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RESEARCH ARTICLE



Greater mindfulness does not influence sexual satisfaction but is independently associated with lower relationship satisfaction

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ABSTRACT

The aim of this cross-sectional study was to elucidate whether mindfulness was associated with relationship and/or sexual satisfaction among individuals in a regular relationship and to assess potential links with other factors. The research group consisted of 276 adults who were in a relationship regardless of marriage. Mindful Attention Awareness Scale (MAAS), Couples Satisfaction Index (CSI), New Sexual Satisfaction Scale (NSSS) were applied to all individuals. In the study group, 160 (58%) of the individuals were female, 116 (42%) were male, 62.3% were married, 59.8% were self-acquainted with their partner and 67.4% lived together with their partner or with their partner and children. Factors contributing to greater sexual satisfaction were shorter relationship duration and being a male, while those with an arranged marriage and those cohabiting with their partner had lower sexual satisfaction. Older age and, very interestingly, higher levels of mindfulness were associated with lower levels of relationship satisfaction. Finally, sexual and relationship satisfaction were closely associated and were respectively identified as independent factors for CSI and NSSS scores. There is a need for more comprehensive longitudinal studies evaluating relationship satisfaction and sexual satisfaction to assess causal relationships and to identify interventions that could benefit relationships.

ARTICLE HISTORY

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KEYWORDS

Sexual behavior; sexual activity; sexual satisfaction; mindfulness; sexual partners

Lay summary

Our study found that males and people who have shorter relationship durations experience higher sexual satisfaction while those with an arranged marriage and those cohabiting with their partner had lower sexual satisfaction. People with older age and who have higher levels of mindfulness had lower relationship satisfaction.

Introduction

Although sexual satisfaction, sexual desire, and sexual activity are of central importance to human life, scientific interest in sexual functioning is relatively new and answers to many questions are still being sought (Dosch et al., 2016). Sexual satisfaction is defined as the subjective evaluation of the aspects of sexual intercourse and the emotional response that follows this evaluation (Lawrance & Byers, 1992). Sexual satisfaction is a sexual right and is accepted as an important part of sexual health (WHO, 2010).

Having a satisfying sex life is a personal matter strongly related to one's past sexual experiences, current expectations and future aspirations (Mayland, 2005). Sexual satisfaction is associated with various factors such as general life satisfaction, interpersonal satisfaction, psychological well-being, physical health, education level, openness to different sexual experiences, accepting the importance of sexuality as a part of life, depression, and social anxiety (Dosch et al., 2016). One of the important factors associated with sexual satisfaction is the person's level of satisfaction regarding the relationship (Kozlowski, 2013; Lawrance & Byers, 1995). As such, the link between sexual and relationship satisfaction have been demonstrated in prior studies (McNulty et al., 2016). However, satisfaction from a relationship as a whole (including its sexual aspect) has been associated with various other parameters, including gender role attitudes (Lefkowitz et al., 2014), religiousness (Cranney, 2020; Rigo & Saroglou, 2018), marriage (Park et al., 2021), whether the marriage was arranged (Sorokowski et al., 2017), having children (Schwartz & Young, 2009), the number of children (Çağ & Yildirim, 2018), length of the relationship (Schmiedeberg & Schröder, 2016), and cohabitation status and its timing (Rhoades et al., 2009), as well as various features of personality and personality traits (Sayehmiri et al., 2020; Schaffhuser et al., 2014).

One of mindfulness research's many drawbacks is that no one agreed-upon definition of mindfulness exists (Van Dam et al., 2018). The mindfulness definition to which we have adhered in our study is the one by Brown and Ryan, defined as follows: "a receptive state of mind in which attention, informed by a sensitive awareness of what is occurring in the present, simply observes what is taking place" (Brown & Ryan, 2003). Mindfulness practice may provide many benefits for the psychological and physical well-being of individuals. A topic that has drawn relatively less attention however, is the role of mindfulness in romantic relationships. This is an important gap in knowledge because mindfulness is strongly associated with self-awareness, self-regulation, anxiety, depression, and stress (Alzahrani et al., 2020; Dillard & Meier, 2021; Vago & David, 2012), all of which can be critical contributors to personal relationships, and by extension, could directly influence satisfaction from personal relationships including the sexual aspect (Carcedo et al., 2020; Khaddouma et al., 2015; Leavitt et al., 2019; Randall & Bodenmann, 2017). Additionally, higher levels of mindfulness are reportedly associated with higher levels of relationship satisfaction, as reported by a meta-analysis (Mcgill et al., 2016). These possible direct or indirect influences on relationship behavior demonstrate the possible role of mindfulness as a factor associated with relationship satisfaction. In some studies, higher levels of mindfulness were associated with increased relationship satisfaction, skillful responses to relationship stress, increased empathy, greater acceptance of one's partner (or spouse),

and more secure spousal attachment (Atkinson, 2013; McGill et al., 2016; Wachs & Cordova, 2007). For instance, it has been reported that mindfulness training can increase relationship satisfaction, in part by helping partners experience greater sexual satisfaction in their relationships (Khaddouma et al., 2015). Nonetheless, conflicting opinions also exist and have shown that greater levels of mindfulness may result in decreased prosocial behavior (Poulin et al., 2021) which could adversely influence relationship and sexual satisfaction since it is defined as “acts by which individuals benefit others.” Therefore, it is evident that the possible mediating role of mindfulness in relationship and/or sexual satisfaction is yet to be clarified.

