Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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ORIGINAL RESEARCH & REVIEWS

COVID-19

Coping Using Sex During the Coronavirus Disease 2019 (COVID-19) Outbreak in the United Kingdom

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ABSTRACT

Background: The use of sex to cope with negative affective states during the coronavirus disease 2019 (COVID-19) pandemic may be influenced by various sociodemographic and psychological characteristics.

Aim: We aimed to examine the effects of social distancing, loneliness, difficulties in emotion regulation, and self-regulation on participants self-reported coping using sex during lockdown in the United Kingdom.

Methods: Participants had to be residents of the United Kingdom, aged between 18−60 years, fluent in English, and had to have an Internet connection. They were instructed not to participate if they had consumed alcohol in the previous 24 hours. A total of 789 participants aged 18−59 years completed an online survey. Participants provided self-report measures of social distancing, loneliness, and difficulties in emotion regulation. A Go/No-Go task was used to assess self-regulation.

Outcomes: Participants self-reported their use of sex to cope over a 14-day period during lockdown, as well as retrospectively for a 14-day period immediately preceding lockdown. Coping using sex items included consensual and non-consensual themes.

Results: Overall, there was no increase in coping using sex during lockdown compared with before lockdown. Findings showed that 30% of participants reported increased coping using sex during lockdown compared with before, 29% reported decreased coping using sex, and 41% reported no change. All regression models included age, gender, ethnicity, diagnosis of psychiatric condition, level of education, being at high-risk for difficulties relating to COVID-19, living alone, and diagnosed or suspected COVID-19 as covariates. Being younger, being male, and greater emotion dysregulation were associated with higher coping using sex total and consent subscale scores during lockdown. Being younger, being male, not living alone, and less adherence to social distancing advice were associated with coping using sex with a theme of rape/violence during lockdown.

Clinical Translation: A proportion of participants used sex to cope more often during lockdown compared with before. Less adherence to social distancing advice and emotion dysregulation were associated with using sex to cope during lockdown.

Strengths & Limitations: Strengths of this study were the large sample size and inclusion of key sociodemographic characteristics as covariates. The main limitations were the cross-sectional design and a sample that was mostly white, educated, and female.

Conclusion: Participants who had difficulty regulating emotions were more likely to use sex to cope. It is important that support is available for people who have problems regulating their emotions during the pandemic and that they have access to appropriate help and advice. **Gillespie SM, Jones A, Uzieblo K, et al. Coping Using Sex During the Coronavirus Disease 2019 (COVID-19) Outbreak in the United Kingdom. J Sex Med 2021;18:50−62.**

Key Words: COVID-19; Social Distancing; Coping; Sex; Emotion Regulation; Self-Regulation; Loneliness

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The coronavirus disease 2019 (COVID-19) outbreak has presented a variety of economic, psychosocial, and health-related stressors that are likely to have a considerable impact on mental health and well-being for some individuals.[1,2] The rapid spread of COVID-19 has led to the introduction of social distancing measures in countries all over the world in an effort to reduce the spread of infection. However, these measures are also expected to have short- and long-term adverse consequences for mental health and well-being,[3] and it is likely that some people will use problematic coping behaviors.[4] In the present study, we investigated the prevalence and correlates of coping using sex during COVID-19 lockdown in the United Kingdom.

A review of the evidence on the psychological impact of quarantine, undertaken in response to the COVID-19 outbreak, highlighted a variety of negative impacts observed following quarantines for severe acute respiratory syndrome, Ebola, and H1N1 influenza.[5] Examining responses to past traumatic, environmental, and natural disasters suggests that the negative consequences of COVID-19 might include higher prevalence of substance use disorder, domestic violence, and child abuse,[6] as well as overeating.[7] Ways of coping with isolation during the period of social distancing are likely to include both health harming (eg, alcohol use, substance use) and health protective (eg, exercise) behaviors.[7] This is consistent with the Threat Appraisal and Coping Theory,[8] according to which adaptive and maladaptive coping strategies should be considered as a response to cognitive appraisals of a situation or condition. Coping is defined as a person's cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as stressful or exceeding the person's resources.[8] The evaluation of a coping strategy is tied to its adaptive or maladaptive effect on one's well-being in the short and/or long term. Adaptive coping involves behaviors that are linked with positive outcomes; for example, exercise, good sleep hygiene, and social support seeking.[9–14] In contrast, maladaptive coping behaviors are associated with negative outcomes; for example, binge eating, self-injurious behavior, and problem gambling.[15,16] A different strategy to cope with negative situations that has not been studied in the context of COVID-19 is the use of sex to cope with, including increased pornography consumption, risky and unlawful sexual behaviors.

An increase in consensual sexual activity during prolonged periods at home with a romantic partner may not be unexpected. However, an increase in sexual fantasizing, viewing pornography, masturbation, and engaging in sexual acts with others to cope with difficult, stressful, or challenging situations may be associated with adverse outcomes, including more risky sexual behaviors,[17,18] and feelings of anxiety, shame, guilt, and loneliness.[19] Although a link between sex and coping during COVID-19 has not been examined, statistics have shown dramatically increased traffic to Pornhub and other major providers of Internet pornography during the COVID-19 crisis.[20] This evidence lends support to the hypothesis that for many people, pornography may represent a means to cope with the restrictions imposed by the lockdown measures. Although descriptive, these statistics are consistent with research showing that online pornography can be used as a way to cope with life stressors, including money stress, family stress, and work stress.[21]

