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# Sexual Satisfaction in a Sample of Italian Women during the COVID-19 Lockdown Period

**Matilde Buattini [1,2], Luca Daminato [1,2], Greta Riboli [1,2,*], Mattia Nese [1], Gianni Brighetti [1], Daniel Giunti [3] and Rosita Borlimi [1]**

[1] Faculty of Psychology, Sigmund Freud University, 20143 Milan, Italy; buattini.phd@milano-sfu.it (M.B.); r.borlimi@milano-sfu.it (R.B.)
[2] Faculty of Psychology, Sigmund Freud Universität, 1020 Vienna, Austria
[3] Centro Integrato di Sessuologia Clinica "Il Ponte", 50136 Florence, Italy
* Correspondence: g.riboli@milano-sfu.it

**Abstract:** This study explored the relationships among psychological, relational, and sexual factors and their impact on sexual satisfaction among Italian women during the COVID-19 lockdown. Data were collected via an online survey with 3803 participants. The survey assessed mental health, relationship quality, frequency of sexual intercourse, frequency of masturbation, body awareness, and sexual satisfaction. Correlation analyses revealed positive relationships among all the variables and negative relationships with low mental health. A network analysis showed that sexual satisfaction was the most central variable, strongly linked to relationship quality, frequency of sexual intercourse, and body awareness. An exploratory mediation model examined the indirect effects of mental health and frequency of masturbation on sexual satisfaction through the other variables as mediators. The results indicated that mental health negatively influenced sexual satisfaction both directly and indirectly through relationship quality and body awareness, while frequency of masturbation had a positive indirect effect through body awareness. These findings highlight the complex interplay among mental health, body awareness, relational factors, and sexual satisfaction, emphasizing the importance of holistic approaches in enhancing sexual well-being. Future research should focus on longitudinal studies to establish causality and explore interventions that promote positive body awareness and relationship quality.

**Keywords:** sexual health; COVID-19; sexual satisfaction; women; body awareness; relationship quality; network analysis; mediation analysis



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## 1. Introduction

Sexual satisfaction refers to the fulfillment or contentment one experiences in their sexual life. It is essential to recognize that sexual satisfaction is subjective and can vary widely among individuals [1] and that it is not merely about the frequency of sexual intercourse or masturbation, but encompasses a broader spectrum including emotional closeness, mutual understanding, and communication between partners [2,3].

Research specifically focusing on women's sexual satisfaction has highlighted predictors of sexual satisfaction in women: the frequency of sexual interactions [1,4], the achievement of orgasms [1], variety and practices in sexual behavior significantly enhancing sexual satisfaction [1], communication about sexuality [5], attachment styles [6], the physical and mental health state and the tendency to have distracting thoughts during sexual intercourse [1]. Other factors contributing to sexual satisfaction include sexual self-esteem, sexual functioning, and the dynamics within sexual relationships [1,7,8]. Sexual self-esteem is defined as an individual's positive regard and confidence in their ability to experience their sexuality in a satisfying and enjoyable manner [9]. On the other hand, sexual functioning involves the complex interplay of physiological, psychological, and social factors that contribute to an individual's sexual well-being. This encompasses various

components such as sexual desire, arousal, satisfaction, and the ability to engage in sexual activities [10].

Masturbation also seems to play a role in sexual satisfaction, even if the relationship appears to be multifaceted. Research shows that women who masturbate tend to have better sexual functioning, greater satisfaction in relationships, and improved orgasmic capacity [11,12]. Additionally, masturbation is linked to a more positive body image and enhancing overall sexual well-being [13]. However, the frequency of masturbation presents a nuanced picture: while it correlates with easier orgasm and more pleasure during masturbation, it is also associated with lower overall and sexual relationship satisfaction [14]. Moreover, the impact of masturbation on sexual satisfaction within relationships underscores its complexity, with significant differences observed between genders [15]. Thus, while masturbation promotes positive sexual outcomes, its effects on overall satisfaction are shaped by individual preferences, relationship dynamics, and orgasmic experiences.

Additional factors such as body image perceptions, body awareness and emotional intimacy, and the quality of sexual communication [1] have been found to play a crucial role. Body image perceptions significantly influence sexual satisfaction, as women who hold positive views of their bodies tend to report higher levels of sexual enjoyment and confidence during sexual activities [16,17]. This self-perception affects the willingness to engage in sexual experiences and the ability to fully immerse themselves in the moment [18]. Body awareness, defined as the individual's ability to process internal bodily signals, integrating interoception and proprioception, typically assessed through self-report measures, is an important variable to consider with respect to sexual satisfaction [19]. It involves sensory awareness originating from physiological states, attitudes, perceptions, beliefs, and cultural experiences [19], and plays a vital role in how individuals perceive and interact with their bodies, impacting health, movement, overall well-being, and sexual satisfaction [19]. A recent review [20] highlights that increased body awareness can lead to improved sexual function and satisfaction by fostering a positive body image and reducing anxiety. The review also discusses various interventions that can enhance body awareness [20]. Specifically, techniques such as sensate focus and mindfulness, which are designed to enhance bodily awareness, have shown significant improvements in sexual response, desire, arousal, and satisfaction among women [20].

Finally, emotional intimacy, which encompasses the depth of emotional connection and mutual understanding between partners, also plays a critical role. Women who experience high levels of emotional intimacy with their partners often feel more secure and valued, which enhances their sexual satisfaction [21]. Thus, the presence of emotional intimacy facilitates a more profound connection, allowing women to express their desires and boundaries more freely. The quality of sexual communication, which involves the ability to openly discuss sexual needs, preferences, and concerns, is a crucial determinant of sexual satisfaction [22]. Effective sexual communication leads to a more attuned and responsive partnership, where both partners feel heard and understood, thus fostering a more satisfying sexual experience [22].

Collectively, these factors illustrate the multifaceted nature of women's sexual satisfaction, emphasizing the importance of psychological, emotional, and communicative dimensions in enhancing their overall sexual well-being.

