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Uncertainty, Sex and Sexuality during the Pandemic: Impact on Psychosocial Resilience

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Abstract

The Coronavirus disease 2019 (COVID-19) pandemic has been a global unprecedented health threat. Besides the myriad of effects on public health, the psychosocial implications of the outbreak have been far-fetched. Though the increased prevalence of psychiatric disorders, reduced access to care and social vulnerabilities have been highlighted in literature, the immense impact on sexuality and psychosexual health tends to be silent. The World Health Organization (WHO) defines sexual health as “a state of physical, emotional, mental and social well-being in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity.” Sexual practices and intimacy have been influenced by more ways than one, namely fear of infection, ambiguity about viral spread, misinformation, physical distancing, travel restrictions, intimate partner violence and deprivation of ‘social touch.’ The frontline workers, socio-economically impoverished groups, age and sexual minorities are especially affected. Sexual and reproductive rights are compromised due to reduced help-seeking, panic and stigma related to the outbreak. Psychological resilience helps one navigate through stressful situations and assumes a special importance during the ongoing crisis. This chapter reviews the multi-faceted intersections between sexual health and resilience, highlights the possible roles of pandemic-related uncertainty and advocates for certain guidelines to promote and preserve healthy expressions of sexuality for coping during COVID-19.

Keywords: sex, sexuality, sexual health, COVID-19, pandemic, coping, resilience

1. Introduction

Very few global catastrophes have been as unprecedented as the Coronavirus 2019 (COVID-19) crisis. The pandemic caused by the severe acute respiratory syndrome coronavirus – 2 (SARS-CoV-2) started with its epicenter in Hubei (Wuhan province), China in December 2019. As of today, the virus has affected 137 million people across the world claiming the lives of 2.94 million, the numbers rising as we speak [1]. More than a year has passed since COVID-19 was declared as a pandemic by the World Health Organization (WHO), and presently many nations are threatened by the second waves of infection, though several vaccine rollouts have begun globally. Besides the public health burden that has received primary importance, the emotional and social effects of such a large-scale crisis are

far-fetched. Long-term uncertainty, lockdowns, travel restrictions, fear of infection, social chaos, stigma towards those infected, apprehension and grief have been the psychosocial offshoots of the pandemic which are discussed several times in literature [2, 3]. The morbidity of psychiatric disorders such as depression, anxiety, post-traumatic stress, insomnia and adjustment disorders has increased based on various studies from both developing and developed nations [4–6]. Especially the vulnerable populations such as frontline workers, age and gender minorities, socio-economically disadvantaged groups, homeless individuals, migrants and those suffering from the infection have disproportionately shared the brunt of the pandemic [2, 7, 8]. Though several of these issues have been discussed in academic, social and policy discourse, one of the basic facets of human existence has largely been silent in research. This is the need for ‘social touch’, physical proximity and intimacy which comprise sexuality and sexual health. An infectious disease pandemic is bound to affect sexual and reproductive rights as well as health in multiple ways due to the fear and risks of infection [9]. Further, partners have been separated due to lockdowns, travel has been restricted, and the ‘assuring’ nature of intimate touch is now feared and tabooed. Lifestyles and work patterns have changed with prolonged entrapment within families on one hand and long-term physical distancing on the other, all of which have the potential to influence relationship dynamics [10]. Sexuality has also increasingly shared the virtual platforms with rise in pornography use [11]. The rigorous measures of using face masks, social distancing and respiratory hygiene advocated by all global agencies to curb the viral spread have ‘masked’ emotions, distanced loved ones and caused global exhaustion and frustration [12]. Nevertheless, these precautions need to be followed and continued as crucial strategies to fight the pandemic. As expected, a highly contagious infection like COVID-19 has generated fear of couple intimacy, guilt of transmitting the infection to partners/spouses (especially in the high-risk workers), impacted relationships and increased intimate partner violence (IPV) [12–14]. Psychosexual health forms a vital component of emotional wellbeing and coping during such crisis and can be markedly affected by this prolonged uncertainty during the pandemic period. With this background, this chapter looks at the various dimensions of sex and sexuality during the COVID-19 pandemic, the intersections with psychosocial resilience and anxiety management, and finally highlights strategies for safe sexual practices to navigate through these adversities.