Beyond the use of pornography, considerable variation has been reported in the extent to which people experience sexual interest or sexual response during negative affective states.[22] Negative mood states are typically associated with decreased sexual interest and arousal; yet a proportion of heterosexual male participants have reported increased sexual interest when experiencing negative affect.[23] Of those indicating depressed mood, 9.4% reported increased and 42% reported decreased sexual interest when depressed; for anxiety/stress, the percentages were 20.6% and 28.3%, respectively.[23] Similar results have also been reported in a sample of female college students, and it was shown that, in general, sexual interest during negative mood was more commonly reported by male compared with female respondents.[24] Qualitative findings indicate that sex when depressed can serve needs for intimacy and self-validation, while sex when anxious appears to be more simply related to the calming effect of sexual release.[23]

In relation to COVID-19 in particular, findings from China,[25] and in 3 South East Asian countries,[26] show tentative support for the hypothesis that while most participants might show either reduced or similar levels of sexual behaviors during the pandemic, a small proportion of participants will report more frequent sex. When considering that the COVID-19 pandemic and associated lockdown measures could contribute to changes in negative affect, it is perhaps unsurprising that some people will resort to problematic ways of coping, including using sex to cope, during the period of lockdown.

Other reports have similarly observed a relationship between negative emotions and sex among people who have sexually offended.[27] Cortoni and Marshall[28] showed that sexual preoccupation was linked with the use of sex to cope, and that consensual and non-consensual coping using sex was associated with feelings of loneliness and intimacy deficits in adults who had sexually offended. Other studies have shown that both sexual offenders with adult and child victims engage in offense-related fantasies to cope with negative emotions.[29,30] As well as negative emotions, some reports have also highlighted feelings of loneliness as a risk factor for sexual offence recidivism,[31] although this evidence remains tentative and inconsistently supported.[32] The role of loneliness may be especially important as it relates to the COVID-19 pandemic, given that limited social contacts due to mobility restrictions could ostensibly trigger feelings of loneliness.

It has been proposed that the use of sex as a means to cope with negative affective states may reflect impairments in general self-regulation and emotion regulation in particular.[33,34] Emotion regulation refers to the process by which individuals

use a range of strategies to exert control over which emotions they experience and when they experience them,[35] and includes the ability to engage in goal-directed behavior and refrain from impulsive actions when distressed.[36] There is evidence that difficulties in cognitive reappraisal, that is, in using cognitive resources to construct an emotion eliciting situation in such a way that the emotional impact of the situation is altered, are associated with problems in regulating sexual response.[37,38] It has also been shown that difficulties in emotion regulation represent "psychologically meaningful" risk factors for sexual offending.[32] Emotion regulation also plays an important role in the offence process for sexual offenders,[39,40] and difficulties in emotion regulation have been identified in men who engage in sexually coercive behaviors.[41–45]

The current study aimed to examine the use of consenting and non-consenting sex as a means to cope in a U.K. sample of men and women. We recruited participants online during government-enforced lockdown and asked them to report on their use of sex as a means to cope over the last 14 days, and retrospectively over the 14-day period that preceded the introduction of government-enforced lockdown. We examined changes in self-reported use of sex as a means to cope following the introduction of strict social distancing measures, and the ways in which physically distancing oneself from people outside of the household, perceived feelings of loneliness, self-regulation, and difficulties in emotion regulation were associated with current levels of coping using sex.

Given that sexual coping is not recognized as an adaptive response to negative feelings, and only a small proportion of participants report an increase in sexual interest and response while experiencing low or anxious mood, we did not predict an overall increase in coping using sex during government-enforced lockdown in the United Kingdom. We predicted that self-reported coping using sex during the period of lockdown in the United Kingdom, for both consensual and non-consensual acts, would be associated with increased reports of social distancing and loneliness, and with more difficulties in self-regulation and emotion regulation. We also examined a series of 2-way interactions with social distancing as it was predicted that participants who reported greater social distancing coupled with either feelings of loneliness, difficulties in emotion regulation, or poor self-regulation would show the highest coping using sex scores.

METHODS

Participants

Social distancing and lockdown were officially ordered by the U.K. Government on March 23, 2020. Participants were recruited via Prolific Academic between April 19, 2020 and April 21, 2020. Prolific Academic provides a platform for conducting paid research.[46] Participants recruited via Prolific Academic have been found to produce high quality data from a more diverse population than similar recruiting tools (eg, MTurk, CrowdFlower).[46] In order to participate, individuals had to be aged between 18 and 60 years, a resident of the United Kingdom at the time, speak fluent English, and have an Internet connection. Participants were instructed not to participate if they had consumed alcohol in the previous 24 hours or if sensitive questions about sexual behavior, or health protective or health harming behaviors were likely to cause distress. 907 participants accessed the survey. After removal of 9 potential duplicate responses, and 109 individuals who failed one or both manipulation checks or did not reach the end of the study, the remaining 789 participants had a mean age of 30.56 (±9.59; range 18−59) years. Most participants were female (N = 522 [66.2%]: male = 257 [32.6%], non-binary = 5 [0.6%], preferred not to disclose or missing = 5 [0.6%]). The research was approved by the University of Liverpool, United Kingdom, Committee for Ethical Review (Ref: 7635).

Measures

Social Distancing[47]

We modified a social distancing questionnaire that was designed in the context of COVID-19 to assess the extent to which participants were observing social distancing advice.[47] Participants were asked in the previous 2 weeks how much time they had spent with friends, immediate family, colleagues, and usual social network in person, with the anchors 1 (not at all) to 5 (very often). The original scale, which was designed for use with adolescents, was modified for use with adults by replacing an item that asked about "time spent with others (eg, teachers or neighbors)" with an item that asked about "time spent with others (eg, colleagues or neighbors)." Items were reverse scored; so greater scores indicated increased social distancing. They were also asked about their social media use to connect/play games with friends and family, individuals/groups outside of their usual contacts using the same anchors. 4 items for social distancing (N = 789; ω = 0.638) were included in the current analyses, and an additional 4 items asked about social media use (N = 789; ω = 0.735).