Since it was first identified in Wuhan, Hubei Province in China in December 2019, the new SARS-CoV-2 virus has rapidly spread around the world, giving rise to a global pandemic [23], where public health measures have significantly affected and limited people's lives [23,24]. All of these changes not only affected people's mental health but also had an impact on sexual health and satisfaction [24–28]. During this period, changes in sexual behaviors and satisfaction among women have been observed. Studies conducted in various countries have reported alterations in sexual activity frequency [26–28], sexual desire [27,28], and overall sexual satisfaction [25,27,28] during the pandemic.

In Italy, the COVID-19 pandemic significantly impacted women's sexuality, sexual behaviors, and sexual satisfaction. Research during the second wave of the pandemic

highlighted the role of sexting in improving couple well-being. Sexting is defined as the exchange of sexually explicit messages, images, or videos via digital devices, encompassing both consensual and non-consensual communications [29]. During the COVID-19 lockdown, sexting played a significant role as a coping mechanism for maintaining intimacy and sexual connections in the absence of physical interactions. As individuals were confined to their homes and faced prolonged periods of social isolation, sexting emerged as a way to fulfill emotional and sexual needs, especially for those in romantic relationships separated by distance [29]. The increase in digital communication and the reliance on virtual platforms for social interaction contributed to a rise in sexting activities, as people sought to preserve intimacy and combat loneliness during the pandemic [30]. Women who engaged in sexting reported higher intimacy, passion, and couple satisfaction, indicating sexting as an effective coping strategy during social isolation [29]. Additionally, another Italian survey [31] revealed that the lockdown led to a mix of positive and negative sexual experiences, with increased awareness of sexual needs and a shift towards imaginative sexual activities due to social restrictions. Finally, in a 2021 study conducted in Italy, the authors found that sexual activity during the COVID-19 lockdown had a protective effect, reducing anxiety and depression while enhancing relationship quality and sexual health [5].

These findings suggest that the COVID-19 pandemic has had a multifaceted impact on women's sexual behaviors and satisfaction, emphasizing the need for further exploration and support in this area. However, few studies have investigated the intricate relationships among various psychological, emotional, and behavioral factors and their impact on women's sexual satisfaction during the COVID-19 lockdown. Thus, the present study, which analyzed data from a broader database collected during the pandemic [32], aimed to explore how psychological, relational, and sexual well-being might be related to and influence sexual satisfaction.

Specifically, this study took into account self-reporting general mental health, relationship quality, frequency of masturbation and of sexual intercourse, and their impact on sexual satisfaction. It was hypothesized that all the variables would be positively related to one another and negatively to mental health. Moreover, it was hypothesized that sexual satisfaction had a central role in the network analysis that was to be performed among all these key variables. Finally, our ultimate aim was to test an exploratory mediation model based on emerging network connections that hypothesizes a regressive directionality between the variables with sexual satisfaction as the main outcome.

## 2. Materials and Methods

This study was divided into two phases. The first phase was exploratory and investigated the relationships among the variables of interest (i.e., sexual satisfaction, body awareness, mental health, frequency of sexual intercourse, relationship quality, and masturbation frequency). The second phase aimed to test whether body awareness and mental health influence sexual satisfaction through the mediators of frequency of sexual intercourse and relationship quality.

### *2.1. Sample Characteristics and Data Collection*

The data were collected during the lockdown to explore women's physical and mental health related to their menstrual cycle, sexuality, and body awareness. Participants were Italian women over the age of 18, recruited through online platforms both using the snowball sampling method and posting a 24 h story on the Instagram profile @Sessuologia. The initial sample consisted of 6194 women. Exclusions were made for participants under 18, duplicate entries (identified by the same email), those with missing data, and those who reported not having an intimate relationship at the time of the survey. Transgender and non-binary individuals were excluded due to the very low sample, which also did not allow a comparison between the groups. The final sample included 3803 cisgender women (females whose gender identity corresponds to their sex at birth [33]).

Given the sensitivity of the data, precise measures were taken to ensure privacy and anonymity. Although participants were asked to provide their email addresses (this was a voluntary question, if they were willing to be contacted for other studies), only the researchers who initially collected the data had access to the raw database. Other researchers involved in the study were granted access only to a curated dataset from which identifying information, such as email addresses, had been removed. This cleaned dataset included only the data necessary for the analyses, ensuring the confidentiality of the participants.

### *2.2. The Survey*

To participate in the survey, respondents were presented with an informed consent form and asked to indicate their agreement by selecting "I agree." In the form, they were informed about the purpose of the study, the use of their data, and the measures taken to ensure data privacy and confidentiality. Only those who consented were able to proceed with the survey.

The survey included a range of questions assessing various demographic, psychological, and behavioral variables. The main demographics were: age, geographical origin (northern, central, or southern Italy), current living context (city metropolitan, village, suburban/residential area, isolated context), education level (primary school diploma, secondary school diploma, high school diploma, bachelor's degree, master's degree, PhD/specialization), and occupation (housewife, fixed-term employee, permanent employee, unemployed, entrepreneur, not seeking employment, freelancer, retired, student).

Information about living conditions, habits, and behaviors was also collected: cohabitants (as a multiple-choice question if the person was living with children of their own, a partner, the family of origin, roommates, others—like pets—or living alone). Weight was recorded in kilograms and height in centimeters, while smoking habits were categorized as yes, sometimes, or no and physical activity frequency was measured on a scale from 0 (never) to 4 (daily). Relationship status was determined by asking if participants had an important and stable emotional relationship (yes/no). Those who affirmed this rated the quality of their relationship on a scale from 0 (very poor) to 4 (very good).

Sexual activity was assessed with questions about the frequency of sexual intercourse (0 = no sexual activity to 3 = regular sexual activity) and masturbation (0 = never to 3 = daily). Participants rated their sexual satisfaction on a Likert scale from 1 (very dissatisfied) to 5 (very satisfied) ("My sexual life is satisfying") and their perceived body awareness on a scale from 1 (very low) to 5 (very high) ("How well do you know your body?").

