International Journal of Sexual Health

ISSN: 1931-7611 (Print) 1931-762X (Online) Journal homepage: www.tandfonline.com/journals/wijs20

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To cite this article: Daniela Henriques, Pedro Alexandre Costa & Ana Carvalheira (29 Sep 2025): 'Ménage À Moi': An Analysis of Factors Associated with Masturbation Among Women, International Journal of Sexual Health, DOI: 10.1080/19317611.2025.2565374

To link to this article: https://doi.org/10.1080/19317611.2025.2565374

INTERNATIONAL JOURNAL OF SEXUAL HEALTH
https://doi.org/10.1080/19317611.2025.2565374

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'Ménage À Moi': An Analysis of Factors Associated with Masturbation Among Women

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ABSTRACT

Objectives: Although the literature widely documents the benefits of masturbation, it remains a stigmatized and controversial topic with limited studies on women's experiences and related psychosocial factors. This study aimed to assess female genital knowledge, factors associated with masturbation frequency, and the relationship between masturbation frequency during adolescence and orgasm frequency during partnered sexual practices. *Method*: A web-based survey was completed by 469 Portuguese cisgender adult women ($M = 27.2$ years). *Results*: Most of the sample (74.2%) exhibited an average or low level of knowledge of the female genitalia. Roughly 96% acknowledged having masturbated at some point in their lives, with an average age of onset at 14.1 years. The most common frequency of masturbation reported was once a week (25.9%). A hierarchical multiple regression analysis showed significant associations between the frequency of masturbation and age, place of residence, relationship status, attendance of religious services, female genital knowledge, female genital self-image, frequency of masturbation during adolescence, frequency of orgasm during masturbation, and during partnered sexual activity. Frequency of masturbation during adolescence was significantly and positively correlated with orgasm frequency during partnered sexual activity and vaginal penetration. *Conclusions*: These results emphasize the importance of considering multiple factors in the understanding of masturbation, thus aiding in its destigmatization and intervention.

ARTICLE HISTORY
Received 20 November 2024
Revised 17 September 2025
Accepted 18 September 2025

KEYWORDS
Female masturbation; female genital knowledge; female genital self-image; orgasm; sexual behavior

Introduction

Masturbation is the act of solitary self-stimulation of one's own body for sexual purposes, resulting in sexual arousal and/or pleasure (Bowman, 2017). Besides the usual focus on genital stimulation, it can also involve the stimulation of any erogenous zone or body part, the use of masturbatory aids, and may or may not result in orgasm. Masturbation is a fairly common sexual behavior in Western society (Fischer et al., 2022; Herbenick et al., 2010). Despite extensive literature supporting its individual, relational, and health benefits, it remains a controversial and stigmatized subject, particularly women's masturbation, with fewer studies addressing this topic compared to sexual activity in a relational context (Baćak & Štulhofer, 2011; Bullough, 2003; Burri & Carvalheira, 2019; Fahs & Frank, 2014; Herbenick et al., 2023).

Giving pleasure to oneself is an important aspect of human sexuality that begins early, often in childhood (Kayiran & Sönmez, 2020), and is therefore part of healthy sexual development and a potential source of learning about the female genitalia and sexual response (Coleman, 2003). Indeed, sexual pleasure is a crucial aspect of sexuality, sexual health, and sexual rights, as reflected in the definitions of various international institutions (Ford et al., 2021). According to the World Health Organization (WHO, 2006), sexuality is "a central aspect of being human throughout life and encompasses sex, gender identities and roles, sexual orientation, eroticism, pleasure, intimacy and reproduction" (p. 5). Accordingly, as stated by the Global Advisory Board for Sexual Health and Well-being (GAB, 2016), sexual pleasure "should be exercised within the context of sexual rights, particularly

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the rights to equality and non-discrimination, autonomy and bodily integrity, the right to the highest attainable standard of health and freedom of expression" (para. 3). Masturbation is also associated with markers of health and sexual function, with a significant correlation between masturbation and orgasmic response during sexual intercourse, as well as sexual satisfaction (Carvalheira, 2018; Coleman, 2003). Women who masturbated during their teenage years tend to report improved ease of sexual arousal and orgasm frequency during sexual intercourse (Carvalheira, 2018; Carvalheira & Leal, 2013). It also serves as an indicator of genital self-image and sexual empowerment, allowing women to take control of their sexual experiences and assert ownership over their bodies (Bowman, 2014; Kaestle & Allen, 2011).

Some sociodemographic factors have been found to be associated with masturbation. Masturbation rates typically rise during adolescence, peak in young adulthood, and subsequently decline throughout the course of life (Dodge et al., 2010; Herbenick et al., 2010). Further, a higher level of education has been linked to a greater frequency of masturbation due to increased access to information, sexual health literacy, and sex education, which helps to reduce misconceptions and fears surrounding the activity (Gerressu et al., 2008; Kontula & Haavio-Mannila, 2003). Regarding sexual orientation, research indicates that lesbian and bisexual women tend to report a higher frequency of masturbation compared to heterosexual women (Richters et al., 2003; Traeen et al., 2002).

The social and emotional perception of masturbation appears to vary according to gender. According to Kaestle and Allen (2011), most young adults learn about masturbation through media and peers, and that the lack of discussion about the subject within families and schools enhances the internalization of stigmatizing/traditional ideologies and gender role differences, reflecting the traditional sexual double standard. Specifically, the authors reported that women found it more difficult to accept masturbation as a normative practice and had a more conservative or ambivalent discourse, resulting in a conflicted experience between pleasure and shame/stigma, while men more readily recognize its benefits for a healthy sexual development. Indeed, studies show that women tend to report less masturbation activity than men (Coleman, 2003; Herbenick et al., 2010; 2023), and heterosexual women, in particular, tend to perceive solo masturbation as being inferior to partnered intercourse (Foust et al., 2022).