2. COVID-19 and psychosexual health: multi-dimensional intersections

2.1 Glancing back at the “Plagues”

“A loveless world is a dead world. The plague makes us long for the warmth of our loved ones.”

Albert Camus, The Plague (La Peste), 1947 [15].

Pandemics have a history of social disruption. Since the bubonic plague of the 13th Century, the Spanish Flu, Human Immunodeficiency Virus (HIV), Severe Acute Respiratory Syndrome (SARS), Middle East Respiratory Syndrome (MERS), to the modern-day Ebola and Zika virus outbreaks, linking infectious disease outbreaks to promiscuity, low socio-economic status and lack of hygienic standards were common [16, 17]. Moral standards were imposed by the society and these illnesses were historically viewed with religious and political overtones [18]. Even without a pandemic, sexuality has historically been influenced by social, political, and religious beliefs, with stringency regarding its practice suggested across most

of the communities [19, 20]. Legal and religious ascendancy over sexual expressions have been modified over time, leading to a more permissive attitude, however, sexual expression still remains a taboo and is governed by the socio-legal norms significantly [20]. Delamater in his article [21] pointed out that family and religion are the two most important influencers of sexual expression. The controls exerted may result from the societal perspective of the purpose of the sexual activity, thereby putting down rules for appropriate sexual behaviour. The normative control, comprising of codes of conduct, is seen to have an enormous impact in shaping sexual attitude and behaviour. The codes include social, personal, and peer codes, variably influencing the permissiveness towards sexual expression [21]. Similar regulations surround infectious disease outbreaks. Hence sexual expressions have often been considered 'unsanitary' and associated with 'spread of germs' [19, 20, 22]. Sexuality and sexual expressions have been discussed several times in literature with relation to pandemics. "Poetic description of the plague" highlights newly married couples being segregated in rooms, not allowed to communicate during the classical "black death". "Fear of infection" was seen to "disrupt love and lives" more so in affluent social classes who feared hospitalization and death [22]. Cantor mentions about illicit sexual relationships and immorality being perceived as social reasons for the plague and physicians advising complete sexual abstinence as a solution [23]. In the medieval Europe, coercive sexual relationships, incest and prostitution were seen to rise during the plague and religious blames were allegedly put forth against homosexual individuals for disobeying the "Divine Will" and "sanitary legislation" that supposedly led to the propagation of the illness [24].

In Land, Kinship and Life-Cycle [25], Smith highlights the increase in punishment for fornication during the periods of plague (1349–1350), and sexuality was perceived as a driving force for the spread of infectious illness. However, there is also mention of a spurt in sex-parlors and prostitution as the plague waned off, due to the "need for being connected and expressing their sex drive" in the population which served as coping factors. Social distancing measures were looked down upon by the public during the Spanish Flu of 1918, where innuendos like "you are your safest sexual partner" and "I want to be quarantined with you" gained popularity [26]. It can be concluded from these texts that though there was a social 'aversion and ban' blaming unrestricted sexuality for the spread of infections, traditionally it has been considered to be healthy coping factor for the general public, irrespective of the restrictions.

With changing understanding of pandemics and epidemics, social thoughts have also been modified with time. Sexual dysfunctions, impaired perceived sexual satisfaction, reduced sexual interest, heightened performance anxiety and marital problems were noticed in longitudinal studies done during SARS and MERS [27, 28]. Adverse reproductive outcomes and compromised reproductive rights were seen in vulnerable populations during Ebola and Zika virus outbreaks, especially in the migrants and Lesbian Gay Bisexual Transgender Queer Intersex (LGBTQI) groups [29, 30]. The psychosocial models of care adopted for Nipah infection in India and Zika virus in Brazil involved sex education, healthy and safe expressions of sexuality during the crisis, prevention of viral spread and coping through social connectedness [31, 32]. This assumes enhanced importance during crises such as COVID-19 as sexual wellbeing is linked to better physical health, hope, personal growth, optimism and positivity.