All demographic, lifestyle, sexual, and relational questions were specifically developed by the researchers without the use of pre-existing self-report instruments. The original Italian version of all the questions in the survey with their translations is available in Appendix A.

General mental health, on the other hand, was assessed using the Italian version of the General Health Questionnaire 12 (GHQ-12; [34,35]), which includes 12 items rated on a four-point scale to measure the severity of a mental problem over the past few weeks. The GHQ-12 is a self-report questionnaire that has been validated in Italian populations, is a widely used screening tool for identifying minor psychiatric disorders, and has been shown to have good reliability. The binary 0–0–1–1 scoring method was chosen and used, with a cut-off of 4, as this scoring method provides clearer distinctions between symptom severity levels and for its simplicity and effectiveness in differentiating cases in primary care settings [36].

### *2.3. Statistical Analyses*

The study was exploratory in nature, aimed at understanding the relationships among various demographic, psychological, and behavioral variables. The analyses aimed to determine whether sexual satisfaction was predicted by the frequency of sexual intercourse and relationship quality, accounting for body awareness and GHQ-12 score. Additionally,

direct relationships between these variables and sexual satisfaction were examined to understand the comprehensive pathways influencing sexual satisfaction during the lockdown. All analyses were conducted using JASP 0.18.3 (2024).

Descriptive statistics were calculated to summarize sample characteristics, including mean (M), standard deviation (SD), and frequencies. For the purpose of calculating age frequencies, a new variable was created that categorized participants into defined age ranges (18–29 years, 30–39, 40–49, etc.), with these categories labeled as twenties (20s), thirties (30s), forties (40s), and so on. The body mass index (BMI) was calculated for each participant using the formula BMI= weight (kg)/height $(m)^2$, where height in centimeters was first converted to meters. Outliers in weight and height were carefully examined to ensure the accuracy of the BMI calculations. Implausible values, such as 888 kg or 65 cm, were excluded, while values like 35 kg and 145 cm, though outliers, were retained as they fall within realistic physiological ranges [37,38].

Correlation analyses were conducted to explore the relationships among the frequency of sexual intercourse, sexual satisfaction, relationship quality, body awareness, GHQ score, and frequency of masturbation. Pearson correlation coefficients were calculated with the expectation that sexual satisfaction, body awareness, frequency of sexual intercourse, and relationship quality would correlate positively, while GHQ score would correlate negatively.

One network analysis was performed to examine the interconnections among variables, including relationship quality, frequency of masturbation, frequency of sexual intercourse, sexual satisfaction, body awareness, and GHQ score. The network analysis was conducted using the EBICglasso estimator, with the correlation method set to 'cor', to identify the most significant connections while controlling for false positives [38]. Centrality measures, including betweenness, closeness, strength, and expected influence, were calculated to determine the most influential variables in the networks [39]. The Barrat and Zhang clustering coefficients were used to measure local clustering in the network, as they appropriately account for the strength and relative importance of connections between nodes.

A mediation model was finally conducted to test the directional influences of the network variables on sexual satisfaction. The model examined the direct and indirect effects of general mental health (GHQ) and masturbation frequency (Ma) on sexual satisfaction (SS), with body awareness (BA), frequency of sexual intercourse (FSI), and relationship quality (RQ) serving as mediators. The conceptual path model included the following pathways: (i) GHQ influencing RQ, BA, and FSI; (ii) Ma influencing BA; and (iii) BA, RQ, and FSI influencing SS. The analysis tested both direct and indirect effects, with estimates and standardized beta coefficients (completely standardized effect sizes) calculated for each pathway. To evaluate the model fit, several fit indices were calculated, including $X^2$, comparative fit index (CFI), Tucker–Lewis index (TLI), Root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). The model estimation was performed using the maximum likelihood method. The mediation model was conducted on a sample of 3764 participants. Bootstrap resampling with 10,000 samples (adjusted bias-corrected) was performed to obtain more robust estimates of the indirect effects. The analyses were performed using the PATHj module in Jamovi version 2.3.21.0 (Multivariate Path Analysis) [40], based on the R package lavaan [41].

## 3. Results

### *3.1. Descriptive Statistics of the Sample*

The final sample consisted of 3803 Italian women over the age of 18. The mean age of the participants was 23.4 years (SD = 5.59). Regarding living conditions, 4.0% of the total sample reported living alone, 4.8% lived with children, and 19.6% lived with a partner or spouse. Sexual satisfaction had a mean score of 3.93 (SD = 0.88). The GHQ-12, used to assess general mental health, had a mean score of 6.81 (SD = 2.73), with 95.9% of the sample categorized as having normal mental health according to GHQ-Cat. Subjective body awareness had a mean score of 3.89 (SD = 0.75). The average body weight of participants was 61.0 kg (SD = 12.0). The frequency of sport activity had a mean score of 1.42 (SD = 1.01).

The quality of the current relationship had a mean score of 3.36 (SD = 0.83). The frequency of masturbation had a mean score of 1.37 (SD = 0.73). The frequency of sexual intercourse had a mean score of 2.72 (SD = 0.68).

In terms of geographical origin, 52.6% (N. 1992) of the participants were from northern Italy, while 25.5% (N. 962) from the south and 21.9% (N. 832) from the center of Italy. Moreover, among all participants, N. 1658 (43.8%) reported living in a town, N. 1002 (26.5%) in a metropolitan city, N. 1036 (27.4%) in the provinces, N. 81 (2.1%) in an isolated context, and N. 9 (0.2%) abroad. The majority of participants (N. 2119, 56.0%) had a high school diploma, while N. 272 (7.2%) had attended until secondary school, N. 919 (24.3%) had a bachelor's degree, N. 401 (10.6%) a master's degree, and N. 75 (2.0%) had pursued a specialization or a PhD. Regarding occupation, 62.3% (N. 2359) of the participants were students, 22.9% (N. 867) employees, 5.5% (N. 210) freelancer or entrepreneur, 7% (N. 303) were unemployed, 1.2% (N. 46) were housewives, and only one woman answered was retired. Further details of descriptive statistics regarding specific distributions for BMI, sport activity, relationship quality, frequency of masturbation, sexual activity, and vaginal pathologies are provided in Table 1. BMI was calculated on N. 3780 participants, showing a mean weight of 61 ± 12 kg (min 35, max 168 kg) and mean height of 1.64 ± 0.06 m (min 1.45, max 1.88 m).