UCLA Loneliness Scale[48]

The UCLA loneliness scale is a 20-item Likert scale which measures subjective feelings of loneliness and social isolation (eg, "I lack companionship"), with the anchors "I often feel this way," "I sometimes feel this way," "I rarely feel this way," "I never feel this way." Participants were asked to think about the "last 2 weeks" when responding. A total score for loneliness is used by summing the scores from each question. Evidence suggests the scale has good psychometric properties.[48] The internal consistency in this data set was excellent (N = 789; ω = 0.952).

Coping Using Sex Inventory (CUSI)[28]

Participants completed the 16-item CUSI, which provides a series of scenarios and asks participants to indicate using a Likert

scale from 1 (not at all) to 5 (very often) how often they engaged in these behaviors. The inventory consists of 3 subscales, asking about sexual thoughts and behaviors with themes of consent, rape, and child sexual abuse. The scale also yields an overall score, with higher scores indicating more frequent use of sex to cope. An example of a consensual item is "I have fantasized about having sex with a consenting adult," while an example of a rape item is "I have forced my regular partner to have sex." 2 versions of each scenario were asked: (i) in the 2 weeks before lockdown was introduced by the U.K. government, and (ii) in the last 2 weeks. Although reports for the last 2 weeks were used here to understand the predictors of coping using sex during COVID-19, retrospective reports were used to estimate the proportion of participants who reported increased or decreased coping using sex. The scale had good internal consistency for both scenarios (before lockdown $N = 760$; $\omega = 0.803$; 2 previous weeks $\omega = 0.698$).

Difficulties in Emotion Regulation Scale 16-Item Version (DERS-16)[49]

The DERS-16 is a 16-item Likert scale focusing on behavior over the previous 2 weeks (eg, "When I have been upset in the past 2 weeks, I have become out of control."), with anchors ranging from 1 (almost never) to 5 (almost always). It captures emotion regulation difficulties across the following domains: difficulties in engaging in goal-directed behavior when distressed, impulse control difficulties when distressed, limited use of effective emotion regulation strategies, and limited awareness, clarity, and acceptance of emotions. A review of studies using the original DERS and its derivatives has shown that the different DERS subscales have limited discriminant validity, likely reflecting general emotion dysregulation.[50] Hence, the present study relied on the DERS-16 total score. The internal consistency was excellent ($N = 789$; $\omega = 0.961$).

Worries About COVID19 Questionnaire

Participants were asked to rate on a novel scale how strongly they agree that they were worried about (i) getting COVID-19, and (ii) they might lose their job due to the COVID-19 crisis (strongly disagree, disagree, unsure, agree, strongly agree). Participants were also asked to rate how worried they were about their (i) overall health, (ii) financial security, and (iii) food access compared to before the COVID-19 crisis (a lot more worried, more worried, no more or no less worried, less worried, a lot less worried). Scores were summed across the 5 items. Each item had a maximum possible score of 5. The internal consistency was good ($N = 789$; $\omega = 0.653$).

Go/No-Go Task[51]

Participants completed a Go/No-Go task to assess general self-regulation skills. Specifically, the Go/No-Go task was used to assess participants' behavioral ability to withhold a prepotent motor response. Although general self-regulation and emotion regulation share functional overlaps, these constructs are nonetheless etiologically and biologically distinguishable, and are differentially associated with psychopathology.[52] Thus, the Go/No-Go task was used to measure a function that is separable to that measured by the DERS-16, supported by the finding that cognitive and behavioral measures of self-regulation are weakly correlated and provide unique information.[53] Each trial began with a fixation cross ("+") presented in the center of a screen for 50 ms followed by a blank screen for 150 ms. Following this, a shape (circle or square) appeared in a random spatial location on the screen for 1,000 ms or until a response was made. On "Go" trials participants were required to press SPACE in response to the shape as quickly as possible; on "No-Go" trials participants were required to withhold their response to the shape. Feedback was provided if participants made an omission error ("You should have pressed!"), commission error ("You should not have pressed!"), or if their reaction times on go trials was >600 ms ("Try to be faster!").

There were 5 experimental blocks each containing 50 trials (40 Go + 10 No-Go) and 1 practice block of 10 trials (8 Go + 2 No-Go: not analyzed). The mapping of Go and No-Go stimuli was presented at the beginning of each block. In the first 3 experimental blocks, a circle was the Go response (square = No-Go). On the fourth block the rules changed, and the square signaled a Go response (circle = No-Go), which remained for the final block. The shift in rules increases the variability in commission errors and allows for the detection of set-shifting costs,[54,55] referring to an increase in error rates for blocks where the Go and No-Go stimuli are reversed. For the Go/No-Go task we calculated the total number of commission errors across the 5 experimental blocks (max = 50 errors), and the median Go trial reaction time. A greater number of commission errors is indicative of a reduced ability to withhold a prepotent response (ie, poorer general self-regulation abilities). The intraclass correlation coefficients on a block-by-block basis for the commission errors were acceptable = 0.824 (95% CI 0.802−0.843). The task took approximately 4 minutes to complete.

Procedure

All measures and the main analyses were preregistered using AsPredicted (#39502), an online platform that allows the authors to preregister hypotheses, procedures, and planned analyses, and to separate these from exploratory tests, on April 19, 2020. Upon signing up to the study, participants were presented with a landing page discussing the sensitive nature of some of the questionnaires, before reading the information sheet and providing consent. They then completed a series of demographic questions. The survey also included items probing changes in health behaviors and mental health during lockdown that are reported in a separate manuscript.[7] All additional measures are reported in Supplementary Material 1. Following this, participants completed the Social Distancing questionnaire, UCLA

Loneliness scale, CUSI, DERS-16, and COVID-19 questionnaire. Finally, participants completed the Go/No-Go task. Participants faced attention checks ("Have you ever been to Mars/Jupiter," select "Strongly Disagree") within the questionnaire battery and immediately prior to the Go/No-Go task. The study took approximately 20 minutes to complete. Participants were paid in line with Prolific Academic fair pay recommendations for the time taken to complete the survey.