A satisfying romantic relationship is important in terms of maintaining a healthy sexual life and also contributes to physical and mental well-being (Yeh et al., 2006). To fully understand sexual dissatisfaction and relationship dissatisfaction, it is important to investigate the components of sexual satisfaction and relationship satisfaction. Therefore, we hypothesized that various individual/relationship factors and mindfulness attitude could influence perceived satisfaction levels from a relationship. In this context, the aim of the present research was to investigate whether mindfulness and various other factors were associated with sexual satisfaction and relationship satisfaction.

Methods

This cross-sectional study conducted in Turkey was carried out between 15 May 2020 and 15 August 2020 at Kent University. Ethics committee approval (28.05.2020, 77083609-100/132) was obtained from the Clinical Research Ethics Committee of Kent University and the study was conducted in accordance with the Declaration of Helsinki and its most recent amendments.

Men and women aged older than 24-year old who were in a relationship or married were included in the research, given that they accepted to participate. The informed consent form openly stated that we encouraged participation of individuals conforming to any sexual orientation or gender definition; however, the results demonstrated that all participants were heterosexual and cisgender. The age range was chosen to decrease the effects of extreme variations in the parameters examined, based on studies demonstrating that intimate relationships in the adolescence and early adulthood typically have relatively less reliance on interpersonal features, supportive behavior, and partner-related factors (Giordano et al., 2012; Lantagne & Furman, 2017; Seiffge-Krenke, 2003). Also, since parameters such as having children, cohabitation, marital status, and education level were examined, enrolling subjects younger than 24–25 years of age would have uncontrollably skewed data with respect to these parameters. Finally, young Turkish adults continue to live with their families for an extended period of time (relative to their western peers) – often throughout university education – and usually gain independence from their family only after marriage or following employment (usually after 18–23 years of age) (Cok & Atak, 2015; Koc, 2007).

Persons who did not have a regular relationship ($n=42$) were excluded from the study. Taking into account the social isolation rules under the conditions of the COVID-19 pandemic and considering that individuals would be more comfortable in their responses to sexual and relationship-related questions, we prepared an electronic

survey form created through “Google Forms” for data collection. Questionnaire forms were sent to individuals by sharing links from social media groups (*via* public forums, Twitter and Facebook accounts) and individuals were encouraged to share these links in their own social media – leading to a mixture of convenience and snowball sampling. All subjects had to confirm that they were consenting to participate in the study by providing written informed consent before beginning to answer the questionnaire.

The questionnaire form consisted of four parts. The first part was the data collection form, while the following three sections were based on the scales that had been applied: Mindful Attention Awareness Scale (MAAS), the Couples Satisfaction Index (CSI), and the New Sexual Satisfaction Scale (NSSS).

Data collection form

The form included a detailed description of the purpose and scope of the research, and those who agreed to participate in the study were asked to confirm their consent before completing the questionnaire. Data collected with this form included demographics, sexual orientation and gender identity, marital status, children, siblings, education level, chronic disease(s), mental health, and relationship duration. We also classified the type of acquaintance with partner (or spouse) into three groups: not married, self-acquainted, and arranged marriage. Cohabiting status was also assessed and participants were grouped as follows: living alone, living with partner or partner and children, living with parents, living with friends, and “other”–which included irregular living habits, hotels, and constant traveling as part of employment.

Mindful attention awareness scale

The MAAS measures the general tendency to be aware of and attentive to momentary experiences in daily life. The scale, developed by Brown and Ryan in 2003, consists of 15 items which are 6-point Likert-type queries. The Turkish validity and reliability study of the scale was carried out by Özyeşil et al. Higher scores from the scale show higher levels of mindfulness (Brown & Ryan, 2003; Özyeşil et al., 2011). The Cronbach’s alpha value was 0.843 for the present study.

Couples satisfaction index

The CSI is a 7-point Likert-type scale consisting of 7 items developed by Hendrick in 1988 to measure relationship satisfaction in romantic relationships (Hendrick, 1988). The Turkish validity and reliability study of the scale was performed by Curun in 2001. Two items in the scale are scored inversely and higher score indicates greater relationship satisfaction (Curun, 2001). The Cronbach’s alpha value was 0.919 for the present study.

New sexual satisfaction scale

The NSSS, developed by Stulhofer et al., consists of 20 items responded to in a 5-point Likert-type fashion. Possible scores range between 20 and 100 points. There

are two subdimensions in the scale: self-centered and partner-partner/sexual activity-centered. The self-centered subdimension evaluates sexual satisfaction generated by personal experiences and emotions. The partner-partner/sexual activity-centered subdimension measures the sexual satisfaction a person receives from the sexual behavior and reactions of the spouse/partner, as well as the variety and/or frequency of sexual activities. The Turkish adaptation of the scale was carried out by Tuğut (Štulhofer et al., 2010; Tuğut, 2016). The Cronbach's alpha value was 0.964 for the present study.