**Table 1.** Demographic and Key Variable Descriptive Statistics of the Sample.

| Variable | Mean ± SD | Min-Max | Skewness ± SE | Kurtosis ± SE | Frequency Distribution (%) |
|---|---|---|---|---|---|
| Age | 23.4 ± 5.59 | 18–64 | 2.80 ± 0.040 | 11.3 ± 0.080 | 20s (90.6), 30s (7.1), 40s (1.3), 50s (0.8), 60s (0.2) |
| BMI | 18.6 ± 3.64 | 11.7–52.5 | 2.27 ± 0.040 | 11.2 ± 0.080 | very underweight (38.1), underweight (20.8) normal weight (35.3), overweight (4.5), obese (1.2) |
| Sport | 1.42 ± 1.01 | 0–4 | 0.653 ± 0.040 | 0.0626 ± 0.080 | Never (16.1), Occasionally (44.5), 1–3 times/week (25.1), >3 times/week (10.2), Daily (4.0) |
| GHQ-12 | 6.81 ± 2.73 | 0–12 | −0.330 ± 0.040 | −0.276 ± 0.080 | under cut-off: 13.2 over cut-off: 86.8 |
| Body awareness | 3.89 ± 0.750 | 1–5 | −0.412 ± 0.040 | 0.234 ± 0.080 | 1 (0.3), 2 (3.2), 3 (23.3), 4 (54.1), 5 (19.1) |
| Relationship quality | 3.36 ± 0.839 | 0–4 | −1.56 ± 0.040 | 2.96 ± 0.080 | Very good (54.6), Good (33.9), Fair (10.3), Poor (1.2), Very poor (0.2) |
| F. of masturbation | 1.37 ± 0.734 | 0–3 | −0.170 ± 0.040 | −0.465 ± 0.080 | Never (11.8), Rarely (43.1), Often (41.6), Daily (3.5) |
| Sexual satisfaction | 3.93 ± 0.880 | 1–5 | −0.788 ± 0.040 | 0.712 ± 0.080 | / |
| F. of sexual intercourse | 2.72 ± 0.678 | 0–3 | −2.71 ± 0.040 | 7.02 ± 0.080 | No sexual activity (2.8), No complete sexual experience (3.3), Occasional sexual activity (12.4), Regular sexual activity (81.4) |

Notes: All descriptive statistics were calculated on a sample size of N = 3803, except for body mass index (BMI) (N. 3780 participants) and sexual satisfaction (N. 3764 participants), due to missing data or outliers. SD = standard deviation; Min–Max = minimum and maximum values; skewness and kurtosis with standard error; GHQ-12 = General Health Questionnaire 12; F. of masturbation = frequency of masturbation; F. of sexual activity = frequency of sexual activity.

### *3.2. Correlational Analyses*

Correlation analyses were conducted to explore the relationships among key variables, including sexual satisfaction, body awareness, masturbation frequency, relationship quality, frequency of sexual intercourse, and general mental health (GHQ-12). For a detailed overview of these results, see Table 2.

The analyses revealed that in general, all variables correlated positively with one another except for GHQ score, which correlated negatively. GHQ scores indeed showed negative correlations with sexual satisfaction ($r = -0.146$, $p < 0.001$), body awareness ($r = -0.143$, $p < 0.001$), relationship quality ($r = -0.114$, $p < 0.001$), and frequency of sexual intercourse ($r = -0.059$, $p < 0.001$). Masturbation frequency showed no significant correlation with sexual satisfaction ($r = 0.025$, $p = 0.129$) or frequency of sexual intercourse ($r = 0.004$, $p = 0.784$).

**Table 2.** Pearson correlation coefficients between study measures.

| | Sexual Satisfaction | Body Awareness | Masturbation Frequency | Relationship Quality | F. of Sexual Intercourse |
|---|---|---|---|---|---|
| Body Awareness | 0.169 *** | — | | | |
| Masturbation Frequency | 0.025 | 0.223 *** | — | | |
| Relationship Quality | 0.341 *** | 0.052 ** | −0.016 | — | |
| F. of Sexual Intercourse | 0.421 *** | 0.120 *** | 0.004 | 0.239 *** | — |
| GHQ-12 Tot | −0.146 *** | −0.143 *** | 0.006 | −0.114 *** | −0.059 *** |

Notes: N = 3764, ** $p < 0.01$, *** $p < 0.001$; F. = frequency; GHQ-12 = General Health Questionnaire 12.

On the other hand, sexual satisfaction was positively and significantly ($p < 0.001$) correlated with body awareness ($r = 0.169$), relationship quality ($r = 0.341$), and frequency of sexual intercourse ($r = 0.421$). Body awareness was also correlated with masturbation frequency ($r = 0.223$, $p < 0.001$) and had a modest relation to relationship quality ($r = 0.052$, $p = 0.001$).

### *3.3. Network Analysis*

A network analysis was conducted to examine the interconnections between key variables, hence including relationship quality (RQ), masturbation frequency (Ma), frequency of sexual intercourse (FSI), sexual satisfaction (SS), body awareness (BA), and general mental health (GHQ; see Figure 1). This network analysis included six nodes (variables) and nine non-zero edges out of a possible fifteen, resulting in a sparsity of 0.400. Centrality measures indicated that SS had the highest betweenness (1.725), closeness (1.571), strength (1.700), and expected influence (1.204).