Data Reduction and Analyses

First, we tested the interrelationships between all variables using Spearman's rank correlations. We created binary variables for ethnicity (white—other), psychiatric diagnosis (present—absent), education (educated to degree level and above—not educated to degree level), being in a high-risk group for difficulties resulting from COVID-19 (eg, presence of diabetes) (present—absent), and living status (alone—with others). To examine whether participant characteristics were associated with variability in coping using sex, we used CUSI total and consent subscale scores over the last 14 days as dimensional outcome variables in multiple linear regressions. Because scores on the rape subscale of the CUSI were highly positively skewed (toward zero), we used logistic regression to predict membership based on a binary variable (0 = endorsed none of the rape items, 1 = endorsed at least 1 rape item). Scores on the CUSI child subscale were also heavily skewed toward zero, with only 1% of participants endorsing at least 1 of the items. As such, this variable was not used as an outcome measure.

Some minor changes were made to the covariates included in the preregistered regression models. These are detailed in Supplementary Material 2. In the first step of each regression model, we included sociodemographic characteristics (gender, age, ethnicity, highest education level, living status, COVID-19 high-risk health group, and previous diagnosis of psychiatric illness) of participants, as covariates. In the second step of each model, we included the extent to which participants had socially distanced themselves physically from others, loneliness, difficulties in emotion regulation, and number of Go/No-Go errors, to explore whether these variables explained any incremental variance in the outcome measures. In the third step of each model, we included 2-way interactions of physical social distancing with (i) loneliness, (ii) difficulties in emotion regulation, and (iii) number of Go/No-Go errors, to explore whether the effects of social distancing were moderated by loneliness, emotion regulation, or general self-regulation abilities. In a series of exploratory tests (not preregistered using AsPredicted), we used generalized linear models to examine if the observed effects of social distancing, loneliness, emotion dysregulation, and self-regulation on coping using sex were moderated by gender. The pattern of results observed in these analyses is briefly described in this manuscript with a complete description of the results presented in Supplementary Material 3. To examine whether

Table 1. Descriptive statistics for key variables

Variable (*n* complete)	Min.	Max.	N (%)/Mean (SD)	Median
Ethnicity (787)				
White			629 (80%)	
Psychiatric condition (781)				
Diagnosis received			249 (32%)	
Education (787)				
Degree or higher			510 (65%)	
High-risk condition (789)				
≥1 condition			153 (19%)	
Living status (789)				
Living alone			76 (10%)	
Diagnosed/suspect COVID-19 (785)				
Yes			121 (15%)	
CUSI total during lockdown (755)	16	46	22.71 (5.44)	21
CUSI consent during lockdown (775)	5	25	11.42 (4.9)	10
CUSI rape during lockdown (775)	6	19	6.28 (1.07)	6
CUSI child during lockdown (781)	4	7	4.02 (0.23)	4
Social distancing (789)	1	5	4.68 (0.56)	5
Loneliness (789)	0	58	22.87 (13.76)	22
DERS-16 (779)	16	74	35.52 (14.7)	34
COVID-19 worries (789)	7	25	17.18 (3.18)	17
Go/No-Go errors (789)	0	49	9.46 (6.8)	8

COVID-19 = coronavirus disease 2019; CUSI = Coping Using Sex Inventory; DERS-16 = Difficulties in Emotion Regulation Scale 16-item version. Descriptive statistics for each measure are reported for all participants who completed that measure, hence the *n* complete varies by measure. For social distancing, loneliness, difficulties in emotion regulation, COVID-19 worries, and Go/No-Go errors, higher scores indicate increased levels.

worries about COVID-19 accounted for any incremental variance in the outcome measures, we computed exploratory follow-up analyses with the whole sample including worries about COVID-19 scores in the third step of each regression model. Analyses were carried out in jamovi Version 1.1 (https://www.jamovi.org),[56] running in the R environment.[57]

For logistic regression, model fit was assessed using deviance, Akaike Information Criterion (AIC), and Bayesian Information Criterion (BIC), with lower values of each representing a better fitting model. Missing data on any of the questionnaires led to those cases being removed list-wise.

RESULTS

Participant Demographics

Table 1 shows the minimum and maximum scores, mean, SD, and median score in each of the key variables. Scores indicated that participants, on average, engaged in high levels of physical social distancing. Coping using sex scores during COVID-19 were minimal for the 2 non-consensual subscales, with median scores on the rape and child subscales equivalent to the minimum score possible.

Differences Between Completers vs Non-Completers/Attention Check Failures

There were no statistically significant differences in the age of completers vs non-completers (Welch's $t(116.18) = 0.63$, $P = .529$), CUSI total score (Welch's $t(63.96) = 1.44$, $P = .156$), social distance score (Welch's $t(77.14) = 1.57$, $P = .120$), or total No-Go errors (Welch's $t(58.69) = 0.75$, $P = .458$).

Differences in Coping Using Sex

Figure 1 shows that there was no overall increase in coping using sex during COVID-19, comparing retrospective reports for the 2 weeks immediately preceding government-enforced lockdown in the United Kingdom with reports for 14 days during lockdown, $t(752) = 0.38$, $P = .707$. Overall, 30% of participants ($n = 223$) reported increased coping using sex during lockdown compared with before, 29% ($n = 222$) reported decreased coping using sex, and 41% ($n = 308$) reported no change.