The role of masturbation as a substitute or complement to sexual activity with a partner has been the subject of much research in the literature. The compensatory/substitution model argues that masturbation serves as a means of releasing sexual tension if sexual activity with a partner proves unsatisfactory, if one desires sex more frequently, or if there is no access to a partner (Regnerus et al., 2017). In fact, individuals who are single have been found to have a higher frequency of masturbation in adult samples. In contrast, the complementary model views masturbation as accompanying or reinforcing sexual activity with a partner, with the assumption that sexual activity with a partner increases solo masturbatory behavior. A recent systematic review by Cervilla et al. (2024), lends support to this theoretical distinction by revealing gender-specific patterns: while most studies (71.4%) involving men suggest a compensatory function (as opposed to 7.2% of studies with a positive association), the pattern among women was more nuanced. Specifically, 40% of studies reported no significant relationship between masturbation and sexual satisfaction in women, 33.3% found a negative association, and 26.7% reported a positive association—suggesting a complementary role. In comparison with men, the complementary role of masturbation in women appears to be more frequently observed and is more closely associated with sexual health. In general, studies indicate that various factors can affect the association between sexual activity and masturbation frequency, such as individual, gender, relational, religious, cultural, and sexual agency (Carvalheira, 2018; Carvalheira & Leal, 2013; Cervilla et al., 2024; Das, 2007; Regnerus et al., 2017).

The quality of sex education and the political and religious forces specific to each country can influence masturbatory habits (Francoeur

& Noonan, 2004; Kontula & Haavio-Mannila, 2003). Portugal is a predominantly Catholic country, where social influence and consequent disapproval of autoerotic behavior prevail (Francoeur & Noonan, 2004). Due to cultural and religious stigmas, masturbation can lead to intense feelings of guilt and shame, resulting in difficulties with psychological, sexual, and/or interpersonal functioning (Coleman, 2003). Indeed, the Portuguese study by Carvalheira and Leal (2013) highlights this dimension. Not only did they find a low frequency of masturbation (with the most common frequency being once a month, 36%), but they also noticed that about 35% of the women felt some type of negative emotion/feeling while masturbating: 15.4% shame, 10.3% guilt, and 9.1% ridicule. Furthermore, 16% of women reported engaging in indirect masturbation, where a non-sexual object was pressed against the vulva, suggesting the presence of a stigma associated with masturbation and vulvar exploitation/touching. Religious and educational taboos that forbid vaginal touching and restraint are often transmitted (for example, fear of pain, disgust, guilt, and anxiety about the introduction of foreign bodies/objects), giving women a negative image/representation of their genitals (Carvalheira, 2018). This exacerbates the previous challenge in exploring and learning about the female genitalia, which is already a more complex structure from an anatomical and physiological point of view.

Female genital knowledge

Studies on the knowledge of the female genitalia are particularly scarce and use a wide variety of terminology and instruments, with most studies focusing on health literacy and disease prevention (e.g., El-Hamamsy et al., 2022; Jácomo et al., 2016; Preti et al., 2021; Reid et al., 2017). The definition of female genitalia remains a source of disagreement among international clinical and anatomical societies, adversely impacting communication, research, and healthcare in the field (Zdilla, 2022). The vulva is composed of several anatomical structures that are intrinsically involved in the sexual response, including: the mons pubis, the labia majora, the labia minora, the vestibule, and the clitoris (Yeung & Pauls, 2016). The clitoris, despite being the most important structure for female sexual arousal and orgasm (Yeung & Pauls, 2016), has only recently been studied in greater detail and is still incompletely described in medical textbooks (O'Connell et al., 2005; Pauls, 2015).

The literature indicates that women possess limited knowledge about the female genitalia (Ampatzidis et al., 2021; El-Hamamsy et al., 2022; Howarth et al., 2016; Preti et al., 2021). According to Preti et al. (2021), 23% of women were unable to distinguish between the vulva and the vagina, 61% were unclear about the definition of the vulva, and 83% had difficulty drawing the external genitalia's anatomical structures accurately. Furthermore, approximately one-third of the participants reported no interpersonal variability in female genitalia based on factors such as age, ethnicity, or body mass index. According to the authors, this is related to a lack of education about genital anatomy and how the female genitalia is portrayed in the media. Women have more difficulty identifying the structures of the external genitalia than the internal genitalia (Ampatzidis et al., 2021; Reid et al., 2017), and these differences are attributed by the authors to the greater exposure of images of the internal genitalia in school and medical educational materials (Reid et al., 2017). Nonetheless, women appear to be more accurate in labeling anatomical structures of the female genitalia than men (El-Hamamsy et al., 2022).

Knowledge of the female genitalia may be obtained through formal (e.g., school sex education) and informal (e.g., home, relationships) sources (Fudge & Byers, 2020). However, school sex education often serves as the sole dependable source of information for many women, and even that fails to promote any concept of genital diversity or help them comprehend their bodies (Howarth et al., 2016). Lack of knowledge regarding their bodies can negatively impact women's individual health, such as prevention, communication, and underutilization of the health care system, as well as the health of their offspring and family members, and thus the population (Reid et al., 2017; Shieh & Halstead, 2009). Additionally, it can hinder a woman's pleasure

and orgasm, with masturbation serving as a potential solution to explore and learn about the female genitalia (Carvalheira, 2018).

Female genital self-image

Female genital self-image pertains to genital self-perceptions, i.e., women's subjective feelings and beliefs regarding their own genitalia (Fudge & Byers, 2020; Herbenick & Reece, 2010; Komarnicky et al., 2019). This construct emerges from the interplay between individual and psychosocial factors and is influenced by information communicated through social, cultural, and historical contexts, as well as models and images presented by the media (e.g., pornography) and immediate social experience (e.g., feedback/evaluations from partners) (Braun & Wilkinson, 2001; Fahs, 2014; Fudge & Byers, 2020). It is through this process that women develop cognitive-affective representations of how their genitalia's appearance, function, scent, taste, and perception by their sexual partners could be (Braun & Wilkinson, 2001). As a result, women who perceive their genitalia as deviating from the expected or idealized version, or similar to the feared version, experience dissatisfaction with it (Fahs, 2014; Fudge & Byers, 2020).

Literature suggests that despite moderate reports of positive genital self-images among women (Fudge & Byers, 2020; Herbenick et al., 2011), many women still experience some level of dissatisfaction with their genitalia (Fahs, 2014). Multiple aspects such as hair, menstruation, sexual functioning, labia appearance, odor, and notions of racial implication about the "darkness" of the genitalia are concerns and anxieties expressed, suggesting that the vagina has a vast emotional, cultural, and social significance for women (Fahs, 2014). Indeed, vaginoplasty and laser vaginal rejuvenation are esthetic interventions on the rise and one of the most recent chapters of female victimization in Western society, with the goal of conforming women to the male erotic fantasies: hairless, devoid of color, symmetrical, and even infantilized (Conroy, 2006).