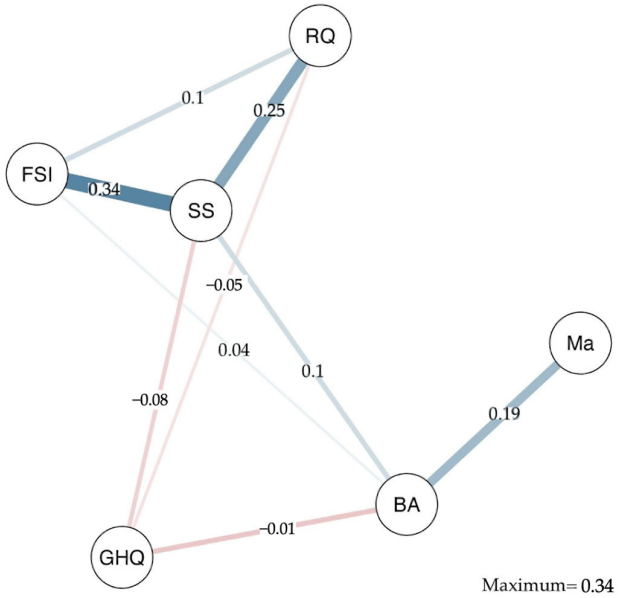


**Figure 1.** Network analysis. Notes: Nodes represent the key study variables; edges indicate significant connections between variables, with thicker lines representing stronger connections [36]; node size indicates variable centrality in the network, with larger nodes representing more central variables [36]; blue lines represent positive relations between variable, while red lines indicate negative relations; FSI = frequency of sexual intercourse; SS = sexual satisfaction; BA = body awareness; RQ = relationship quality; GHQ= General Health Questionnaire; Ma = masturbation frequency.

Strong connections were observed between SS and RQ (weight = 0.248), FSI (weight = 0.345) and BA (weight = 0.098). Ma and GHQ showed weaker and more isolated connections. Ma connected to the network primarily through BA, indicating a more peripheral role. The weight matrix indicated that the strongest connection was between SS and

FSI (weight = 0.345), followed by SS and RQ (weight = 0.248), forming a strong triangular relationship among these variables. Centrality and clustering measures of the network are all shown in Table 3.

**Table 3.** Centrality and clustering (Barrat and Zhang) measures of variables of the network analysis.

| Variable | Betweenness | Closeness | Strength | Expected Influence | Barrat | Zhang |
|---|---|---|---|---|---|---|
| RQ | −0.612 | −0.246 | −0.081 | 0.113 | 0.785 | 1.371 |
| Ma | −0.612 | −1.105 | −1.077 | −0.254 | −1.603 | −1.141 |
| FSI | −0.612 | 0.157 | 0.324 | 0.754 | 0.918 | 0.994 |
| SS | 1.725 | 1.571 | 1.700 | 1.204 | 0.359 | −0.485 |
| BA | 0.724 | 0.570 | 0.049 | −0.117 | −0.837 | −0.771 |
| GHQ | −0.612 | −0.948 | −0.915 | −1.700 | 0.377 | −0.031 |

Notes: The network includes relationship quality (RQ), masturbation frequency (Ma), frequency of sexual intercourse (FSI), sexual satisfaction (SS), body awareness (BA), and general mental health (GHQ); betweenness measures the extent to which a variable lies on the shortest path between other variables; closeness indicates how close a variable is to all other variables in the network; strength represents the sum of the weights of the connections linked to a variable; expected influence reflects the influence a variable has on its neighbors, considering both direct and indirect connections; Barrat clustering coefficient accounts for the weights of the connections; Zhang clustering coefficient emphasizes the relative importance of edge weights, providing a nuanced understanding of the significance and intensity of connections between variables.

### *3.4. Mediation Analyses*

The mediation model examined the effects of GHQ and Ma on SS, with BA, FSI and RQ as mediators (see Figure 2). The model showed adequate fit, with $X^2$ of 240, df = 5, $p < 0.001$, indicating a significant model fit. However, fit indices, such as RMSEA (0.112, 95% CI: 0.100–0.124, $p < 0.001$), CFI (0.862), and TLI (0.613), suggested some room for model improvement. The SRMR was 0.053, indicating an acceptable fit. The analysis indicated significant direct effects of GHQ and indirect effects of both GHQ and Ma on SS.

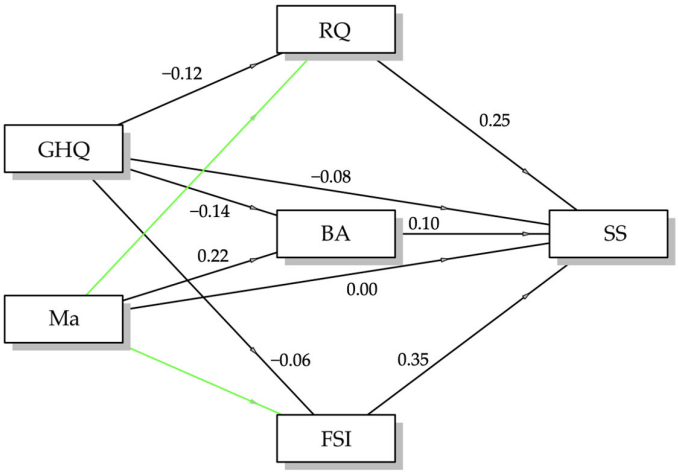


**Figure 2.** Mediation model of sexual satisfaction: effects of general mental health (GHQ) and masturbation frequency (Ma) with mediators. Notes: Figure 2 illustrates the mediation model with general mental health (GHQ) and masturbation frequency (Ma) as the independent variables, perceived body awareness (BA), frequency of sexual intercourse (FSI), and relationship quality (RQ) as mediators, and sexual satisfaction (SS) as the dependent variable. Path coefficients (β) are rounded to two decimal places. All reported component and direct effects were significant at $p < 0.001$, except for the direct effect of Ma on SS ($p = 0.887$). Green lines indicate relationships that were not calculated in the model.