Statistical analysis

The data collected during the research process were transferred to the computer environment and analyzed using the IBM SPSS (Version 24.0; IBM Corp., Armonk, NY, USA) package program. Number, percentage, mean, standard deviation, median, first quartile, and third quartile were used in the depiction of descriptive data. The conformity of data to normal distribution was evaluated with histograms and Q-Q plots. Spearman Correlation coefficient, One-Way Analysis of Variance, Kruskal-Wallis test, t-test for independent groups, Mann-Whitney U test, and multiple linear regression (stepwise selection method) were used in the analysis of variables. The dependent variables of the linear regression scales were CSI score and NSSS score. Factors demonstrated to be associated with relationship or sexual satisfaction in the literature and variables that showed univariate relationships with CSI or NSSS scores were included in the multivariable regression models. The statistical significance threshold was accepted as a p value of $<.05$; however, the p value thresholds for pairwise comparisons (after >2 -group comparisons) were based on the Bonferroni correction.

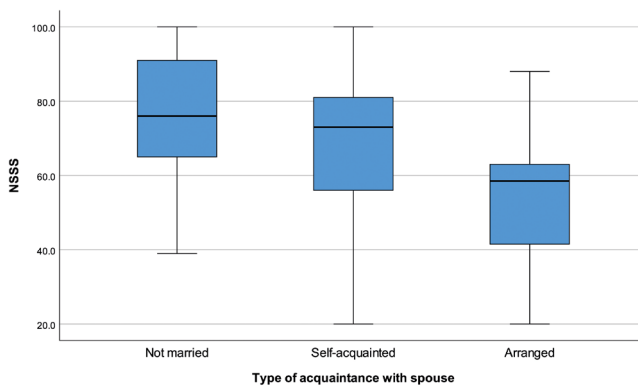
Results

In the study group, 160 (58%) of the individuals were female, 116 (42%) were male, 55.1% of the individuals were between the ages of 27–34 years, 62.3% were married, 58% had no children, 34.8% had a relationship continuing for 1–5 years, 59.8% were self-acquainted with their partner and 67.4% lived together with their partner or with their partner and children (Table 1).

It was determined that MAAS score was significantly higher in those who were single ($p=.008$), those who had no children ($p=.025$), and those who had met their partner in an arranged fashion compared to self-acquainted individuals ($p=.022$). The CSI score was significantly higher in those without children compared to those with children ($p=.044$). No other significant differences were noted for CSI scores. NSSS total score was significantly higher among unmarried individuals ($p=.001$), those without children ($p<.001$), and those living alone ($p=.004$). Additionally, NSSS total score was highest in unmarried individuals, followed by self-acquainted individuals (Figure 1), and then, those with an arranged marriage ($p<.001$). Shorter relationship duration appeared to be associated with higher NSSS score ($p=.001$, Figure 2; Table 2).

Table 1. Distribution of the study group by descriptive characteristics.

	<i>n</i> (%)
Sex	
Female	160 (58.0)
Male	116 (42.0)
Age groups	
18–26	30 (10.9)
27–34	153 (55.4)
35–42	57 (20.7)
42+	36 (13.0)
Marital status	
Single	96 (34.8)
Married	172 (62.3)
Other	8 (2.9)
Children	
Absent	160 (58.0)
Present	116 (42.0)
Siblings	
Absent	30 (10.9)
Present	246 (89.1)
Education level	
High School/Undergraduate	187 (67.8)
Postgraduate/PhD	89 (32.2)
Chronic disease	
Absent	246 (89.1)
Present	30 (10.9)
Mental health disease	
Absent	246 (89.1)
Previously present (now absent)	20 (7.2)
Present	10 (3.6)
Relationship duration	
0–1 years	40 (14.5)
1–5 years	96 (34.8)
5–10 years	73 (26.4)
10 years and above	67 (24.3)
Type of acquaintance with partner	
Not married	99 (35.9)
Self-acquainted	165 (59.8)
Arranged	12 (4.3)
Cohabiting status	
Alone	30 (10.9)
Partner / Partner and children	186 (67.4)
Parents	36 (13.0)
Friends	15 (5.4)
Other	9 (3.3)

**Figure 1.** New Sexual Satisfaction Scale score with regard to type of acquaintance with partner.

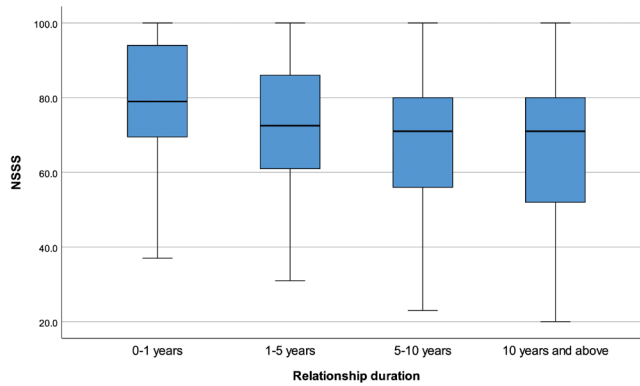


Figure 2. New Sexual Satisfaction Scale score with regard to relationship duration.