Correlations Between Measures

Participants who reported more social distancing reported less coping using sex (total, consent) over the last 14 days, and were less likely to endorse a rape item. However, the converse was observed for loneliness and difficulties in emotion regulation, with higher scores associated with greater coping using sex over the last 14 days (CUSI total, CUSI consent), and greater likelihood of endorsing a rape item. Participants who made more errors on the Go/No-Go task also reported feeling lonelier and experiencing more difficulties in emotion regulation. Similarly, participants who were more worried about COVID-19 also reported feeling lonelier and experiencing greater difficulties in emotion regulation (see Table 2.

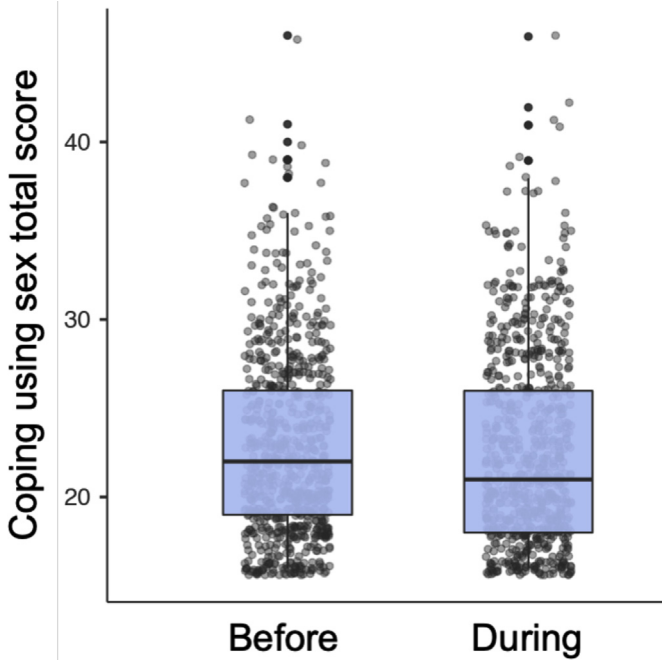

Figure 1. Total scores on the Coping Using Sex Inventory for 2 weeks immediately preceding lockdown and 2 weeks during lockdown. Figure 1 is available in color online at www.jsm.jsexmed.org.

Coping Using Sex Total

For coping using sex total score, the first step accounted for 21% of the total variance (adjusted $R^2 = 0.21$, $F(8, 730) = 25.54$, $P < .001$). As indicated in Table 3, being younger and being male were associated with reporting increased coping using sex. After the second step was added, the overall model accounted for 22% of the total variance and was associated with a significant F change (adjusted $R^2 = 0.22$, F change $(4, 726) = 4.03$, $P = .003$). Greater difficulties in emotion regulation were associated with greater coping using sex. The effects of being younger and being male remained significant. The addition of the 2-way interactions of physical social distancing with (i) loneliness, (ii) difficulties in emotion regulation, and (iii) Go/No-Go errors did not significantly improve the model (adjusted $R^2 = 0.22$, F change $(3, 723) = 1.07$, $P = .361$). Variance inflation factors (VIFs) suggested no problems with multicollinearity for step 1 ($1 < \text{VIF} < 1.1$) or step 2 ($1 < \text{VIF} < 2.1$). In an exploratory analysis, we replaced the 2-way interactions of social distancing in the third step with worries relating to COVID-19. This step did not significantly improve the overall model (adjusted $R^2 = 0.22$, F change $(1, 715) = 0.71$, $P = .399$).

A series of generalized linear models that included the 2-way interactions of gender with social distancing, loneliness,

Table 2. Spearman's correlations between variables

Variable	1	2	3	4	5	6	7
1. CUSI total	-						
2. CUSI consent	1‡	-					
3. CUSI rape (dichotomous)	0.45‡	0.39‡	-				
4. Physical social distancing	−0.09*	−0.08*	−0.13‡	-			
5. Loneliness	0.09*	0.08*	0.17‡	−0.10†	-		
6. DERS-16	0.13‡	0.12‡	0.14‡	−0.06	0.65‡	-	
7. Go/No-Go errors	0.02	0.02	0.06	−0.03	0.09*	0.15‡	-
8. COVID-19 worries	0	−0.01	0.03	0.03	0.19‡	0.23‡	0.04

COVID-19 = coronavirus disease 2019; CUSI = Coping Using Sex Inventory; DERS-16 = Difficulties in Emotion Regulation Scale 16-item version.
*$P < .05$
†$P < .01$.
‡$P < .001$.

difficulties in emotion regulation, and Go/No-Go errors revealed a significant interaction of loneliness with gender, with higher loneliness scores associated with greater coping using sex in men but not women (see Supplementary Material 3).

Coping Using Sex Consent Subscale

For scores on the consent subscale, the first step of the model accounted for 21% of the total variance (adjusted $R^2 = 0.21$, $F(8, 748) = 25.99$, $P < .001$). As indicated in Table 4, being younger, being male, and being white were associated with higher scores on the consent subscale. After the second step was added, the overall model accounted for 22% of the total variance and was a better fit to the data compared to the first model (adjusted $R^2 = 0.22$, F change $(4, 744) = 2.46$, $P = .044$). Greater difficulties in emotion regulation were associated with higher scores on the consent subscale. The effects of being younger and being male remained significant from the first

Table 3. Results of multiple linear regression on Coping Using Sex Inventory total scores