The $R^2$ values show the contribution of the mediators to the model. Sexual satisfaction had the highest $R^2$ value ($R^2$ = 0.223, 95% CI: 0.199–0.246), indicating that 22.3% of the variance in SS was explained by the model. Body awareness ($R^2$ = 0.070, 95% CI: 0.055–0.086)

and relationship quality ($R^2$ = 0.014, 95% CI: 0.007–0.022) were also moderately explained, while sexual frequency showed a lower $R^2$ value ($R^2$ = 0.004, 95% CI: 0.001–0.009).

The analysis indicated significant direct effects of GHQ and indirect effects of both GHQ and Ma on SS. The direct effect of GHQ on SS was −0.026 (β = −0.080, $p < 0.001$). The indirect effects of GHQ on SS through the mediators were also significant ($p < 0.001$), with the highest effect through RQ (−0.009; β = −0.029). Additionally, the effect of Ma on SS via BA was 0.027 (β = 0.023, $p < 0.001$).

Parameter estimates revealed that GHQ negatively predicted RQ (estimate = −0.036, $p < 0.001$), while Ma positively influenced BA (estimate = 0.228, $p < 0.001$). In terms of predicting SS, RQ had a positive and significant effect (estimate = 0.263, $p < 0.001$), as did BA (estimate = 0.119, $p < 0.001$) and FSI (estimate = 0.480, $p < 0.001$).

The indirect effects showed that Ma had a positive indirect effect on SS through BA (estimate = 0.027, $p < 0.001$), while GHQ had a negative indirect effect on SS through both RQ (estimate = −0.009, $p < 0.001$) and BA.

See Table 4 for a detailed summary of all direct and indirect effects, along with the corresponding standardized values.

**Table 4.** Mediation analysis results: direct and indirect effects on sexual satisfaction.

| Type | Effect | Estimate ± SE | 95% CI | β | z | *p* |
|---|---|---|---|---|---|---|
| Indirect | GHQ ⇒ RQ ⇒ SS | −0.009 ± 0.001 | −0.012; −0.007 | −0.030 | −6.301 | <0.001 |
| | GHQ ⇒ BA ⇒ SS | −0.005 ± 0.001 | −0.007; −0.003 | −0.015 | −5.391 | <0.001 |
| | GHQ ⇒ FSI ⇒ SS | −0.007 ± 0.002 | −0.011; −0.004 | −0.023 | −3.846 | <0.001 |
| | Ma ⇒ BA ⇒ SS | 0.027 ± 0.005 | 0.019; 0.037 | 0.023 | 5.908 | <0.001 |
| Component | GHQ ⇒ RQ | −0.036 ± 0.005 | −0.045; −0.026 | −0.118 | −7.156 | <0.001 |
| | RQ ⇒ SS | 0.263 ± 0.019 | 0.227; 0.300 | 0.253 | 14.119 | <0.001 |
| | GHQ ⇒ BA | −0.040 ± 0.004 | −0.048; −0.031 | −0.144 | −9.062 | <0.001 |
| | BA ⇒ SS | 0.119 ± 0.017 | 0.085; 0.154 | 0.104 | 6.769 | <0.001 |
| | GHQ ⇒ FSI | −0.015 ± 0.004 | −0.022; −0.008 | −0.064 | −3.945 | <0.001 |
| | FSI ⇒ SS | 0.480 ± 0.027 | 0.428; 0.533 | 0.357 | 17.817 | <0.001 |
| | Ma ⇒ BA | 0.228 ± 0.017 | 0.195; 0.261 | 0.222 | 13.305 | <0.001 |
| Direct | GHQ ⇒ SS | −0.026 ± 0.005 | −0.035; −0.017 | −0.082 | −5.493 | <0.001 |
| | Ma ⇒ SS | 0.002 ± 0.017 | −0.031; 0.037 | 0.002 | 0.142 | 0.887 |

Notes: Multivariate path analysis [40]; N = 3764; CI = confidence intervals; β = beta (completely standardized effect sizes); SE = standard error; GHQ = General Health Questionnaire 12 [34]; RQ = relationship quality; SS = sexual satisfaction; BA = perceived body awareness; FSI = frequency of sexual intercourse; Ma = masturbation frequency.

## 4. Discussion

The aim of this study was to explore the relationships among various psychological, relational, and sexual variables and their impact on sexual satisfaction among Italian women during the COVID-19 lockdown. Specifically, we investigated how general mental health, relationship quality, frequency of sexual intercourse, masturbation frequency, and body awareness are interconnected and influence sexual satisfaction. Our findings provide insights into the multifaceted nature of sexual satisfaction and highlight the central role of sexual satisfaction in the network of relationships.

Our first hypothesis, that all the variables would positively correlate with one another and negatively with general mental health, was largely confirmed. As expected, general mental health negatively correlated with sexual satisfaction, body awareness, relationship quality, and frequency of sexual intercourse. Conversely, sexual satisfaction showed positive correlations with body awareness, relationship quality, and frequency of sexual intercourse, supporting previous research that highlights the importance of these factors in enhancing sexual satisfaction [42–44]. Interestingly, in this first analysis, masturbation frequency did not show significant correlations with sexual satisfaction or frequency of sexual intercourse. This result suggests a more complex relationship between masturbation and sexual satisfaction, as revealed by the study's subsequent analysis, in each case highlighting

the need for further investigation. These findings differ from the study of Mollaioli and colleagues [12], where higher masturbation frequency was linked to greater orgasmic intensity and sexual satisfaction. This discrepancy may be attributed to differences in demographic composition, as this study considered a sample with a slightly higher BMI and a larger proportion in stable relationships, both of which can influence sexual satisfaction. The younger average age and lower BMI in our sample may have also impacted sexual behavior and body image perceptions. Moreover, another study conducted in 2021 [4] reported a positive correlation between the frequency of sexual activity and sexual satisfaction during the COVID-19 lockdown in Italy, which is in line with our findings. However, their study also emphasized the role of sexual activity in improving psychological well-being and dyadic adjustment, which further suggests that relational and psychological variables, such as communication and relational cohesion, might have influenced our participants' experience of sexual satisfaction differently.

