used contraception (n=113, 31.2%), over half (n=198, 54.2%) had their last childbirth more than two years ago, and 58.0% (n=219) gave birth vaginally. Nearly 60% (n=214) had two or fewer children, and 39.5% (n=143) had been married for less than five years. Most partners were aged 30–39 years (n=153, 42.3%).

Principal component analysis (PCA) with varimax rotation revealed a three-factor structure (Table 1). Female sexual desire, arousal, and lubrication formed

Table 1: Factor loadings of sexual function items on three components

Domain	Item	Component		
		1	2	3
Desire	D1	0.78		
	D2	0.82		
Arousal	A3	0.77		
	A4	0.74		
	A5	0.69	0.42	
	A6	0.56	0.54	
Lubrication	L7	0.59	0.44	0.42
	L8		0.42	0.67
	L9	0.43	0.47	0.50
	L10		0.46	0.67
Orgasm	O11	0.44	0.63	
	O12		0.56	0.54
Satisfaction	S13		0.78	
	S14		0.83	
	S15		0.86	
	S16		0.83	
Pain	P17			0.86
	P18			0.88
	P19			0.85

*Using principal component analysis with varimax rotation (loadings less than 0.4 is omitted in the presentation for simplicity).

†Three components were formed using Kaiser's criteria.

‡Eigenvalues are 5.09, 4.79, and 4.58 for components 1, 2, and 3, respectively

the first component, indicating a strong correlation between these domains. Orgasm and sexual satisfaction clustered into the second component, while sexual pain constituted the third standalone component. Moderate correlations existed between the components, as some items, such as lubrication and orgasm, loaded across multiple factors.

Initially, three components were extracted using the eigenvalue 1 cut-off and the scree plot. Though we extract two components or use other rotation methods, the cross-loadings remain the same. On the other hand, it was consistent with a previous study (a reference to our 2008 study), and we believe the cross-loadings were well-explained. The second component, lubrication and orgasm, is very highly correlated with other components such as desire and arousal, satisfaction and also pain. Therefore, the structure of the three components was considered best-plausible.

While highlighting the distinctive nature of sexual pain as a separate factor, this analysis underscores the interconnectedness of the specific domains of the sexual response cycle.

The eigenvalues of the three components in this study were 5.09, 4.79, and 4.58 for components 1, 2, and 3, respectively, while there were 6.11, 5.59, and 3.50 in a previous study (a reference to our 2008 study). Variance extracted was 76.1% in this study, while 80% in the last study. Therefore, the results here are considered consistent and similar to those of the previous study.

DISCUSSION

The concept of the female Sexual Response Cycle (SRC) has predominantly been shaped by research conducted in Western contexts (11). In East Asia, including Malaysia, discussions about SRC are relatively new, especially in the clinical, therapeutic, and academic arenas. This novelty stems from the deeply rooted social and cultural traditions in Malaysia, where topics related to sexuality are often considered taboo. This cultural sensitivity limits open conversations and creates barriers to recognising and addressing the complexities of female sexuality in therapeutic and academic settings. Increasing awareness and fostering discussions are essential for advancing understanding and research in this domain.

Over the years, the conceptualisation of female sexual desire has undergone significant evolution, with terms such as sexual drive, motivation, interest, and libido used interchangeably to describe it (8,17). Women express sexual desire through various behaviours, including their willingness to engage in sensual or sexual activities, which reflects their self-esteem and overall sense of well-being. Although women may express genuine interest in sexual activity, they often take longer

to become physiologically or emotionally prepared for sexual engagement (5–7). Sexual desire is influenced by diverse factors, such as the desire for emotional connection, intimacy, and the release of sexual tension (18). Emotional closeness and bonding, especially after shared experiences of sensuality and romantic cues, play a pivotal role in shaping women’s sexual desire and arousal (14).

Female sexual desire often interacts with other aspects of SRC, such as sexual satisfaction and the frequency of sexual encounters. It is further influenced by contextual factors, including environmental and relational dynamics (4,5,7). Women’s upbringing, cultural norms, and past relationships significantly shape their attitudes and experiences related to sexual desires (17). The psychophysiological manifestations of female sexual desire are often non-genital and include indicators such as increased heart rate, blood pressure, perspiration, or tingling sensations in the nipples. However, many women report experiencing a lack of sexual concordance, wherein their physical responses do not necessarily align with their awareness of sexual desire (5–7).

Over the last few decades, research has substantially influenced the understanding of SRC in women and has contributed to the development of definitions and diagnostic frameworks, such as those found in psychiatric classifications (12). Evidence consistently indicates that many aspects of female SRC do not align with the traditional linear SRC model, which was originally developed based on studies of male sexual function (8). A report by the American Foundation of Urological Disease’s International Definitions Committee, comprising experts from seven countries, highlighted this discrepancy and proposed updated definitions and concepts for female sexual functioning (19). These discussions have led to the conclusion that sexual desire and arousal are not always sequential but often coexist and reinforce each other, suggesting that SRC may not adhere to a strictly linear sequence of phases (20–22). The traditional distinction between sexual desire and arousal is often perceived as binary and somewhat arbitrary by many women. This distinction has been extensively researched in men and has received relatively less attention in studies involving women without female sexual dysfunction (FSD) (23). According to Masters and Johnson’s classical model, women can differentiate between sexual desire and arousal (1). Desire is typically defined as “interest in sexual activity,” while arousal is described as a “state of physical readiness for sexual activity.” These definitions align with the linear model, which emphasises spontaneous physical responses as drivers of sexual excitement. However, contemporary perspectives on female sexuality suggest that women’s primary goal in engaging in sexual activity is not limited to achieving orgasm, but encompasses broader forms of satisfaction, including physical, emotional, relational,

and psychological gratification (4,5,7,9,11).