2.2 How has COVID-19 impacted sexuality?

Systematic literature on how COVID-19 has impacted psychosexual health is lacking. Few predominant dimensions have been conceptualized [33]:

- Fear of sexual intimacy, lack of perceived satisfaction and ambiguity about safe sexual practices
- Worsening of symptoms, treatment and distress of those already suffering from sexual disorders and dysfunctions
- Cyber-sexuality and consumption of pornography

The various possible factors impacting sexuality and sexual health during COVID-19 are depicted in **Figure 1** and we propose that each of them adds to the uncertainty and anxiety related to this global outbreak. Impaired psychosexual health in turn can impact psychological resilience and coping with this persistent multi-faceted stress.

Panzeri et al. [11] conducted an online survey between April–May, 2020 to explore relationship quality between cohabiting couples. Out of 124 participants, more than two-thirds were women and most couples did not report differences in sexuality. However, women reported reduction in satisfaction, pleasure, arousal and desire primarily due to concerns of worry, stress and lack of privacy. Qualitative data in this regard is more informative and is yet to be analyzed from this study. Another study with similar design conducted by Arafat et al. [34] in three South-Asian countries of India, Nepal and Bangladesh had male predominance in participation. 45% of the respondents mentioned that COVID-19 had affected their sexual life and though the frequency of sexual interactions changed little after lockdown, the quality of sex and perceived sexual satisfaction were affected more. Half of the sample however reported improvement in emotional bonding and coping during lockdown and this was related to more time spent together, better ‘family time’, less work burden and reduced social commitments. A cross-sectional study from Turkey [35] assessed sexual dysfunction and sexual behaviour in 245 volunteers and reported that sexual intercourse had decreased in men post-pandemic. Sexual avoidance and solitary sexual behaviours (pornography use, masturbation) increased more in the males but the couples who