The network analysis confirmed our second hypothesis, demonstrating the central role of sexual satisfaction in the network of relationships. Sexual satisfaction exhibited the highest centrality measures, indicating its strong connections with other variables, particularly relationship quality, frequency of sexual intercourse, and body awareness. The strong triangular relationship among these variables underscores their interconnectedness and collective impact on sexual satisfaction. These findings align with prior studies that emphasize the critical role of relational and psychological factors in sexual satisfaction [1,16,45].

Moreover, the exploratory mediation analysis aimed to test the directional influences of the network variables on sexual satisfaction. While the fit indices suggest that the model could benefit from improvements and should be interpreted with caution at a global level, the relationships between variables—both direct and indirect—offer valuable insights. Our model revealed significant indirect effects of both general mental health and masturbation frequency on sexual satisfaction through body awareness, frequency of sexual intercourse, and relationship quality [46]. Specifically, general mental health had a notable negative impact on sexual satisfaction, both directly and indirectly, through relationship quality and body awareness. Masturbation frequency positively influenced body awareness, which in turn positively affected sexual satisfaction. These results highlight the intricate pathways through which psychological and behavioral factors influence sexual satisfaction. The finding that body awareness mediates the effects of general mental health and masturbation frequency on sexual satisfaction underscores the importance of a positive body image and self-awareness in enhancing sexual experiences. This is consistent with prior research indicating that greater body awareness can enhance sexual function and satisfaction by promoting a positive body image and reducing anxiety [20,47,48].

Several limitations should be noted. First, the cross-sectional design of the study limits the ability to infer causal relationships between the variables. Longitudinal studies to establish the directionality of these relationships would have been useful. Second, the use of self-report measures may introduce biases such as social desirability and recall biases, potentially affecting the accuracy of the responses. Moreover, a limitation of this study is that a standardized questionnaire for sexual function, such as the Female Sexual Function Index [49], was not utilized. Instead, the sexual function questions were specifically developed by the researchers, which, while tailored to the study's objectives, may limit the comparability of our findings with other research using validated instruments. Third, there may be concerns regarding the representativeness of the sample, as the average age of the participants was notably lower than the average age of the Italian population, which is 46.6 according to the Italian National Institute of Statistics [50]. Additionally, the BMI distribution indicated a tendency towards lower weight categories, with a significant portion of participants being classified as underweight. This skewness towards a younger and lighter population may limit the generalizability of the findings, particularly in understanding the relationship between body awareness and sexual satisfaction. Prior research has demonstrated that higher BMI is often linked to lower sexual satisfaction, particularly in older populations where body image concerns can also play a significant role [51,52]. Moreover,

the relationship between sexual satisfaction and life transitions, such as retirement, has been shown to vary, with factors like relationship satisfaction influencing the trajectory of sexual satisfaction [53]. These findings suggest that future studies should aim to include more diverse age groups and a wider range of BMI to better capture the complexities of the relationship between body perception, sexual satisfaction, and mental health, particularly in the context of significant life transitions like aging and retirement.

Fourthly, the religious affiliation of the participants, a variable that particularly affects sexual satisfaction, was not taken into account [54]. Moreover, as anticipated, transgender and non-binary persons were excluded from the sample due to the low representativeness. This turned out to be a limitation as it restricted the study's ability to fully capture the diverse experiences of the different gender identities, potentially leading to incomplete or biased conclusions.

In conclusion, the majority of the participants reported high scores on the GHQ, showing a general high mental distress of the sample, potentially limiting the generalizability of the findings to populations with more varied mental health statuses.

Despite these limitations, the study has several strengths. The large sample enhances the statistical power and reliability of the findings. The use of advanced statistical techniques such as network and mediation analyses provides a comprehensive understanding of the relationships among key variables. Additionally, the study addresses a gap in the literature by examining the impact of the COVID-19 lockdown on women's sexual satisfaction, providing valuable insights into how public health measures affect intimate aspects of life.

Future research should first improve the research design from the limitations found, and assess how sexual satisfaction has changed over the years. Furthermore, it might be useful to set up a research design that repeats the same questionnaire every year to assess whether events, such as the COVID-19 lockdown, have an impact on sexual health. If a similar lockdown situation recurs, it might be useful to assess the variables from a longitudinal perspective, evaluating the same group at multiple times. Furthermore, given the subjective nature of sexual satisfaction, it could be assessed at the micro-level with the use of methodologies such as the ecological momentary assessment in favor of an idiographic approach.

## 5. Conclusions

In conclusion, this study provides significant contributions to the understanding of the intricate relationships among psychological, relational, and behavioral factors that influence sexual satisfaction among Italian women during the COVID-19 lockdown. Through the analysis of data collected from 3803 participants, the research elucidates the central role of sexual satisfaction within a network of variables, particularly its strong associations with relationship quality, frequency of sexual intercourse, and body awareness. The findings reveal the pivotal influence of mental health, which negatively impacts sexual satisfaction both directly and indirectly through its effects on relationship quality and body awareness. In contrast, the frequency of masturbation was found to have a positive indirect effect on sexual satisfaction by enhancing body awareness. These results contribute to the theoretical framework by clarifying the pathways through which psychological and relational factors interact to shape sexual well-being.

In practical terms, the findings underscore the critical importance of interventions that promote positive body awareness and relationship quality to enhance sexual satisfaction. It is imperative for health-care providers to integrate comprehensive assessments that encompass body image, mental health, and relationship dynamics into sexual health care. Such an approach would address the multifaceted nature of sexual satisfaction, thereby ensuring that interventions are both preventative and responsive to the complexities of sexual well-being. Moreover, the study highlights the necessity of holistic approaches that recognize the complex interplay between mental health, body awareness, relational factors, and sexual satisfaction. These approaches are essential for developing effective, evidence-

based interventions tailored to the diverse needs of women. Future research should prioritize longitudinal studies to establish causal relationships and to further explore the mechanisms through which these factors influence sexual satisfaction. Such studies would offer a more profound understanding of the temporal dynamics involved and inform the development of targeted interventions aimed at enhancing body awareness, relationship quality, and mitigating the detrimental effects of poor mental health.