Table 2. Distribution of investigated parameters according to descriptive features.

	MAAS mean \pm SD	CSI median (IQR)	NSSS median (IQR)	Self-centered NSSS median (IQR)	Partner-centered NSSS median (IQR)
All participants	36.8 \pm 9.2	39 (32–44)	73 (59.5–83)	37 (30–42)	37 (30–43)
Sex					
Female	36.9 \pm 8.8	39 (31.5–44)	71 (58.5–82.5)	34 (28–40)	37 (30–43)
Male	36.8 \pm 9.9	39 (33–44)	74 (63–86.5)	40 (33–44)	35 (29–42.5)
<i>p</i>	.927	.888	.099	<.001	.622
Marital status					
Single	38.9 \pm 9.5	38 (31–43)	75 (65–91)	39 (33–46)	38 (33–45)
Married	35.8 \pm 9.0	39 (33–44)	71.5 (54–80)	35.5 (29–41)	35 (28.5–41)
<i>p</i>	.008	.537	.001	<.001	.001
Children					
Absent	37.9 \pm 9.3	40 (34.5–44)	75.5 (63.5–87)	38 (32–43)	38 (31.5–44)
Present	35.4 \pm 9.0	37 (28–44)	69 (53–80)	35 (29–41)	32 (26–40.5)
<i>p</i>	.025	.044	.002	.015	<.001
Siblings					
Absent	35.9 \pm 10.2	40.5 (35–44)	75.5 (68–86)	38.5 (33–42)	38 (32–43)
Present	37.0 \pm 9.1	39 (32–44)	72 (59–83)	37 (30–42)	36 (29–43)
<i>p</i>	.568	.475	.459	.362	.562
Education level					
High School/ Undergraduate	36.1 \pm 8.6	39 (32–44)	72 (58–83)	37 (29–42)	35 (29–43)
Postgraduate/ Doctorate	38.4 \pm 10.3	38 (32–43)	75 (63–85)	37 (32–43)	38 (30–43)
<i>p</i>	.074	.464	.239	.267	.374
Chronic disease					
Absent	36.9 \pm 9.1	39 (32–44)	73 (60–85)	37 (30–43)	37 (30–44)
Present	36.7 \pm 10.6	35 (29–43)	68 (54–78)	34 (30–40)	33.5 (26–40)
<i>p</i>	.928	.122	.055	.165	.035
Age groups					
18–26	37.2 \pm 10.5	39 (36–44)	77.5 (65–91)	37.5 (33–46)	39.5 (35–45)
27–34	38.0 \pm 8.8	40 (33–44)	73 (60–82)	37 (30–42)	36 (30–41)
35–42	34.6 \pm 9.3	38 (33–45)	77 (51–88)	38 (28–45)	38 (26–45)
42+	35.1 \pm 9.3	36.5 (22–42)	68.5 (53–80.5)	34 (30–41)	32.5 (26–42.5)
<i>p</i>	.061	.057	.170	.369	.111
Mental health disease					
Absent	36.7 \pm 9.4	39 (33–44)	74 (60–84)	37 (30–43)	37 (30–44)
Previously present (now absent)	39.4 \pm 8.0	38 (30.5–43)	70.5 (55–79.5)	35.5 (27.5–39.5)	35.5 (25.5–40.5)
Present	36.0 \pm 7.3	32.5 (23–39)	60 (51–67)	30 (28–37)	28 (23–31)
<i>p</i>	.441	.217	.051	.171	.057

(Continued)

Table 2. (Continued)

	MAAS mean \pm SD	CSI median (IQR)	NSSS median (IQR)	Self-centered NSSS median (IQR)	Partner-centered NSSS median (IQR)
Relationship duration					
0–1 years	36.9 \pm 10.2	39.5 (28–43)	79 (69.5–94) ^a	41 (35.5–47.5) ^a	39.5 (35–47.5) ^a
1–5 years	38.1 \pm 9.6	39 (34–44)	72.5 (61–86) ^{ab}	37 (31–42) ^{ab}	37 (30–44) ^{ab}
5–10 years	37.5 \pm 8.5	41 (32–45)	71 (56–80) ^b	35 (28–40) ^b	34 (29–40) ^b
10 years and above	34.3 \pm 8.5	37 (29–43)	71 (52–80) ^b	37 (27–41) ^b	34 (26–41) ^b
<i>p</i>	.066	.393	.001	.001	.001
Type of acquaintance with partner					
Not married	38.9 \pm 9.3 ^a	38 (31–43)	76 (65–91) ^a	39 (33–46) ^a	38 (32–45) ^a
Self-acquainted	35.7 \pm 8.8 ^b	39 (33–44)	73 (56–81) ^b	37 (30–41) ^b	35 (29–41) ^b
Arranged	36.1 \pm 12.6 ^{ab}	35 (24.5–43)	58.5 (41.5–63) ^c	29.5 (24–33) ^c	29.5 (15–31) ^c
<i>p</i>	.022	.292	<.001	<.001	<.001
Cohabiting status					
Alone	38.0 \pm 9.5	38 (29–43)	75.5 (68–94) ^a	39.5 (33–48) ^a	42 (36–47) ^a
Partner/ Partner and children	35.9 \pm 9.1	39 (33–44)	72 (55–80) ^b	36.5 (29–41) ^b	35 (29–41) ^b
Parents	38.2 \pm 9.7	39 (31–43.5)	79 (69–89.5) ^{ab}	39 (33–46.5) ^{ab}	39.5 (35–45) ^a
Friend/Other	40.9 \pm 8.0	37 (26.5–42)	70 (61–90) ^{ab}	36 (29–44.5) ^{ab}	34.5 (29.5–44.5) ^{ab}
<i>p</i>	.074	.484	.004	.009	.003