Female genital self-image can hinder daily activities and sexual experiences due to concerns related to appearance, performance, and/or embarrassment (DeMaria et al., 2019; Komarnicky et al., 2019; Vigil et al., 2021). Limited knowledge about how female genitalia should look, smell, and feel is suggested as the cause (DeMaria et al., 2019). Women who have a positive genital self-image tend to be more involved in activities such as receiving oral sex, using vibrators, self-examining their genitalia, and undergoing gynecological exams more often, as well as engage in masturbation more frequently. In contrast, they are less likely to experience any negative changes in their sexual function (Herbenick et al., 2011; Herbenick & Reece, 2010; Komarnicky et al., 2019).

Although there is evidence of a positive association between female genital self-image and masturbation, to our knowledge no research has specifically examined the relationship between masturbation and knowledge of female genitalia. In addition, few studies have examined the relationship between these other variables, occasionally yielding conflicting outcomes. Research has shown that women who have a positive genital self-image are more likely to engage in masturbation, undergo gynecological exams, and self-examine their own genitalia (Bowman, 2014; Carvalheira, 2018; Herbenick et al., 2011). However, contrary to their initial hypotheses, the study by Fudge and Byers (2020) found that knowledge of female genitalia was not associated with female genital self-image after controlling for social desirability but was associated with the quality of sexual health education received in school at the bivariate level. The relevance of the present study lies in filling this gap in scientific knowledge, thus clarifying a phenomenon that is so often stigmatized. This study had three primary goals: (1) to investigate women's knowledge of the female genitalia; (2) to explore the variables associated with the frequency of masturbation during the past 12 months; and (3) to analyze the relationship between the frequency of masturbation during adolescence and the frequency of orgasm during sexual activity and vaginal penetration with a partner. A quantitative, exploratory, correlational, and cross-sectional study was conducted to achieve this goal. Based on the literature review, a positive association is

expected between the practice of masturbation and knowledge of the female genitalia as well as female genital self-image.

Materials and methods

Participants

To participate in this study, individuals had to meet the following criteria: (1) identify as a cisgender woman, (2) hold Portuguese nationality, and (3) be at least 18 years of age. Out of the initial 490 participants, 21 were excluded due to errors in filling out the protocol (e.g., entering impossible values or data in the incorrect fields), resulting in a final sample of 469 women. Their average age was 27.2 years ($SD = 11.19$; range = 18-78). Most participants (56.9%) reported being in a stable or committed relationship (Table 1). In terms of education, 56.7% held a bachelor's degree, 24.9% had a high school diploma, 17.9% held a master's degree or doctorate, and 0.4% held an elementary school diploma. The majority (71.2%) of participants reported having no religious affiliation, with the remaining 28.8% identifying as Christian (27.3%) or unspecified religion (1.5%).

Table 1. Sociodemographic characteristics of the sample ($N = 469$).

Variables	%	*n*
Place of residence		
Large city	63.3	297
Small town	27.9	131
Rural	8.7	41
Relationship status		
Not in a steady/committed relationship	43.1	202
In a steady/committed relationship, with a length of:		
<1 year	10.7	50
1–2 years	14.5	68
2–3 years	6.0	28
3–4 years	7.2	34
>4 years	18.6	87
Attendance of religious services		
No religion	46.1	227
Never	18.2	88
Less than once a year	11.0	52
Once a year	5.7	24
Twice a year	7.4	33
Once a month	3.8	16
Twice a month	2.6	8
Once a week or more	5.3	21
Sexual orientation		
Exclusively heterosexual	58.8	276
Predominantly heterosexual	26.2	123
Equally heterosexual e homosexual	6.6	31
Predominantly homosexual	4.9	23
Exclusively homosexual	3.4	16

Procedures

Women were invited to take part in the study by completing an online survey hosted on Google Forms platform. Prior to this, a pilot study was conducted with five participants who provided feedback on their general understanding of the protocol and questions, thus assessing the face validity of the items. The initial group consisted of five Portuguese cisgender women selected through convenience sampling from the personal networks of the researchers involved. Feedback was primarily provided in written form, with a few exceptions that were discussed. The feedback received raised issues with the protocol's design and difficulties in comprehending certain items/questions in Portuguese that required linguistic/cultural adjustments (e.g., the term "my genital organ" was changed to "my genitalia" in the Female Genital Self-Image Scale). The protocol was then reviewed and corrected by the researchers based on the feedback and suggestions received before proceeding with a large-scale dissemination. Overall, women were recruited through non-probability sampling methods, specifically self-selection sampling, by sharing the web link on various social media platforms, such as Facebook, Instagram, LinkedIn, and others. Initially, participants were provided with an informed consent form containing a brief explanation of the study and were then requested to provide their consent before completing the protocol. Data collection occurred between January and March 2023. The study was approved by the ethics committee of ISPA—University Institute.

Measures

Sociodemographic Questionnaire

The sociodemographic characteristics of the sample were obtained by asking participants about their *age* (open-ended answer option), *educational level* ("What is your highest level of education completed?", with response categories ranging from: elementary school diploma to master's degree/doctorate), *sexual orientation*, *relationship status*, *place of residence*, *religion* ("Do you currently identify with any religious affiliation?", response options were: "No"; "Yes, Christian religion"; "Yes, other

religion"), *attendance of religious services* ("Apart from special occasions such as weddings, funerals, and baptisms, how often do you attend religious services or meetings?", response categories were: "No religion"; "Never" to "Once a week or more"), *gender* ("Which gender do you identify with?", response options were: female, male, non-binary, other), and *birth sex* ("What sex were you assigned at birth?", response categories were: female, male). See Table 1 for more details and response options.

Female genital knowledge

Due to the absence of a suitable available measure to assess female genital knowledge (Reid et al., 2017), the researchers developed a scale based on their clinical experience (where they observed a greater degree of confusion, misunderstanding, and lack of knowledge about the content measured by this scale) and prior research on the subject (e.g., Ampatzidis et al., 2021; El-Hamamsy et al., 2022; Fudge & Byers, 2020; Preti et al., 2021; Reid et al., 2017). The developed 7-item scale addresses female genital anatomy and physiology by presenting statements to be rated as true or false (Table 2). The total score was computed by summing the number of correct responses in the seven items, ranging from 0 to 7 points. Higher scores indicate a greater knowledge of the female genitalia. The KR-20 value for this particular scale was 0.62, suggesting a questionable internal consistency and potential for enhancement.