			95% CI			
Predictor	Estimate	SE	Lower	Upper	*T*	*P*
Model 1						
Age	−0.14	0.02	−0.18	−0.1	−7.47	<.001†
Gender	4.46	0.39	3.69	5.24	11.34	<.001†
Ethnicity	0.89	0.46	−0.01	1.79	1.95	.051
Psychiatric condition	−0.10	0.40	−0.88	0.68	−0.26	.798
Education	0.11	0.38	−0.64	0.86	0.28	.779
High-risk group	0.32	0.46	−0.58	1.21	0.70	.486
Living alone	−0.49	0.61	−1.68	0.71	−0.8	.425
Diagnosed/suspect COVID-19	0.72	0.50	−0.26	1.7	1.44	.151
Model 2						
Age	−0.12	0.02	−0.16	−0.08	−5.92	<.001†
Gender	4.56	0.39	3.78	5.33	11.54	<.001†
Ethnicity	0.69	0.46	−0.22	1.59	1.49	.14
Psychiatric condition	−0.60	0.42	−1.42	0.22	−1.44	.15
Education	0.05	0.38	−0.69	0.8	0.14	.89
High-risk group	0.33	0.45	−0.56	1.22	0.73	.47
Living alone	−0.51	0.61	−1.7	0.68	−0.84	.40
Diagnosed/suspect COVID-19	0.43	0.5	−0.56	1.43	0.86	.39
Social distancing	−0.56	0.31	−1.17	0.06	−1.78	.08
Loneliness	2.04E-04	0.02	−0.03	0.03	0.01	.99
DERS-16	0.05	0.02	0.02	0.08	2.84	.005*
Go/No-Go errors	−0.03	0.03	−0.08	0.03	−0.92	.36

COVID-19 = coronavirus disease 2019; DERS-16 = Difficulties in Emotion Regulation Scale 16-item version.
*$P < .01$.
†$P < .001$.

Table 4. Results of multiple linear regression on Coping Using Sex Inventory consent scores

Predictor	Estimate	SE	95% Confidence Interval		t	P
			Lower	Upper		
Model 1						
Age	−0.14	0.02	−0.17	−0.1	−8.05	<.001†
Gender	3.92	0.35	3.23	4.6	11.14	<.001†
Ethnicity	0.93	0.41	0.12	1.73	2.27	.02*
Psychiatric condition	−0.12	0.36	−0.82	0.57	−0.35	.73
Education	0.07	0.34	−0.6	0.75	0.22	.83
High-risk group	0.05	0.41	−0.76	0.85	0.11	.91
Living alone	−0.32	0.54	−1.39	0.74	−0.6	.55
Diagnosed/suspect COVID-19	0.53	0.45	−0.35	1.41	1.18	.24
Model 2						
Age	−0.12	0.02	−0.16	−0.09	−6.72	<.001†
Gender	4	0.35	3.3	4.69	11.3	<.001†
Ethnicity	0.77	0.42	−0.05	1.58	1.85	.06
Psychiatric condition	−0.49	0.38	−1.23	0.25	−1.31	.19
Education	0.02	0.34	−0.65	0.69	0.05	.96
High-risk group	0.06	0.41	−0.74	0.87	0.15	.88
Living alone	−0.31	0.54	−1.37	0.76	−0.56	.57
Diagnosed/suspect COVID-19	0.34	0.45	−0.55	1.23	0.76	.45
Social distancing	−0.27	0.28	−0.83	0.29	−0.96	.34
Loneliness	0	0.02	−0.03	0.03	−0.22	.829
DERS-16	0.04	0.02	0.01	0.07	2.43	.015*
Go/No-Go errors	−0.03	0.02	−0.08	0.02	−1.06	.289

COVID-19 = coronavirus disease 2019; DERS-16 = Difficulties in Emotion Regulation Scale 16-item version.
*$P < .05$.
†$P < .001$.

model. The effect of ethnicity was no longer significant. The addition of the 2-way interactions of physical social distancing with (i) loneliness, (ii) difficulties in emotion regulation, and (iii) Go/No-Go errors did not significantly improve the model (adjusted $R^2 = 0.22$, F change $(3, 741) = 1.08$, $P = .358$). VIFs suggested no problems with multicollinearity for model 1 ($1 <$ VIF < 1.1) or model 2 ($1 <$ VIF < 2.1). In an exploratory analysis, we replaced the 2-way interactions of social distancing

Table 5. Model fit indices for logistic regression on Coping Using Sex Inventory rape endorsement

Model	Deviance	AIC	BIC	R^2_N	Overall model test/comparison	χ^2	df	P
Whole sample								
1	502.40	520.40	562.07	0.11	Model 1	46.00	8	<.001
2	477.33	503.33	563.53	0.17	Model 1—model 2	25.06	4	<.001
3	475.34	507.34	581.43	0.18	Model 2—model 3	2.00	3	.573
Females								
1	260.88	276.88	310.80	0.07	Model 1	15.06	7	.035
2	252.20	276.20	327.08	0.11	Model 1—model 2	8.68	4	.070
3	249.55	279.55	343.16	0.12	Model 2—model 3	2.64	3	.450
Males								
1	232.67	248.67	276.68	0.09	Model 1	15.28	7	.033
2	200.61	224.61	266.63	0.28	Model 1—model 2	32.06	4	<.001
3	197.40	227.40	279.91	0.29	Model 2—model 3	3.22	3	.360

AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; df = degrees of freedom.