Ultimately, this research underscores the importance of adopting a holistic, integrative approach to sexual well-being, which is crucial for fostering a healthier, more satisfying sexual life for women.

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**Data Availability Statement:** The raw data supporting the conclusions of this article will be made available by the authors on request.

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## Appendix A

The survey

Demographic Questions

- Gender/Genere (multiple-choice question)
  - Italian: Genere (Femminile, Non-binary, FtM)
  - English: Gender (Female, Non-binary, FtM)
- Age/Età (open-ended numerical question)
  - Italian: Età
  - English: Age
- Region of Origin/Zona di Provenienza (multiple-choice question)
  - Italian: Zona di provenienza (Nord Italia, Centro Italia, Sud Italia)
  - English: Origin (North of Italia, Centre of Italy, South of Italy)
- Current Residential Context/Attuale Contesto di Residenza (multiple-choice question)
  - Italian: Attuale contesto di residenza (Città metropolitana, Paese, Provincia o quartiere residenziale, Contesto isolato)
  - English: Current residential context (Metropolitan City, Village, Province or Residential Neighborhood, Isolated Area)
- Education Level/Grado di Istruzione (multiple-choice question)

- Italian: Grado di istruzione (Licenza elementare, Licenza media, Diploma di maturità, Laurea triennale, Laurea magistrale, Dottorato/Specializzazione)
- English: Education level (Elementary School Diploma, Middle School Diploma, High School Diploma, Bachelor's Degree, Master's Degree, PhD/Specialization)

- Occupation/Attività Professionale (multiple-choice question)
  - Italian: Attività professionale (Libero Professionista, Studente, Imprenditore, Dipendente a tempo indeterminato, Dipendente a tempo determinato, Inoccupato, Disoccupato, Casalingo)
  - English: Occupation (Freelancer, Student, Entrepreneur, Permanent Employee, Fixed-Term Employee, Not Seeking Employment, Unemployed, Housewife)
- Who Do You Live With?/Con Chi Vive? (multiple-selection question)
  - Italian: Con chi vive? (Partner/coniuge, Da solo, Genitore/i, Fratello/i, Figlio/i, Coinquilino/i)
  - English: Who Do You Live With? (Partner/Spouse, Alone, Parent(s), Sibling(s), Child(ren), Roommate(s))
- Please Indicate Your Current Weight/Indichi il Suo Peso Attuale (open-ended numerical question)
  - Italian: Indichi il suo peso attuale (kg)
  - English: Please Indicate Your Current Weight (kg)
- Please Indicate Your Height (cm)/Indichi la Sua Altezza (cm) (open-ended numerical question)
  - Italian: Indichi la sua altezza (cm)
  - English: Please Indicate Your Height (cm)
- Do You Regularly Smoke Cigarettes?/Abitualmente Fuma Sigarette? (Likert scale 0–3)
  - Italian: Abitualmente fuma sigarette? (Sì, A volte, No)
  - English: Do you Regularly Smoke Cigarettes? (Yes, Sometimes, No)
- Do You Engage in Physical Activity?/Svolge Attività Fisica? (Likert scale 0–5)
  - Italian: Svolge attività fisica? (Mai, Saltuariamente, 1–3 volte a settimana, Più di 3 volte a settimana, Tutti i giorni)
  - English: Do you Engage in Physical Activity? (Never, Occasionally, 1–3 Times a week, More Than 3 Times a Week, Daily)

Sexuality and Relationship Questions/Domande Relative alla Sessualità e alla Relazione

- Do You Have an Important and Stable Emotional Relationship?/Ha una Relazione Affettiva Importante e Stabile? (multiple-choice question)
  - Italian: Ha una relazione affettiva importante e stabile? (Sì, No)
  - English: Do you Have an Important and Stable Emotional Relationship? (Yes, No)
- Please Rate the Quality of Your Relationship/Valuti la Qualità di Questa Relazione (Likert scale 5–1)
  - Italian: Valuti la qualità di questa relazione: (Molto buona, affettuosa, calda e serena; Buona, abbastanza serena e affettuosa, non ci sono liti importanti; Discreta, su alcune cose c'è incomprensione, potrebbe esserci più affetto; Non buona, c'è poco affetto e frequenti contrasti; Pessima, non c'è amore ma solo litigi e incomprensioni)
  - English: Please Rate the Quality of Your Relationship: (Very Good, Affectionate, Warm and Serene; Good, Quite Serene and Affectionate, No Major Quarrels; Fair, There Is Some Misunderstanding, There Could Be More Affection; Not Good, There Is Little Affection and Frequent Conflicts; Very Poor, There Is No Love, Only Arguments and Misunderstandings)
- How Often Do You Masturbate?/Con Quale Frequenza si Masturba? (Likert scale 4-1)
  - Italian: Con quale frequenza si masturba? (Tutti i giorni, Spesso, Raramente, Mai)

- English: How Often Do You Masturbate? (Daily, Often, Rarely, Never)

- My Sexual Life Is Satisfying/La Mia Vita Sessuale è Soddisfacente (Likert scale 1–5)
  - Italian: La mia vita sessuale è (1 = per nulla soddisfacente, 5 = molto soddisfacente)
  - English: My Sexual Life Is (1 = Not At All Satisfying, 5 = Very Satisfying)
- How Well Do You Know Your Body?/Quanto Sente di Conoscere il Suo Corpo (Likert scale 1–5)
  - Italian: Quanto sente di conoscere il suo corpo (1 = per nulla, 5 = moltissimo)
  - English: How Well Do You Know Your Body? (1 = Not At All, 5 = Very Well)

General Health Questionnaire/Questionario Generale di Salute (GHQ-12; Goldberg and Hillier; Giorgi Rossi et al.): 12 questions (Likert scales 0–3)
Optional Email/Email Facoltativa

- Italian: Lasciaci la tua mail se sei curiosa di ricevere informazioni e una restituzione sullo studio! (non è un campo obbligatorio)
- English: Leave your email if you are interested in receiving information and feedback on the study! (optional field)

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