Variables related to masturbation

Since a validated or standardized questionnaire was not available to assess specific dimensions of masturbatory behavior (Burri & Carvalheira, 2019), the researchers developed a questionnaire by using the items employed in previous similar studies (e.g., Burri & Carvalheira, 2019; Carvalheira & Leal, 2013), choosing only the most relevant ones for this research. Initially, the participants were asked if they had ever engaged in masturbation; if yes, they were further asked about their *age at onset* ("How old were you when you masturbated for the first time?", with an open-ended answer option), *frequency of*

Table 2. Response rates for the Female Genital Knowledge Scale ($N = 469$).

Items	% of correct answers	*n*	% of incorrect answers	*n*
1. The clitoris is an internal anatomical structure that is shaped like the wings of an airplane. (T)	43.3	203	56.7	266
2. Only a small part of the clitoris is outside the body (glans). (T)	90.2	423	9.8	46
3. The clitoris has a length of 1-2 cm. (F)	55.7	261	44.3	208
4. The clitoris has a length of 8-10 cm. (T)	52.2	245	47.8	224
5. The vulva and the vagina are the same. (F)	94.9	445	5.1	24
6. The sensitivity of the vagina is the same as of the clitoris. (F)	98.3	461	1.7	8
7. The vagina of a woman who has more sexual activity becomes more stretched/"loose". (F)	84.6	397	15.4	72

Note. (T) = True; (F) = False.

masturbation during adolescence ("On average, how often did you masturbate during your adolescence?", rated on a scale of 1 = Less than once a year to 9 = Sometimes more than once a day), and *over the past 12 months* ("On average, how often have you masturbated in the past 12 months?", rated on a scale of 1 = Less than once a year to 9 = Sometimes more than once a day); if no, they were directed to the next part of the protocol.

Variables related to orgasm in sexual practices

To determine the frequency of orgasms in various sexual practices, both alone and with a partner, the study included questions concerning the *frequency of orgasm during masturbation* ("Overall, how often do you reach orgasm while masturbating?", rated on a scale of 1 = Never to 5 = Always and more than one orgasm"), *frequency of orgasm during sexual activity* ("Altogether, how often do you orgasm during sexual activity with your partner? This includes vaginal and anal penetration, any type of genital stimulation, and mutual masturbation.", rated on a scale of 1 = Never to 6 = Always), and *frequency of orgasm vaginal penetration with a partner* ("Overall, how often do you orgasm during vaginal penetration with your partner? Regardless of whether or not there is other stimulation at the same time.", rated on a scale of 1 = Never to 6 = Always).

Female genital self-image

Female genital self-image was assessed using the Female Genital Self-Image Scale (FGSIS; Herbenick & Reece, 2010; adapted by Mendes et al., 2021). The FGSIS consists of 7 items, such as: "I am not embarrassed about my genitals" or "I think my genitals smell fine". Unlike the original and adapted versions of the instrument, the items were scored on a 5-point Likert-type scale (ranging from 1—"strongly disagree" to 5—"strongly agree"). This modification aimed to standardize the protocol and provide greater response detail, avoiding the need for participants to adopt a polarizing stance on a delicate and sensitive issue for women. The total score is calculated by summing the individual scores (ranging from 7 to 35 points) with higher scores indicating a greater level of satisfaction with female genital self-image. Studies have shown good psychometric properties for the original English version (Fudge & Byers, 2020; Herbenick & Reece, 2010), and acceptable properties for the Portuguese version (Mendes et al., 2021). The scale exhibited good internal consistency in the present research, with a Cronbach's alpha value of .85.

Analytic Strategy

Statistical analyses were conducted using IBM SPSS Statistics (version 30). As all participants completed the full protocol, there were no missing data to impute, and analyses were performed on the total sample ($N = 469$). Depending on the analysis, relevant subsamples were considered (e.g., the hierarchical regression model related to masturbation included only participants reporting this behavior). For the purposes of analysis, the total score on the female genital knowledge variable (ranging from 0 to 7) was categorized into three levels based on the empirical distribution of responses. The 33rd and 66th percentiles were utilized as cut points, thereby classifying participants as having low knowledge (0–4, $\leq$ 33rd percentile), average/moderate knowledge (5–6, 34th–66th percentiles), and high knowledge (7, $>$ 66th percentile). Pearson's correlations were conducted to examine the associations between the frequency of masturbation during adolescence and the frequency of orgasm during sexual activity and vaginal penetration with a partner. To explore patterns of association between factors and the frequency of masturbation in the last 12 months, a correlational analysis of all variables included in the study was conducted, followed by a hierarchical multiple regression model, with masturbation frequency designated as the dependent variable. Several variables were recoded into dummy variables to be introduced in the regression model, namely, sociodemographic variables such as place of residence (urban = 0 vs. rural = 1), educational level (elementary/high school diploma = 0 vs. university/college degree = 1), relationship status (single = 0 vs. partnered = 1), and sexual orientation (heterosexual = 0 vs.

non-heterosexual = 1). An *enter* method was conducted in three steps. Step 1 assessed the contribution of sociodemographic variables (to control for confounding effects). Step 2 added variables related to genital knowledge and self-image, and Step 3 introduced sexual variables related to masturbation. None of the variables used presented any issues of multicollinearity (Marôco, 2018).

Results

Female genital knowledge

The mean score of the sample for female genital anatomy and physiology was 5.19 ($SD = 1.48$; range = 1–7). Most participants (74.2%, $n = 348$) scored between 0 and 6 points (Table 3). Some items were found to have a higher rate of incorrect answers (around 50%), specifically items 1, 3, and 4, all pertaining to knowledge about the clitoris (Table 2). The results from anatomy-related questions showed that 56.7% ($n = 266$) of women did not consider the clitoris to be an internal anatomical structure that is shaped like the wings of an airplane. Furthermore, 47.8% ($n = 224$) of the participants were incorrect about the accurate size of the clitoris, and 44.2% ($n = 261$) believed it to be between 1-2 cm. Phi's correlation coefficient showed several correlations, including a strong positive association between item 3 and 4, which are opposite statements about the size of the clitoris (Table 4). Additionally, a noteworthy positive correlation was found between item 7 and items 3, 5, and 6, suggesting a connection between the existence of myths/false beliefs and a lack of knowledge regarding the clitoris (items 3 and 6) and the vulva (item 5).