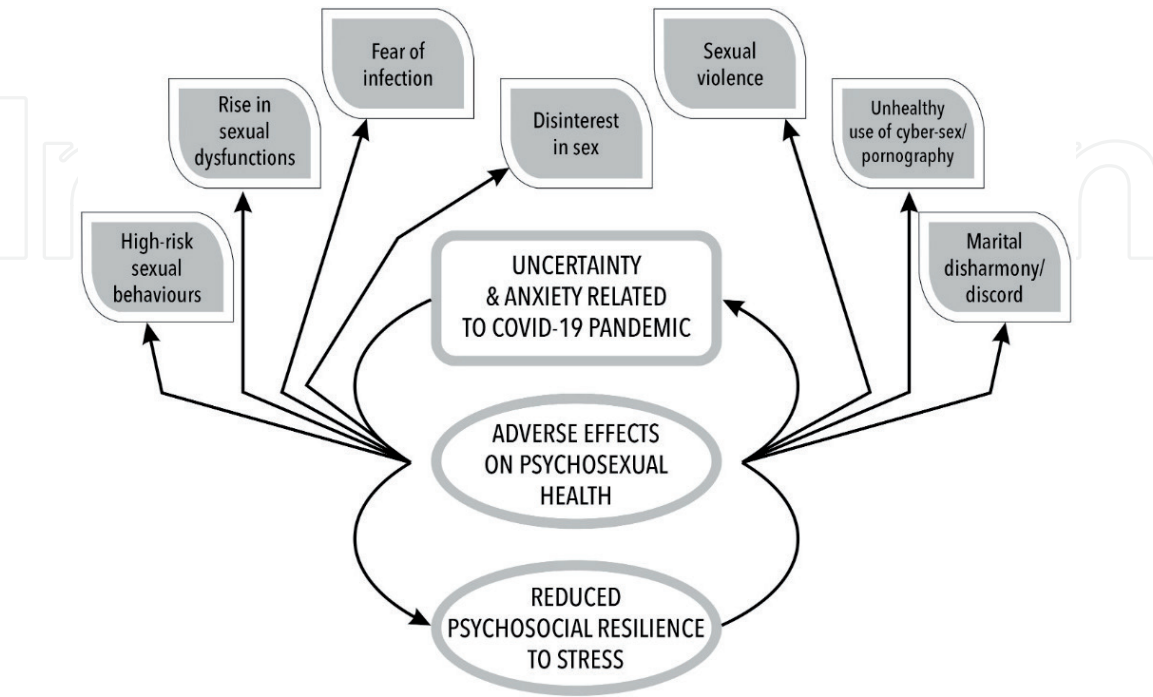


Figure 1. Multi-faceted intersections between COVID-19 related uncertainty/anxiety, sexual health & psychological resilience.

spent more time together had better sexual interactions and healthier coping strategies with lower depression/anxiety scores. In another larger but preliminary study from Italy on 1,515 individuals through Facebook and Instagram, 40% respondents revealed enhanced sexual desire during the lockdown [36]. However, both frequency and quality of sexual behaviours decreased in couples over time with increase in autoerotic interactions. Sexual satisfaction decreased significantly throughout the lockdown and was associated with increased pornography use, male sex, depression scores and unhealthy ways of coping (such as binge-eating, harmful use of technology, etc.)

In the absence of larger longitudinal studies, it has been hypothesized that psychiatric comorbidities (especially depression and anxiety disorders), a consistent fear of contracting the infection and uncertainty related to the global crisis alter sexual desire and interest [12, 33, 37]. These discrepancies have varied socio-cultural connotations as manifestations of sexuality itself can be quite heterogeneous. While for some individuals, need for 'social touch' and intimacy are vital to cope, in others the moral underpinnings about mortality, grief and death anxiety can lead to sexual aversion [38]. Discrepancies in these perceptions within a couple can lead to impaired relationships and discord. Besides, body dissatisfaction, body image perceptions, 'fat talk' and weight gain have also increased during this pandemic due to lack of physical activity, altered sleep-wake cycle and change in dietary patterns, all of which can influence sexual intimacy [39, 40]. The "Dual Control Model of Sexual Response" can be used to explain the differential impact of uncertainty/anxiety on sexual reactions of individuals. Individual variations in sexual arousal and inhibition patterns may decide what effect stressful situations would have on their sexual cycle [41]. Due to these differences, there can also be increased sexual violence and coercive sexual practices. Global data already shows a significant rise of intimate partner violence (IPV) across the world [42]. Sexual frustration and dysfunctional coping strategies can be further compounded by increased substance abuse during the pandemic that can perpetuate the cycle of violence and discord in relationships [42].

SARS-CoV-2 is more infectious than its earlier congeners with new mutant strains being more pathogenic [43]. Aerosol and fomite spreads are rapid and survival of the virus on various inanimate objects can last up to three weeks [44]. Besides, since the advent of the pandemic, there has been a plethora of misinformation and rumor mongering all across media about its pathogenesis, origin and treatment. This adds to the fear, uncertainty and ambiguity in safe sexual practices [45]. Various global agencies have already issued guidelines in this regard [46, 47]. The readers are encouraged to go through Banerjee and Rao [37] as well as Pennanen-lire et al. [33] for comprehensive reviews of COVID-19's sexual impact and summary of safe sex guidelines during this crisis. Sex education and risk reduction counseling are considered to be most important with permissible sexual contact within equal-risk and quarantined partners. Informed decision making, emotional support, mutual consent and respect between couples are called for. Ultimately healthy sexuality is much more than mere intercourse and is based on a biopsychosocial understanding of desires, needs and consequences.