MAAS: Mindful Attention Awareness Scale; CSI: Couples Satisfaction Index; NSSS: New Sexual Satisfaction Scale; SD: standard deviation; IQR: interquartile range.

Same letters denote the lack of statistically significant difference between groups.

Bold values denote statistical significance at the $P < 0.05$ level.

Next, we assessed NSSS subdimensions. The level of self-centered sexual satisfaction was higher in males ($p < .001$), unmarried individuals ($p < .001$), those without children ($p = .015$), those in relationships shorter than 5 years ($p = .001$), and those who lived alone compared to those living with their partner/partner and children ($p = .009$). Additionally, self-centered sexual satisfaction scores were highest among unmarried individuals, followed by self-acquainted individuals, and then, those with an arranged marriage ($p < .001$). Partner-centered sexual satisfaction levels were higher in those who were unmarried ($p = .001$), those without children ($p < .001$), those without chronic disease ($p = .035$), and those who lived alone or with their parents compared to those living with their partner/partner and children ($p = .003$). In addition, partner-centered sexual satisfaction scores demonstrated lower values relative to relationship duration (the shorter the relationship, the higher the score; $p < .001$) and partner acquaintance (higher to lower: unmarried, self-acquainted, arranged marriage; $p < .001$; Table 2).

The most notable correlations between variables were as follows: CSI score was found to be positively and significantly correlated with total NSSS score ($r = 0.523$, $p < .001$), self-centered sexual satisfaction ($r = 0.418$, $p < .001$), and partner-centered sexual satisfaction ($r = 0.551$, $p < .001$; Table 3).

Linear regression analysis revealed that NSSS scores were independently associated with CSI, cohabiting status (partner/partner and children), type of acquaintance with partner (arranged), relationship duration (0–1 years), and sex (male). Having a higher CSI score, being in a 0–1-year relationship and being a male were significantly associated with higher NSSS score (Std β values: 0.525, 0.135, and 0.099, respectively); whereas being in an arranged marriage and cohabiting with partner/partner and children were associated with lower NSSS score (Std β values: -0.134 and -0.183 , respectively) (Table 4).

Table 3. Correlations between variables.

		NSSS	CSI	MAAS	Self-centered NSSS	Partner-centered NSSS
New Sexual Satisfaction Scale (NSSS)	<i>r</i>	1				
	<i>p</i>	–				
Couples Satisfaction Index (CSI)	<i>r</i>	.523	1			
	<i>p</i>	<.001	–			
Mindful Attention Awareness Scale (MAAS)	<i>r</i>	–.196	–.288	1		
	<i>p</i>	.001	<.001	–		
Self-Centered NSSS	<i>r</i>	.927	.418	–.169	1	
	<i>p</i>	<.001	<.001	.005	–	
Partner-Centered NSSS	<i>r</i>	.947	.551	–.191	.768	1
	<i>p</i>	<.001	<.001	.001	<.001	–
Age	<i>r</i>	–.102	–.160	–.132	–.062	–.126
	<i>p</i>	.089	.008	.028	.308	.036

Bold values denote statistical significance at the $P < 0.05$ level.

Table 4. Factors associated with sexual satisfaction (NSSS score).

	Unstandardized coefficients		Standardized coefficients			<i>F</i>	<i>R</i> ²
	<i>B</i>	<i>SE</i>	Beta	<i>t</i>	<i>p</i>		
Constant	30.050	4.641		6.475	<.001	33.716	0.384
Couples Satisfaction Index	1.083	0.099	0.525	10.913	<.001		
Cohabiting status (partner / partner and children)	–7.055	2.155	–0.183	–3.274	.001		
Type of acquaintance with partner (arranged)	–11.867	4.277	–0.134	–2.775	.006		
Relationship duration (0–1 years)	6.898	2.846	0.135	2.424	.016		
Sex (male)	3.619	1.756	0.099	2.060	.040		

SE: standard error.