Masturbatory behavior and related variables

Overall, 95.5% ($n = 448$) of the participants reported that they had engaged in masturbation at some point in their lives, although a few had never done so. The average age of onset for masturbation was 14.1 years ($SD = 4.49$; range = 3-44), with most of the sample (81.3%, $n = 364$) having started between the ages of 10 and 19. The frequency of masturbation during adolescence among these women ranged widely.

Table 3. Distribution of the overall score obtained on the Female Genital Knowledge Scale ($N = 469$).

Overall score	%	*n*
0–4 points	37.5	176
5–6 points	36.7	172
7 points	25.8	121

Approximately 22% ($n = 98$) of participants reported masturbating 2-3 times a week, followed by twice a month (19.4%, $n = 87$) and once a week (17.2%, $n = 77$). However, 14.7% ($n = 66$) reported masturbating less than once a year and 3.1% ($n = 14$) more than once a day during adolescence. The frequency of masturbation during adolescence was found to be positively and significantly associated with the frequency of orgasm during sexual activity ($r = .18$, $p < .001$) and vaginal penetration ($r = .10$, $p = .040$) with a partner.

The frequency of masturbation in the past 12 months among those who engaged in masturbation also showed a wide distribution. Nearly 26% ($n = 116$) of participants reported masturbating once a week, followed by twice a month (23.9%, $n = 107$) and 2-3 times a week (19%, $n = 85$); 5.1% ($n = 23$) reported masturbating less than once a year, and 2.7% ($n = 12$) reported masturbating more than once a day. In addition, 7.4% ($n = 33$) of the subsample who engaged in masturbatory behaviors reported never having experienced an orgasm during the act, compared to 12.5% ($n = 56$) who reported achieving an orgasm every time, and sometimes more than one.

Bivariate correlations among study variables are presented in Table 5. As shown in Table 6, Step 1 (sociodemographic variables) was found to be significant and accounted for 14% of the variance of frequency of masturbation in the last 12 months, $F(6, 441) = 12.33$, $p < .001$. Age, place of residence, relationship status, and attendance of religious services were all significantly associated with masturbation frequency. Thus, a higher frequency of masturbation in the past 12 months was found to be associated with younger, single women residing in urban areas and with lower attendance of religious services. Step 2 (genital knowledge and self-image variables) was also significant, $F(8, 439) = 12.53$, $p < .001$, accounting for an additional 4% of variance,

Table 4. Correlations between items of the Female Genital Knowledge Scale ($N = 469$).

Item	1	2	3	4	5	6
1. The clitoris is an internal anatomical structure that is shaped like the wings of an airplane.	–					
2. Only a small part of the clitoris is outside the body (glans).	.06	–				
3. The clitoris has a length of 1–2 cm.	.31***	.18***	–			
4. The clitoris has a length of 8–10 cm.	.34***	.20***	.90***	–		
5. The vulva and the vagina are the same.	.01	.02	.07	.07	–	
6. The sensitivity of the vagina is the same as of the clitoris.	−.02	.07	.02	.01	.04	–
7. The vagina of a woman who has more sexual activity becomes more stretched/"loose".	.06	.12*	.16***	.19***	.14**	.17***

Note: $p < .05$. $p < .01$. $p < .001$.

Table 5. Correlation between the variables in the study ($N = 448$).

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Frequency of masturbation during the past 12 months	–										
2. Age	−.27***	–									
3. Place of residence	−.09	−.08	–								
4. Educational level	−.03	.27***	.00	–							
5. Relationship status	−.18***	.03	−.02	−.02	–						
6. Attendance of religious services	−.21***	.14**	.07	.06	.08	–					
7. Sexual orientation	.15**	−.16***	−.04	−.10*	−.04	−.14**	–				
8. Female genital knowledge	.21***	−.16***	−.11*	.02	.02	−.22***	.01	–			
9. Female genital self-image	.13**	.10*	−.02	.14**	.11*	−.02	−.04	.08	–		
10. Frequency of masturbation during adolescence	.49***	−.11*	−.07	−.09	.00	−.19***	.11*	.11*	.04	–	
11. Frequency of orgasm during masturbation	.33***	.04	−.09	.03	.03	−.15**	.02	.18***	.22***	.33***	–
12. Frequency of orgasm during sexual activity with a partner	−.03	.15**	−.06	.07	.38***	.02	−.01	.15**	.37***	.18***	.28***

Note: $p < .05$. $p < .01$. $p < .001$.

Table 6. Factors associated with last year's masturbation frequency ($N = 448$).

Variables	R^2_a	ΔR^2	*B*	*β*
Step 1: Sociodemographic variables	.13***	.14***		
Age			−0.04	−.25***
Place of residence (urban vs. rural)			−0.60	−.10*
Educational level (elementary/high school vs. university/ college diploma)			0.20	.05
Relationship status (single vs. partnered)			−0.54	−.15***
Attendance of religious services			−0.13	−.15**
Sexual orientation (heterosexual vs. non-heterosexual)			0.40	.08
Step 2: Genital knowledge and self-image variables	.17***	.04***		
Female genital knowledge			0.15	.13**
Female genital self-image			0.05	.16***
Step 3: Sexual variables related to masturbation	.39***	.22***		
Frequency of masturbation during adolescence			0.32	.41***
Frequency of orgasm during masturbation			0.29	.19***
Frequency of orgasm during sexual activity with a partner			−0.20	−.16***

Note: $p < .05$. $p < .01$. $p < .001$.

F_{change} (2, 439) = 11.40, $p < .001$ (Table 6). Female genital knowledge and female genital self-image were also significantly associated with masturbation frequency. Higher levels of female genital knowledge and female genital self-image were associated with a greater frequency of masturbation in the last year. Step 3 (sexual variables related to masturbation) was also significant, $F(11, 436) = 26.75$, $p < .001$, and accounted for an additional 22% of the variance, F_{change} (3, 436) = 52.82, $p < .001$ (Table 6). Frequency of masturbation during adolescence, frequency of orgasm during masturbation, and frequency of orgasm during sexual activity with a partner were found to be significantly associated with masturbation frequency. Thus, higher frequency of masturbation in the last 12 months was associated with higher frequency of masturbation during adolescence, higher frequency of orgasm during masturbation, and lower frequency of orgasm during sexual activity with a partner. Overall, the hierarchical regression was statistically significant, explaining 40% of the total variance.