Table 6. Results of logistic regression on Coping Using Sex Inventory rape endorsement

Predictor	Log(Odds)	SE	*Z*	*P*	Odds ratio	95% CI	
						Lower	Upper
Model 1							
Age	−0.04	0.01	−3.04	.002**	0.96	0.93	0.98
Gender	1.14	0.25	4.64	<.001***	3.13	1.93	5.08
Ethnicity	−0.13	0.28	−0.47	.64	0.88	0.51	1.51
Psychiatric condition	0.14	0.27	0.52	.60	1.15	0.68	1.94
Education	0.09	0.25	0.38	.71	1.1	0.67	1.79
High-risk group	0.13	0.31	0.43	.67	1.14	0.63	2.07
Living alone	−1.15	0.61	−1.88	.06	0.32	0.1	1.05
Diagnosed/suspect COVID-19	0.48	0.29	1.7	.09	1.62	0.93	2.84
Model 2							
Age	−0.03	0.02	−1.97	.049*	0.97	0.94	1
Gender	1.22	0.25	4.78	<.001***	3.38	2.05	5.57
Ethnicity	−0.15	0.29	−0.5	.615	0.86	0.49	1.53
Psychiatric condition	−0.28	0.29	−0.95	.34	0.76	0.43	1.34
Education	0.12	0.26	0.48	.63	1.13	0.68	1.87
High-risk group	0.08	0.32	0.25	.80	1.08	0.58	2.02
Living alone	−1.28	0.62	−2.04	.04*	0.28	0.08	0.95
Diagnosed/suspect COVID-19	0.19	0.3	0.64	.52	1.22	0.67	2.2
Social distancing	−0.52	0.18	−2.95	.003**	0.6	0.42	0.84
Loneliness	0.02	0.01	1.95	.05	1.02	1	1.05
DERS-16	0.02	0.01	1.67	.09	1.02	1	1.04
Go/No-Go errors	0.01	0.02	0.46	.65	1.01	0.97	1.04

COVID-19 = coronavirus disease 2019; DERS-16 = Difficulties in Emotion Regulation Scale 16-item version.
Estimates represent the log odds of "Rape = 1" vs "Rape = 0." Gender reference category = female (vs male), ethnicity reference category = not white (vs white), psychiatric condition reference category = no condition (vs previous diagnosis), education is highest level of qualification with reference category = less than degree level (vs degree level or higher), high-risk condition reference category = no condition (vs 1 or more high-risk conditions), living alone reference category = not alone (vs alone).
*$P < .05$; **$P < .01$; ***$P < .001$.

in the third step with worries relating to COVID-19. This step did not significantly improve the overall model (adjusted $R^2 = 0.21$, F change $(1, 733) = 0.78$, $P = .377$).

A series of generalized linear models that included the 2-way interactions of gender with social distancing, loneliness, difficulties in emotion regulation, and Go/No-Go errors again revealed a significant interaction of loneliness with gender, with higher loneliness scores associated with greater coping using sex in men but not women (see Supplementary Material 3).

Coping Using Sex Rape/Violence Subscale

Logistic regression was used to predict endorsement of items related to rape or violence. Overall, 92 participants (12%) endorsed at least 1 item on the rape subscale. Model fit and model comparison values are shown in Table 5. The Chi-square likelihood ratio test suggested that the model was a good fit of the data. Being younger and being male were associated with having endorsed at least 1 item on the rape subscale (Table 6). Adding the second step to the model led to a better fit to the data compared with the first step only, with lower values for deviance and AIC, and a higher Nagelkerke R^2 value. Engaging in less social distancing predicted having endorsed at least 1 rape item. Being younger and being male remained significant predictors, and not living alone also predicted endorsing at least 1 item. The addition of the 2-way interactions of physical social distancing with (i) loneliness, (ii) difficulties in emotion regulation, and (iii) Go/No-Go errors resulted in a poorer fitting model, with higher AIC and BIC values, and a non-significant Chi-square comparison with the second model. VIFs suggested no problems with multicollinearity for model 1 ($0.9 < \text{VIF} < 1.2$) or model 2 ($1 < \text{VIF} < 2.1$). In an exploratory analysis, we replaced the 2-way interactions of social distancing in the third step with worries relating to COVID-19. This step resulted in a poorer fitting model, with higher AIC and BIC values, and a non-significant Chi-square comparison with the second model.

A series of generalized linear models that included the 2-way interactions of gender with social distancing, loneliness, difficulties in emotion regulation, and Go/No-Go errors revealed a significant interaction of loneliness with gender, and a significant interaction of difficulties in emotion regulation with gender. Simple effects analyses showed that higher loneliness scores were

associated with a greater likelihood of endorsing 1 or more items on the rape/violence subscale in men but not women, while higher difficulties in emotion regulation scores were associated with a greater likelihood of endorsing 1 or more items on the rape/violence subscale in women but not men (see Supplementary Material 3).

DISCUSSION

In this study, we examined the associations of physical social distancing, loneliness, difficulties in emotion regulation, and general self-regulation with the tendency to cope using sex during difficult or challenging situations over a 14-day period during lockdown in the United Kingdom. Our findings showed that, overall, there was no significant change in the mean levels of coping using sex during lockdown compared to retrospective reports relating to the 14-day period immediately preceding lockdown. For 30% of participants, using sex to cope increased during lockdown compared with before, but for a similar proportion of participants, using sex to cope decreased. The observation of similar numbers of participants increasing and decreasing their frequency of sexual behaviors would be expected over the course of 28 days irrespective of COVID-19 lockdown.

Zero-order correlations showed that participants who reported being lonelier, experiencing greater difficulties in emotion regulation, and who adhered less to physical social distancing advice reported higher coping using sex scores. When looking at the predictors of coping using sex during lockdown, we showed that being male, being younger, and experiencing more difficulties in emotion regulation were associated with higher total reports of coping using sex. The same pattern occurred for the subscale assessing consensual coping using sex. Although social distancing was associated with overall levels of coping using sex, as well as with consensual coping using sex, these associations were no longer significant in the regression analyses. A small proportion of participants reported coping using sex around themes of rape or violence (12%) over the 14-day period during lockdown and these data were strongly positively skewed (toward zero). However, we nonetheless found that participants who reported less social distancing, and those who reported being male, being younger, and not living alone, were more likely to have endorsed at least 1 rape item on the CUSI. Overall, the effect sizes reported were small and we would urge some caution around overinterpretation of results.