2.3 Changing approaches and needs

Few considerations are vital. For newly married couples or partners who have never been separated before for such prolonged periods, the challenges are much more. The same applies to frontline workers and their partners as the fear, apprehension and stress will understandably be more for them. Complete sexual abstinence (including lack of any form of foreplay) though ideal cannot be considered to be a pragmatic and feasible solution in all [48]. Chronic sexual repression can also

impact self-confidence, sexual performance, increasing the prevalence of anorgasmia, arousal complaints, erectile dysfunction (ED) and premature ejaculation (PME) [49]. Impaired sexual dynamics in the couple can in turn cause loneliness, anxiety, sleep problems and poor coping that further impact resilience and add to the vicious cycle of uncertainty during the pandemic crisis [33]. Besides continued sexual abstinence has shown to impair couple communication and pre-existing psychiatric conditions. It also carries a risk of high-risk sexual behaviours, gambling disorders, alcohol abuse and compulsive masturbatory practices [49, 50]. Cybersex has been the 'new normal' of sexuality with various pornography platforms delivering free premium content during the lockdown. While it helps with safe and anonymous expression of intimacy and deals with uncertainty to some extent, it carries the obvious concerns of socio-cultural acceptance, ease of technology use, risks of data theft, cyber-security threats, risks of sexual extortion, cyber-harassment and cyber-bullying (especially for the minors) (discussed later).

The Lesbian Gay Bisexual Transgender Queer Intersex (LGBTQI+) population is disproportionately affected during this pandemic and their sexual rights compromised. Besides the usual brunt of social stigma, prejudice and financial stressors during the outbreak, social cohesion within their groups is adversely affected by lack of cultural gatherings, PRIDE festivals and travel restrictions which lead to a double-edged 'minority stress' [51]. The various dimensions of this 'othering' during COVID-19 have been highlighted by Banerjee and Nair [52] as social inequality, sexual stigma, stereotyping, gender-based discrimination, marginalization and misinformation about their 'gender roles'. This can lead to multi-faceted effects during the pandemic impairing their psychosocial resilience. In the Love and Sex in the Time of COVID-19 survey, Stephenson et al. [53] explored changes in sexual behaviour and HIV prevention approaches in gay, bisexual and other men who have sex with men (GBMSM). Among 518 participants, the awareness about HIV prevention was high but there was no decrease in the number of sexual partners during the lockdown. High sexual activity was associated with binge drinking and substance abuse. The authors called upon for comprehensive HIV prevention plan for this group utilizing tele-health services. In another qualitative exploration of the lived experiences of older transgender adults from India, social disconnection, stigma, ageism, sexual difficulties and "survival threats" emerged as the main themes [54]. Social rituals, spirituality and acceptance of "gender dissonance" were the pre-dominant coping factors during the pandemic whereas mental healthcare and social inclusion were the perceived unmet needs. In today's world of human-rights based approach to mental health, it is necessary to consider safe, appropriate and free sexual expressions to be integral to psychosexual health and intervention strategies need to be socio-culturally sensitive rather than being moralistic or paternalistic in their approach. The next section deals with various facets of emotional resilience during the COVID-19 pandemic and their crossed paths with psychosexual health.

3. Psychosocial resilience during the pandemics: living through the adversities

Spencer defines resilience as the ability to adapt to stress and adversity adequately [55, 56]. Psychological resilience or simply resilience basically refers to individual psychological, social, environmental, cultural, and physical resources associated with this adaptation [57]. Essentially, it is a dynamic process that protects a person by modifying his/her responses to the stressful life events [58]. Thus, its importance during crisis situations is indubitable. Pandemics comprise of one such situation. Resilience enables a person to stride through the crisis, by maintaining