Discussion

The main purpose of this study was to investigate women's knowledge of the female genitalia, to explore variables associated with the frequency of masturbation in the past 12 months, and to analyze the relationship between the frequency of masturbation during adolescence and the frequency of orgasm during sexual activity and vaginal penetration with a partner. To this end, a quantitative, exploratory, correlational, and cross-sectional study was conducted with a sample of 469 women. The study participants showed an average or low level of knowledge regarding the female genitalia. Several variables were found to be significantly associated with the frequency of masturbation in the past 12 months. Additionally, a significant and positive correlation was observed between the frequency of adolescent masturbation and the frequency of orgasm during partnered sexual activity, as well as during vaginal penetration with a partner.

Female genital knowledge

Regarding the first objective, most of the sample (74.2%) exhibited an average or low level of knowledge of the female genitalia. These findings are consistent with the majority of the current literature on the subject (Ampatzidis et al., 2021; El-Hamamsy et al., 2022; Howarth et al., 2016; Preti et al., 2021). As observed by Preti et al. (2021), a significant proportion of the women (23%) could not name the difference between the vulva and the vagina (vs. 5.1% found in our study), did not know what the vulva was (61%), and had difficulty drawing and naming the external female genitalia correctly (85%). Regarding the latter, approximately 61% of respondents left the question blank, and almost all these women commented that the question was inappropriate because it was embarrassing. This phenomenon is further substantiated by the qualitative study conducted by Howarth et al. (2016), which revealed that the women in their sample employed a diverse array of terminology to describe their

genitalia, with “vagina” being the most frequently used term among adults. The precise anatomical parts to which the term "vulva" referred were not widely known, and most women preferred to use the term "vagina" to refer to their entire genital area, although some were aware that this was not anatomically correct. As the authors of previous studies have mentioned, the observed low or average knowledge of the genitalia may reflect a lack of or gaps in sex education regarding genital anatomy (Howarth et al., 2016; Preti et al., 2021), which often omits aspects related to the genitalia (e.g. the clitoris) (Allen, 2004) and emphasizes the reproductive dimension (e.g. manuals with abstract drawings of the internal reproductive structures) (Allen, 2004; Howarth et al., 2016) and prevention of dangers associated with sexual activity—rather than focusing on women’s desire, pleasure or knowledge of their bodies, this approach exclusively recognizes heterosexuality and restricts their sense of empowerment and entitlement to sexuality (Allen, 2004). Throughout history, a binary lens has been utilized regarding gender and sexuality, whereby sexual pleasure that does not align with the experience of a cisgender male is often stigmatized, associated with shame, control, and oppression (Peters et al., 2023). This powerful principle has influenced the impartiality of scientific research, particularly in the field of sexual health.

Furthermore, it was found that approximately 50% of the responses for items 1, 3, and 4 of the Female Genital Knowledge Scale were incorrect, indicating a lack of understanding of the clitoris. The analysis of inter-item correlations supports this idea, as there is a strong positive association between item 4 and 3, which are contradictory statements about the size of the clitoris, and therefore also reveal a lack of knowledge about its anatomy. These findings are consistent with Rath’s (2018) study, which interviewed cis women and female-assigned at birth trans and found that only a small number knew about the full size and anatomy of the clitoris and those who knew this information learned it from feminist and sex education sources on the Internet. Although many participants lacked knowledge about the clitoris, they recognized the importance of learning about it to enable them to experience sexual pleasure. Indeed, the clitoris is a vital structure for female sexual pleasure and orgasm, and sexual practices involving the clitoris have consistently been shown to enhance sexual pleasure and increase the likelihood of orgasm in women (Dienberg et al., 2023). Despite its significance, the clitoris has been seriously misunderstood, misrepresented, and often neglected within the social consciousness and medical literature (Peters et al., 2023).

Lastly, the positive correlation between item 7 (“The vagina of a woman who has more sexual activity becomes more stretched/"loose"”) and items 3 (“The clitoris has a length of 1-2 cm”), 5 (“The vulva and the vagina are the same”), and 6 (“The sensitivity of the vagina is the same as of the clitoris”) also suggests a relationship between the presence of sexual myths/erroneous beliefs (Nobre et al., 2003) and lack of knowledge about the clitoris/vulva. Dysfunctional sexual beliefs are false and unrealistic concepts about sexuality that are accepted as unquestionably true, despite a lack of evidence to support them (Nobre et al., 2003). These beliefs are internalized from childhood through contact with the socio-cultural environment, direct sources of information (such as the internet, pornography, and sex education programs), as well as personal experience (Nobre & Pinto-Gouveia, 2006). However, holding dysfunctional sexual beliefs can be problematic as they may increase susceptibility to developing and maintaining sexual difficulties and dysfunctions. The present framework underscores the imperative for increased investment in sex education and health programs, incorporating a discourse on eroticism that acknowledges desire, pleasure, and the practical experiences of these phenomena (Allen, 2004).

Masturbatory behavior and related variables

Approximately 96% of the participants reported having engaged in masturbation at some point in their lives, which is consistent with the findings of previous studies in this area. For instance, the study by Carvalheira and Leal (2013) found that 91% of the Portuguese women surveyed reported having masturbated previously ($N = 3,687$). Similarly, Lima et al. (2022) reported a response

rate of 96.7% for their Brazilian sample, and Burri and Carvalheira (2019) reported a response rate of 94.5% for their German sample. However, some disparities exist when compared to other studies: Baćak and Štulhofer (2011) reported that 60% of the Croatian women constituting their sample had engaged in masturbation; Herbenick et al. (2023) reported a prevalence of 76.7% among a representative sample of the American population; while Gerressu et al. (2008) noted a prevalence of 71.2% in a representative sample of women from England. These discrepancies may stem from methodological differences in: (a) the data collection process, where an online questionnaire was used because it is the most reliable method of obtaining truthful information from participants on sensitive topics such as sexuality, compared to pencil and paper questionnaires (Baćak & Štulhofer, 2011; Carvalheira & Leal, 2013); and (b) the type of sample, which in this study was recruited through self-selection sampling. Nevertheless, they may also result from possible sociocultural variations (Burri & Carvalheira, 2019).