The concepts of female sexual desire and arousal have been subject to considerable debate in scientific literature (24–26). A large-scale prospective survey involving more than 3,400 women found a strong correlation between sexual desire and arousal. Supporting both linear and circular models, Sand and Fisher (27) validated that women’s SRC encompasses overlapping and dynamic phases. These findings reinforce the idea that female SRC cannot be confined to a rigid, sequential structure and instead involves a nonlinear interplay between various domains. Our study examined SRC among semi-urban Malaysian women, involving over 300 participants from diverse educational and socioeconomic backgrounds. Most respondents reported moderate household income and frequent use of primary healthcare facilities. Using statistical analysis, we identified six domains of female SRC that could be categorised into three primary constructs. The first construct, comprising sexual desire, arousal, and lubrication, reflects motivational and initiating aspects of sexual activity. The second construct, which includes orgasm and sexual satisfaction, represents the achievement phase of sexual response. Lastly, sexual pain emerged as a distinct, standalone, and third construct. These three constructs were identified using the Malaysian Version of the Female Sexual Function Index (MVFSI), a validated psychometric tool. This framework highlights three primary dimensions of female SRC: sexual drive, sexual achievement, and sexual pain.

Our findings of significant correlations between SRC domains align with previous research conducted in Western contexts, particularly supporting the nonlinear or circular model of SRC (5–7). For example, the overlap between female sexual desire and arousal indicates shared psychophysiological and psychological mechanisms, distinguishing women’s SRC from those of men (28,29). The interconnectedness of sexual desire, arousal, and lubrication suggests that these domains represent a unified construct, reinforcing Basson’s circular SRC model (5–7). Basson argued that female sexual desire often stems from non-sexual intimacy and emphasised the importance of relational factors, such as emotional closeness, mutual respect, and shared experiences, in motivating women to engage in sexual activities (6).

Despite its strengths, this study has several limitations. The sample predominantly consisted of Malay women, which may introduce sampling bias and limit the generalisability of the findings to other ethnic groups in Malaysia. Additionally, the study lacked data on the sexual functioning of respondents’ partners, which would have provided a more comprehensive understanding of the relational dynamics affecting SRC. Reliance on statistical analysis without incorporating psychophysiological measures further limited the

scope of the findings. On another limitation, social desirability bias in self-reports may be present, which refers to the tendency of individuals to answer questions in a way that portrays them in a positive and socially acceptable light, even if it's not entirely accurate. This bias can significantly impact the validity of research findings, especially in sensitive topics like sexual behaviour. It can be manifested by over-reporting desirable behaviours, such as preferring to report their desired sexual responses, e.g., reporting that their sexual response is more of Basson (circular) rather than Masters and Johnson (linear) when they have intimate sexual functioning. Moreover, cultural taboos surrounding sexuality among conservative Muslim females likely contributed to underreporting or hesitance among participants to discuss their sexual experiences openly. A relationship issue with their spouse, and a more complex emotion and deep feelings like intimacy and hostilities, will be best studied under a qualitative study. Research has shown that patients often hesitate to disclose sexual issues, even in therapeutic settings with established rapport (30,31). Studies addressing FSD and related difficulties often experience lower response rates owing to these sensitivities (32,33).

There is a clear need for further research on female SRC in Malaysia, particularly studies that incorporate cross-cultural perspectives to enhance our understanding of human sexual responses. Such research could also explore the intersection of race, gender, and individual context (34–37). Our findings align with earlier research conducted in 2008, further supporting the validity of the SRC framework among Malaysian women (38). Future studies should investigate the neural mechanisms underlying SRC (39), examine male sexual responses in depth (40,41), and include participants with mental health conditions that may affect sexual functioning (42).

CONCLUSION

After considering all the explanations, pros and cons, and interpretations of our findings, we conclude that the circular model of sexual response may best suit the Malaysian women's population. Recognising the female sexual response as a circular model has essential diagnostic and therapeutic implications. For diagnostic purposes, we can introduce the concepts of "sexual drive" and "sexual achievement" to help identify Malaysian women experiencing either "sexual drive problems" or "sexual achievement problems." This identification will help clinicians to determine the underlying causes of sexual dysfunction related to sexual responses, enabling a more focused treatment approach. For example, for women who are having sexual dysfunction, recognising their sexual needs may be a natural, spontaneous response through touching and caressing them (not waiting for sexual desire as a first cue). As sexual arousal becomes intense, the sexual desire may precede the sexual arousal and fortify the sexual response, like

subsequent orgasm. The therapeutic approach is that if we apply the Basson model approaches, i.e., foreplay and more caressing, it will lead to a complete sexual response cycle. Furthermore, acknowledging the significant overlap between sexual desire and arousal enhances the understanding and effectiveness of sex therapy.

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