Other variables included in the model, age ($p = .286$), marital status ($p = .740$), children ($p = .610$), education level ($p = .432$), chronic disease ($p = .144$), mental health disease ($p = .128$), and MAAS score ($p = .906$) were found to be nonsignificant.

In the linear regression analysis performed to identify factors independently associated with relationship satisfaction (CSI score), we found that partner-centered sexual satisfaction score, MAAS score, and age were the parameters which demonstrated significance. While higher partner-centered sexual satisfaction score was associated with higher CSI (Std β : 0.508), higher MAAS and older age were associated with lower CSI (Std β values: –0.223 and –0.137, respectively) (Table 5). Other variables included in the model, sex ($p = .312$), children ($p = .897$), chronic disease ($p = .741$), mental health disease ($p = .486$), and self-centered NSSS score ($p = .923$) were found to be nonsignificant.

Discussion

Sexual satisfaction may be associated with a broad range of factors since it is intertwined with quality of life, quality of marriage, general wellbeing and happiness (Stephenson et al., 2011). In the current study, we aimed to determine factors associated with sexual satisfaction and relationship satisfaction among individuals in a

Table 5. Factors associated with relationship satisfaction (CSI score).

	Unstandardized coefficients		Standardized coefficients			F	R ²
	B	SE	Beta	t	p		
Constant	34.885	3.536		9.866	<.001	51.082	0.360
Partner-Centered NSSS	0.446	0.043	0.508	10.310	<.001		
Mindful Attention Awareness Scale	-0.212	0.047	-0.223	-4.528	<.001		
Age	-0.171	0.062	-0.137	-2.767	.006		

SE: standard error, NSSS: New Sexual Satisfaction Scale.

relationship, with particular focus on mindfulness due to the limited and inconsistent literature on this topic.

Recognizing internal and external stimuli can contribute to greater relationship satisfaction, especially by increasing sexual satisfaction from one's partner (Khaddouma et al., 2015). Considering data from studies examining the role of mindfulness in promoting healthy sexual relationships through greater intimacy, it appears that higher intimacy and less cognitive disorganization contribute to healthy relationships (Yeh et al., 2006). According to a previous research, both dispositional and learned higher awareness levels are consistently associated with greater relationship satisfaction (Kozlowski, 2013). In the study by Leavitt et al., it was stated that sexual awareness increases both relationship satisfaction and sexual satisfaction (Leavitt et al., 2019). In a meta-analysis by McGill et al., it was reported that higher levels of mindfulness were associated with higher levels of relationship satisfaction, and therefore, it was suggested that mindfulness could be considered as an educational goal for persons seeking greater levels of relationship satisfaction (McGill et al., 2016). In the current study, contrary to what is reported in the literature, it was determined that greater levels of mindfulness (as measured by MAAS) were associated with lower relationship satisfaction. Although this is an interesting finding in its own right, a very recent study reported decreased prosocial behavior among independent individuals with greater levels of mindfulness (Poulin et al., 2021). When this possible effect is viewed from the two relevant analyses in this study (relationship and sexual satisfaction), it appears that the mindfulness levels in our highly educated study group could elicit adverse effects on relationship satisfaction, and, anecdotally, this could also explain the lack of effects on sexual satisfaction – which has a highly independent and personal dimension (that can satisfy selfish desires) despite its proven association with relationship satisfaction. It is also possible that relationship and sexual satisfaction were less important (or impactful) for our highly educated study group, which may be another potential explanation for low satisfaction-related scores. Additionally, it should be noted that nonattachment, another factor associated with mindfulness, may have influenced the levels of relationship and sexual satisfaction (Soler et al., 2021). Nonattachment is defined as "the relative absence of attachment to ideas, images, or sensory objects, and the absence of inner pressure to obtain, hold, avoid, or change conditions or experiences" (Sahdra et al., 2010). The previously reported positive correlation between awareness and nonattachment may have also impacted the levels of relationship and sexual satisfaction (Feliu-Soler et al., 2016). Since the present study did not investigate the nonattachment variable, this notion remains a prediction. Future mindfulness researchers who aim to

investigate mindfulness and meditation with relationship and/or sexual satisfaction could consider nonattachment as another variable to explore.