The frequency of reported masturbation varied significantly among participants. Overall, most of the sample who engaged in masturbation reported doing so once a week (25.9%), twice a month (23.9%), or 2–3 times a week (19%) within the past 12 months. These frequencies differ from those found in the Portuguese study by Carvalheira and Leal (2013)—published about a decade ago—where most women reported masturbating less than once a month (34%), with only 14.3% reporting more than once a month, and 9.8% reporting weekly masturbation. Since the demographics of the samples are comparable, the observed discrepancies can be ascribed to the recent modernization of Portuguese society and the consequent changes in views on gender roles and sexuality, with the Portuguese population becoming increasingly more open to the phenomenon of masturbation (Aboim, 2013; Francoeur & Noonan, 2004). Indeed, there has been an easing of the double standard of sexism and homophobia, thus allowing women and non-heterosexual individuals to claim their rights to eroticism and sexual citizenship (Aboim, 2013). In contrast, the findings are comparable to those reported by Burri and Carvalheira (2019) with a sample of German women. Most women reported engaging in masturbation with a frequency of either 2–3 times a week (26.8%), once a week (26.3%), or twice a month (20.9%). These minor differences are unlikely to be attributed to demographic variables since the samples had relatively similar mean ages and percentages of single women. Instead, such differences may be attributed to religious or sociocultural factors (Burri & Carvalheira, 2019).

It should also be noted that 4.9% of the sample who engaged in masturbation reported a frequency of daily or multiple times per day over the past 12 months. This trend has been previously observed in studies such as Carvalheira and Leal (2013), who reported 5.7% of women experiencing similar findings, and Burri and Carvalheira (2019), who found 10% of their sample reporting the same. This phenomenon may be associated with some individuals using sexual behavior, including masturbation, as a way to manage their mood when experiencing elevated levels of stress and pressure (Bancroft, 2009).

Regarding the second objective of this study, several factors were identified and accounted for a significant portion of the variance of masturbatory activity in the last 12 months. Women who were younger, single, residing in urban areas, with lower attendance of religious services and frequency of orgasm during sexual activity with a partner, but greater female genital self-image and female genital knowledge, higher frequency of masturbation during adolescence and frequency of orgasm during masturbation were associated with a higher frequency of masturbation in the past 12 months. Several studies have found a negative correlation between religiosity and female masturbation (Baćak & Štulhofer, 2011; Carvalheira & Leal, 2013). Our study supports these findings, suggesting that the teachings of the Catholic Church influence the masturbatory behavior of religious women (Baćak & Štulhofer, 2011). Thus, participating in more ritual interactions may foster the implementation of social control processes and moral influence, such as the dissemination of messages about normative sexuality in religious sermons.

Knowledge of the female genitalia was positively associated with a higher frequency of masturbation. Indeed, accurate and standardized information gathered from various sources can help women increase their knowledge of their genitalia and reduce their adherence to myths or misinformation (Fudge & Byers, 2020), ultimately lead to a decrease in the fears and feelings of guilt associated with masturbation habits (Kontula & Haavio-Mannila, 2003). Some studies that specifically examined clitoral knowledge found that an increase in knowledge of the clitoris was linked to a reduction in adherence to gendered sexual scripts, which was in turn linked to a rise in pleasure and orgasmic experience (Dienberg et al., 2023; Wade et al., 2005). The literature indicates a positive correlation between female genital self-image and frequency of masturbation (Fahs, 2014; Herbenick et al., 2011; Herbenick & Reece, 2010), which aligns with our study results. Studies have found that positive genital self-image is linked to higher frequency of gynecological exams, masturbation, pleasure, receipt of oral sex, and better overall sexual function (DeMaria et al., 2011; Herbenick et al., 2011; Herbenick & Reece, 2010). Women who possess a positive self-image of their genitals exhibit higher levels of comfort with their bodies and genitalia, viewing their genitalia as an integral part of their identity, sexuality, and overall well-being, much like any other body part (DeMaria et al., 2019).

The positive relationship between the frequency of masturbation during adolescence and the frequency of masturbation in the past 12 months can be attributed to the fact that many individuals explore their bodies and discover sexual responses through masturbation during adolescence (Atwood & Gagnon, 1987; Saliares et al., 2017), and therefore it is expected that later in life they will continue to engage in similar masturbation tendencies that they learned during this period (Kontula & Haavio-Mannila, 2003). Indeed, masturbation plays a positive role in sexual development (Carvalheira, 2018). Hogarth and Ingham (2009) found that positive masturbatory experiences were associated with feelings of pleasure, release, inner calmness, and greater body awareness and autonomy in young women. The authors suggest that these positive experiences may be interconnected with an open relationship with parents, comfort with one's body, awareness of personal desires and needs, effective communication with partners, and the adoption of safer sexual practices. Some studies suggest that orgasm may serve as a reward for engaging in sexual activity by activating specific regions of the brain that are associated with pleasure, addiction, and reward circuits (Berridge & Kringelbach, 2015). This phenomenon may also occur during solitary sexual activity, potentially explaining the positive correlation between the frequency of orgasm during masturbation and the frequency of masturbation. In turn, the frequency of orgasm during sexual activity with a partner was negatively associated with the frequency of masturbation. This finding is consistent with Kontula and Meittinen's (2016) research, although their correlation was not statistically significant. Interestingly, women who had never masturbated or had only done so infrequently were more likely to experience orgasm during intercourse. This inverse relationship may be related to the compensatory/replacement model, in which the absence of a partner or sexual frustration with their partner can lead to an increased investment in masturbatory behaviors to relieve sexual tension (Regnerus et al., 2017; Rowland, Kolba, et al., 2020). Carvalheira and Leal (2013) noted that some women can only achieved orgasm through indirect masturbation (where a non-sexual object was pressed against the vulva), resulting in frustration when they are unable to enjoy and orgasm with a partner. Therefore, the misalignment between masturbation and partnered sexual activity may negatively impact the likelihood of achieving orgasm and experiencing pleasure during partnered sex, leading to a preference for masturbation over partnered sex (Rowland, Hevesi, et al., 2020).