Our findings support earlier research by showing that sexual interest during negative mood (as measured by the CUSI) was more commonly reported by male compared with female respondents.[24] Although the underlying reasons for why some people experience increased sexual interest during negative affect are unclear, it has been reported that sex may serve needs for intimacy and self-validation, and that feelings of sexual release may have a calming effect.[23] Across both female and male respondents, participants in this study who reported greater coping using sex also experienced more difficulties in emotion regulation. Our findings are consistent with earlier work showing that difficulties in cognitive reappraisal of emotion, that is, in restructuring the emotional experience in such a way that the emotional impact is altered, were associated with problems in regulating sexual response.[37,38] Furthermore, our exploratory analyses examining gender interactions, presented in Supplementary Material 3, revealed that loneliness was associated with greater coping using sex (overall and for the consent subscale) only in men, tentatively suggesting that, when feeling lonely, men and women resort to different coping strategies, and that coping using sex is motivated by loneliness in men more so than in women.

In order to deal with the potential adverse mental health effects of COVID-19, immediate actions that have been identified include improved monitoring and reporting of mental health and determining the efficacy of mechanistically based digital and non-digital interventions.[58] In line with these recommendations, participants who experience difficulties in emotion regulation may be encouraged to engage with online or offline mindfulness practice, which is associated with benefits in regulating negative affective states.[39,40] As highlighted by others, a priority for COVID-19 research should be to establish the benefits of different online interventions for improving mental health and resilience.[58] A limitation of the results reported here is that it remains unclear whether or not coping using sex when experiencing negative mood was associated with any adverse outcomes. Future research should seek to examine this possibility, especially when considering that coping using sex was reported more often among people who were experiencing more difficulties in emotion regulation.

For the rape/violence subscale, being male, being younger, and not living alone predicted having endorsed items related to rape/violence. Participants who engaged in fewer physical social distancing behaviors were more likely to have endorsed items relating to rape/violence. Even though emotion dysregulation was associated with endorsement of rape items at the zero-order level, this association was no longer significant in the multiple regression analyses. The finding that less social distancing predicted endorsement of rape items could indicate that these participants were more likely to cross social boundaries and defy social norms more generally. Indeed, recent findings show that empathy represents a basic prosocial motivation for engaging in social distancing during COVID-19.[59] This interpretation is also supported by findings that antisociality is associated with aggressive sexual fantasy and sexual coercion against women,[60] and represents a psychologically meaningful risk factor for sexual offending.[32] In addition, our exploratory analyses, presented in Supplementary Material 3, suggested that predictors of having endorsed at least 1 rape item on the CUSI may differ across gender. In particular, we showed that men who feel lonely, and women who reported difficulties in emotion regulation, were more likely to endorse rape items, but not the other way around.

This may indicate that rape fantasies or behaviors could have different motivations in men and women. The extent to which these findings are specific to pandemic conditions is difficult to ascertain. Earlier research has shown that rates of intimate partner violence increased during emergencies and natural disasters, including hurricanes, floods, and oil spills.[61] A similar increase has emerged during the period of lockdown to prevent the spread of COVID-19 infections.[62,63] It is possible that similar motivations that may underpin increased coping using sex with a theme of rape/violence among men (eg, loneliness) also contribute to higher rates of intimate partner violence, including sexual violence. Future research should seek to explore this possibility.

In contrast to our hypotheses, for the total score and the subscale scores of the CUSI, none of the effects of social distancing were moderated by feelings of loneliness or difficulties in self- or emotion regulation. Worries about COVID-19 were also unrelated to CUSI total or consent subscale scores, suggesting that any effects of adhering (or not) to social distancing regulations are independent of experiencing feelings of loneliness or emotion regulation.

Although our findings highlight correlates of coping using sex in the period of lockdown to prevent the spread of COVID-19, they are subject to limitations. First, participants only reported measures at one time point during lockdown, and data corresponding to the 14-day period immediately preceding the introduction of lockdown were based on retrospective accounts. As such, data for this period may lack some degree of accuracy and make comparisons of CUSI scores for before and during lockdown more difficult. Similarly, our cross-sectional design also means that causal relations of physical social distancing and difficulties in emotion regulation with coping using sex cannot be established. Second, most participants were female (66.2%), white (80%), and educated to degree levels or higher (65%), and as such our sample is not overly representative of the general population of the United Kingdom. Third, although 12% of participants endorsed at least 1 item related to rape/violence, the extent to which these scores are a true reflection of the participants' coping using sex is difficult to estimate. Although participants were ensured of their anonymity, some may have experienced fear of reprisal for responding positively to nonconsensual items.

CONCLUSIONS

Overall, our findings suggest that difficulties in emotion regulation increase the likelihood of using sex to cope with a consensual theme, while less adherence to social distancing was associated with using sex to cope with a theme of rape/violence. A series of exploratory analyses provided some support for gender differences in the factors associated with coping using sex. For example, loneliness was consistently associated with greater coping using sex (total, consent subscale, rape/violence subscale) in men but not women. Conversely, greater difficulties in emotion regulation were associated with a greater likelihood of endorsing items related to rape/violence in women but not men. Our main findings are generally in-line with the pattern of results that would be expected outside of the COVID-19 pandemic. However, with concerns expressed by charitable and law enforcement agencies that lockdown represents a period of increased risk for vulnerable women and children, both at home and online,[64] it is important that people who are concerned about their sexual thoughts and behaviors can seek appropriate support. Coping using sex, including excessive pornography use, may also be associated with adverse consequences in the long term.[19,65] As such, it is important that the long-term effects of coping using sex during the COVID-19 pandemic are investigated and understood.

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SUPPLEMENTARY DATA

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jsxm.2020.11.002.