In linear regression analyses, it was determined that relationship satisfaction, cohabiting status, type of acquaintance with partner, relationship duration, and sex were independently associated with sexual satisfaction. It has been reported that sexual differences between men and women are the result of both biological and socio-cultural factors. In addition, the existence of significant individual variability in sexual desire, sexual activity and intensity and/or frequency of sexual satisfaction among men and women is also important. Some women's sexual function appears to be much closer to the level generally defined in men, while some men may in fact have very low sexual desire (Dosch et al., 2016). In the current study, although univariate comparisons were nonsignificant for overall NSSS scores, the self-centered sexual satisfaction subdimension was greater in men than in women. One particular reason for this may be the fact that sexual satisfaction in women is associated with more numerous factors compared to men (Carpenter et al., 2009), and therefore, it may be more difficult for women to achieve sexual satisfaction, especially when assessments are performed in a single-factor manner. This possibility is particularly pertinent in the context that partner-centered NSSS scores were similar in males and females, indicating that satisfaction from partner-related sexual behavior and reactions were perceived to be at the same level in both sexes, while females perceived lower levels of self-centered satisfaction. Considering the patriarchal structure of Turkish society and the fact that female sexuality and its discussion have long been observed as restricted topics (Gursoy et al., 2016; Ilkcaracan & Women for Women's Human, 1998), women's perception of sexual satisfaction or their narration of their experiences could be repressed in more than one dimension. First, women who reported lower satisfaction but higher partner-centered satisfaction may have been basing their response on their partner, rather than providing an answer based on their experience related to their partners' actions; thus, leading to higher scores in partner-centered satisfaction due to achieving male orgasm. Second, even if scores were based on their own experiences, women may have been reluctant to report relatively high scores in self-satisfaction, possibly due to cultural or social "needs" to repress their experiences during sex. However, this is also true for the other end of the spectrum, as women in patriarchal societies may also be reluctant to report sexual dissatisfaction (Ziaee et al., 2014). Of note, although the education levels of women included in this study were much higher than the average Turkish population, it has been shown previously that education level is not directly linked to female sexual satisfaction, even though highly educated women may be more likely to report lower sexual satisfaction (similar to our findings) (Abdoly & Pourmousavi, 2013).

A previous study (Schmiedeberg & Schröder, 2016) reported sexual satisfaction improvement throughout the first year of analyzed relationships, but this increase was followed by a steady decline with time. Although it is thought that this effect is caused by the frequency of sexual intercourse, it was reported that this effect continues even when the frequency of sexual intercourse is controlled. It has been hypothesized that the nonlinear effect of intercourse duration on sexual satisfaction is an initial learning effect related to partner-specific sexual skills, and that this effect changes as a result of declining passion in the later stages of the relationship

(Schmiedeberg & Schröder, 2016). In this study, similar to the literature, it was determined that the sexual satisfaction levels were higher in those with shorter relationship duration compared to those who were in longer-term relationships. However, in contrast, Barrientos and Paez reported that sexual satisfaction increases in long-term relationships (Barrientos & Páez, 2006). To increase the sexual satisfaction of individuals in the later periods of their relationships, psychosocial interventions may be beneficial.

We found that the sexual satisfaction levels of individuals with arranged marriage and those living with their partner/partner and children were lower relative to the respective comparative groups. Kislev reported in a comprehensive study that marriage was not a factor associated with sexual satisfaction. The study even reported that their group of married subjects had lower sexual satisfaction when compared to certain unmarried groups. The only exceptions to this finding were reported to be single people without a partner; however, this was more likely to be due to less-frequent intercourse, rather than a lack of sexual self-esteem and/or sexual communication (Kislev, 2020). In the study by Park et al., it was reported that higher sexual satisfaction was associated with less desire to marry and stronger beliefs that unmarried people can be happy without marriage (Park et al., 2021). Since marriage has a dynamic that carries certain burdens and considerably greater responsibilities than other relationships, it is not surprising that sexual satisfaction in married individuals decreases compared to unmarried individuals, especially if supportive efforts are lacking on both sides. Additionally, identities such as motherhood and fatherhood may make it difficult for individuals to freely exert (or return) to their pre-marital or pre-birth sexual status (Schwartz & Young, 2009).

It is stated that the increase in the duration of the relationship for individuals who have a romantic relationship significantly affects relationship satisfaction. Often, this directional relationship is inverse (decreases with longer relationship duration) or it can be U-shaped (decreases with time at the start of the relationship, but recovers after a certain time). It has been reported that these directional influences may differ according to culture; for example, in arranged marriages, relationship satisfaction has been shown to be lower in the early stages of marriage (Sorokowski et al., 2017). In another study, it was reported that relationship satisfaction decreases over time during the time period covering the first 4–5 years of marriage, but the rate of decrease eventually becomes less steep (Mcnulty et al., 2016). Similarly, Çağ and Yıldırım reported that marital satisfaction gradually decreased until 6–10 years, but showed a slight increase thereafter (Çağ & Yıldırım, 2018). In the present study, although sexual satisfaction was found to be inversely related with relationship duration, relationship satisfaction did not demonstrate an independent association with the duration of relationship. Notably, CSI scores were found to be associated with three factors: partner-centered sexual satisfaction score (positively), MAAS score (inversely), and age (inversely).