Orgasmic response with a partner and masturbation during adolescence

Regarding the third objective of the study, the findings indicated a significant and positive correlation between the frequency of masturbation during adolescence and the frequency of orgasm

during sexual activity with a partner, as well as during vaginal penetration with a partner. The study conducted by Carvalheira and Leal (2013) also produced similar results, suggesting that women who engaged in masturbation during adolescence experienced a greater ease of sexual arousal and frequency of orgasm during sexual intercourse. As previously noted, adolescence is a phase in which individuals explore their body and sexual responses via masturbation (Atwood & Gagnon, 1987; Saliares et al., 2017), with clitoral stimulation being the most prevalent practice (Fahs & Frank, 2014). Therefore, it is possible that a greater experience with masturbation (accumulated over time) may facilitate the adjustment of the existing stimulation during sexual activity in order to achieve orgasm, regardless of who is doing it. Furthermore, increased familiarity with clitoral stimulation may ease its integration into any sexual activity, thereby increasing the likelihood of achieving orgasm. The study by Horne and Zimmer-Gembeck (2005) corroborates this possibility by observing that female adolescents who reported masturbating demonstrated higher sexual subjectivity. Indeed, they felt more entitled to sexual pleasure from themselves and partners, more efficacious in achieving sexual pleasure, and were more sexually self-reflective compared to those without such experience. Nonetheless, our findings are correlational in nature and should be further explored through longitudinal research.

Strengths and limitations

To the best of our knowledge, this study is the first to address the relationship between women's practice of masturbation and knowledge of the female genitalia. With a substantial sample size of 469 women of diverse sexual orientations, this study makes a significant contribution to the scientific knowledge regarding female masturbation and promotes equal destigmatization of such sensitive and taboo topic.

As for the limitations of the present study, we used a self-selection sampling method due to the ease of access and recruitment of participants. However, this method is non-probabilistic and cannot guarantee the representativeness of the populations studied. Additionally, the specific characteristics of the sample, including age, education level, culture, and religion further limit the generalizability/extrapolation of the results obtained. It is worth noting that this sample only included cisgender women, which is also a limitation. Nevertheless, this was based on the assumption that the discrepancy between sex and gender may affect individuals' knowledge of and relationship with their genitalia (e.g., less knowledge, poorer genital self-image, and greater avoidance of contact due to dissatisfaction), which in turn could have affected the results.

It is important to note a potential bias in the voluntary participation of the study, which is prevalent and troublesome in sexuality research (Burri & Carvalheira, 2019). In fact, individuals who are inclined to participate in sexuality studies tend to possess greater sexual experience, be more comfortable with related topics, and hold a less conventional perspective toward sexuality (Fahs, 2014; Wiederman, 1999). Additionally, conducting research on sexuality within highly religious populations poses specific challenges, particularly due to the presence of cultural taboos, strict normative frameworks, and potential conflicts between religious doctrine and sexual behavior (Cortes et al., 2021). These contextual factors may result in participants abstaining from answering or discontinuing their participation in sexuality-related surveys, thereby compromising the generalizability of the findings. Furthermore, verbal responses regarding sexuality frequently involve aspects linked to public image, which are influenced by social perceptions and biases (Aboim, 2013). Therefore, participants often express opinions regarding what sexuality ought to be, rather than what it is. These phenomena may have influenced the results obtained for the different variables measured (e.g., higher frequency of masturbation, or greater knowledge of the female genital anatomy, among other factors). Although the online format offers the advantage of anonymity and minimizes potential social desirability effects, the questionnaire on female genital knowledge may have been biased as participants could have referred to the Internet to answer the questions presented.

Another potential limitation of the present study is that the survey did not provide an explicit definition of masturbation as referring exclusively to solo sexual activity. Previous research has shown that individuals vary in how they label certain behaviors as masturbation (de Jong & Adams, 2024; Kirschbaum & Peterson, 2018), particularly depending on factors such as the presence of a partner, the occurrence of orgasm, whether the behavior involves direct self-genital stimulation, or whether it is partner-focused (Kirschbaum & Peterson, 2018). This ambiguity may have affected participants' interpretation of the item and, consequently, the accuracy of the self-reported frequency of masturbation. Additionally, that most of the questionnaires used (i.e., on masturbatory behavior and knowledge of the female genital body) were developed specifically for this study and were not based on standardized or validated instruments due to the lack of such measures in existing literature. The validity of the scale used to assess knowledge of the female genitalia also warrants consideration. While the items demonstrate a certain degree of consistency in measuring the intended construct, the questionable level of reliability is not unexpected given the limited number of items. Nonetheless, the findings indicate the presence of potential areas for enhancement, particularly concerning item homogeneity and/or scale length. Further investigation into item performance may prove valuable. Finally, the use of 5 response options in the Female Genital Self-Image Scale could potentially limit the obtained results as the instrument was altered from its originally validated version (which had 4 points). Nonetheless, the modification sought to standardize the protocol and offer more extensive responses without necessitating more radical stances on such a delicate and sensitive topic. Future research should include validated and adapted instruments for the population under study (i.e., if available), along with larger and more diverse samples of individuals with varying sexual orientation and gender identity, with a greater number of LGBTQIA+ individuals, to comprehensively explore the connection between the variables and these dimensions. Qualitative (or mixed/hybrid) methodologies can be highly useful in capturing the experiences of these individuals in greater detail.

Conclusion

The present study's findings emphasize the multifaceted nature of female masturbation with several related factors. The high frequency of masturbation exhibited may reflect sociocultural changes toward sexuality, gender roles, and the sexual double standard, indicating a shift toward less repressive sexual socialization and a greater emphasis on female pleasure, thus enabling a more positive, healthy, and empowering relationship with one's body, genitalia, and sexuality. In fact, masturbation can be a tool for self-discovery, exploration and greater knowledge about sexual pleasure, the female body, and genitalia. Nonetheless, it is worth noting the importance of investing in comprehensive sex education programs aimed toward female sexual pleasure and reality-based curriculum through various media. This could positively contribute to dispelling myths/misconceptions and negative thoughts/feelings associated with masturbation, as well as its resulting stigmatization. This study has implications for different areas by promoting greater knowledge, awareness, and discussion about female masturbation, as well as playing a role in promoting social change. It is also relevant to educational and clinical projects in the field of sexuality. With regard to clinical practice, it highlights the need to assess different dimensions of female masturbation, especially, for example, with patients who have sexual difficulties.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The author(s) reported there is no funding associated with the work featured in this article.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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