Having a child triggers emotional, psychosocial, and interpersonal processes, such as dependency/independence conflicts, problems in caring for the child and the expansion of the family (Bitzer & Alder, 2000). Therefore, having a child is expected to affect sexual life, sexual satisfaction, and, by extension, relationship satisfaction. In the study of Witting et al., it was reported that orgasm problems were less frequent

in multiparous women than nulliparous women. Additionally, in the same study, it was reported that women who were pregnant with their first child had fewer pain problems and higher sexual satisfaction compared to matched nonpregnant controls (Witting et al., 2008). Çağ and Yıldırım reported that men's marital satisfaction was highest when there was no child in the family, while it decreased when there was a single child; however, interestingly, marital satisfaction was found to increase after the second child. It has been reported that the marital satisfaction of women is inversely proportional to the number of children (Çağ & Yıldırım, 2018). Karalı reported that the number of children did not affect sexual satisfaction, but somewhat reduced marital adjustment (Özbek, 2016). Similarly, Özbek reported that the number of children was a factor that was associated with reduced marital satisfaction (Norton et al., 1999). In the current study, it was determined that the level of relationship satisfaction in those without children was higher compared to those who had children, similar to prior studies (Twenge et al., 2003), but we did not identify an independent relationship between these factors. This may indicate that, rather than the presence/absence of children, other underlying factors that could confound the exposure (having children) may be affecting relationship satisfaction. However, it is critical to note that the effects of having children, childcare and the role of children in the family differ greatly according to various factors, including social norms, cultural characteristics, financial status and inter- and intra-family communication (Fang et al., 2022), which may confound comparisons with other studies. In addition, the evaluation methods utilized by the studies may have caused the observed differences between results.

Sexual satisfaction is an important indicator of sexual health and is strongly associated with relationship satisfaction (Pascoal et al., 2014). Interdependence theory hypothesizes that individuals evaluate their relationships by weighing their perceived relationship rewards against their perceived relationship costs and that they are more likely to be satisfied with the relationship when they perceive that the rewards exceed the costs. Considering that sexual satisfaction is also an important relationship reward, being more satisfied with sexual intercourse may lead people to be more satisfied with their relationships in general (Mcnulty et al., 2016). According to Weiss, couples can experience emotional dominance in their relationships. So much so that their overall assessment of the relationship can affect the way they evaluate certain qualities of that relationship. Overall satisfaction or dissatisfaction with the relationship can positively or negatively affect perceptions of certain aspects of that relationship. In this context, the sexual satisfaction of the individual who is satisfied with his relationship can be expected to be high (Weiss, 1980). However, evidently, these two perspectives are not mutually exclusive and may not indicate a direct causal relationship. It is possible that higher levels of sexual satisfaction lead to higher levels of subsequent relationship satisfaction, or vice-versa (Mcnulty et al., 2016). Çolak and Cin reported a positive and significant relationship between happiness in a relationship and sexual satisfaction for women (Çolak & Cin, 2019). Uzel reported a strong positive relationship between marital adjustment and sexual satisfaction (Uzel, 2015). In Karalı's study, a highly positive relationship was reported between marital satisfaction and sexual satisfaction (Özbek, 2016). In the study by Witting et al., it was reported that greater satisfaction in the relationship was associated with higher sexual satisfaction (Witting et al., 2008). In the

current study, we found that NSSS and CSI scores were both independently associated with each other. That is, higher CSI and NSSS scores resulted in higher sexual satisfaction and relationship satisfaction, respectively. Our results are in agreement with the literature. However, as mentioned before, it has not been clearly proven which of these factors causes the other. The answer to this question can be sought by conducting research with long-term longitudinal designs.

Limitations

This research has several limitations. One of them is that the study was not planned prospectively and was population-based; therefore, the level of evidence is low. Since participants received the questionnaire on the internet and filled it voluntarily, and considering the confidential nature of the questions, respondent characteristics may have been fundamentally different from individuals who refused participation, and this situation is likely to affect our results. Furthermore, it has been reported that online approaches are deemed susceptible to data quality problems due to fraudulent behavior and inaccurate responses (Pozzar et al., 2020); however, voluntary participation and the fact that responses were only recorded if all “required” areas had been filled would have greatly limited the number of such data points. The majority of subjects who participated in the study had received considerably higher-level education compared to the population, and this is a factor that limits generalizability. Since all subjects who decided to participate in the study were heterosexual and cisgender, this is also a limitation for generalizability and necessitates studies that conduct research with the inclusion of these populations. Another limitation of the study is that the relationship between nonattachment and sexual satisfaction, which is an important factor related to mindfulness, was not evaluated. Finally, the inability to make a qualitative assessment with the in-depth interview technique (due to the COVID-19-related restrictions in place during the data collection period) can be noted as an unavoidable limitation.

Conclusion

The findings of our study support prior data in the context that relationship and sexual satisfaction are closely related to each other. Other factors contributing to greater sexual satisfaction were shorter relationship duration and being a male, while those with arranged marriage and those cohabiting with their partner had lower sexual satisfaction. On the other hand, older age and, very interestingly, higher levels of mindfulness were independently associated with lower levels of relationship satisfaction. There is a need for more comprehensive longitudinal studies evaluating relationship satisfaction and sexual satisfaction to assess causal relationships and to identify interventions that could benefit relationships.

Disclosure statement

No potential conflict of interest was reported by the authors.

Ethical approval

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Clinical Research Ethics Committee of Kent University (Date: 28.05.2020/ No: 77083609-100/132).

Authors' contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Selim Arpacioğlu, Beyza Arpacioğlu and Gozde Avsar. The first draft of the manuscript was written by Selim Arpacioğlu, Beyza Arpacioğlu and Gozde Avsar and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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