health and functionality, or by “bouncing back” to the premorbid functioning after the crisis, or by even growing at an individual level afterwards [59]. The complications with pandemics are manifold. They affect the population at large, usually last long as exemplified in the past by Spanish Flu and now by Covid-19, and interspersed with acute exacerbations, thereby limiting the resources in general [60]. There needs to be a constant dynamic interaction between one’s individual resources, environmental resources and stressors for the resilience to develop [61]. There exists literature showing an inverse relationship between psychological resilience and psychological distress in natural catastrophes like earthquake, hurricane, etc. [59]. A number of factors in this current pandemic can be outlined, that are linked to poorer health, social and psychological outcomes. The factors include constant need for safety measures like masks, sanitization, emergence of novel viral strains with uncertainty and fear regarding the future, lack of a rock-solid preventive or curative measure, physical distancing and separation from social contacts and loved ones, home confinement, and financial insecurity including loss of job, to name a few. Hence, the role of developing resilience is all the more important in this context to fight and sail through this situation.

This brings us to the question of how is resilience developed. The answer is simply by enhancing the psychosocial resources, strengthening them, and using them in the process [62]. Certain individual traits like hope, motivation, humour, personal skills are shown to improve resilience [63]. A recent qualitative study on the frontline healthcare workers during Covid-19 found out that “resilience framework” comprised of “resilient identity” formation by social network, sense of purpose, gratitude, hope, “resilience management” by professional collectivism, problem negotiation, assumption of vulnerable role, and “working through distress” via self-care, risk minimization, peer and social support, lifestyle changes and relationships [64]. Across literature, the role of social and interpersonal relationships has been emphasized in strengthening resilience. Perceived family support, organized family dynamics, peer support, support from a significant other are found in two studies as predictors of greater resilience during Covid-19 [65, 66]. Social support encompasses not only the size but also the quality of social network, social connectedness being an integral component. Social connectedness is shown to be associated with lower perceived stress in a study on the Austrian citizens [67]. Sexuality, as a concept, embraces intimacy, pleasure along with physical sexual interactions [68]. Positive sexual health as highlighted by Pennanen-Iire et al. (2020) confers emotional and psychological benefits [33]. While regular sexual interaction with partner improves both physical and mental health, the intimacy aspects also enhance sense of belonging, security, hope, mood, well-being, and ultimately resilience.

4. Sexual health and emotional resilience

In this section, we elaborate the link between psychosexual health and resilience. The World Health Organization (WHO) defines sexual health as “a state of physical, emotional, mental and social well-being in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity. Sexual health requires a positive and respectful approach towards sexuality and sexual relationships, as well as the possibility of having pleasurable and safe sexual experiences, free of coercion, discrimination and violence” [68, 69]. Expression of sexuality impacts people’s day-to-day lives and improves general well-being [70]. To begin with the components of sexuality, that includes both physical and emotional aspects of sexual interactions and interpersonal bonding, let us discuss the role of touch.

“Touch” is a fundamental facet of interpersonal connectedness and sexual encounter. It is known to give rise to positivity and bonding [71]. Social touch can include expressions of intimacy, expectations, care, well-being, and mood [72]. Social touch is closely related to affective modulation via release of oxytocin, vasopressin, mu-opioid receptor stimulation, stimulation of coupling between ventromedial prefrontal cortex (vmPFC) and periaqueductal gray (PAG). Sexual touch implicates other areas as well, like anterior cingulate cortex (ACC), limbic system, nucleus accumbens (NA), and PFC [72]. There is also a role of serotonin on the positive affect of affiliative touch, discriminative affective touch, social dependency [73–75]. Biological studies have found significant role of NA, medial PFC, ventral tegmental area and serotonin on resilience [76]. Thus, it can be said that social and sexual touch improves resilience via biological and psychological mechanisms.

During the Covid-19 pandemic, separation of partners, physical distancing practices, fear of illness have given birth to “touch starvation” or “touch hunger”, which is all the more relevant for frontline workers, infected individuals and alike [72]. This deprivation is seen to be associated with disruption of resilience, and increase in stress and trauma [77]. Chronic touch deprivation is also seen to impede immunity by expediting autonomic activation in response to stress and the adverse effect of covid-19 on the physical system is likely to be enhanced by the pre-existing immune deficit. Poor physical health and sexuality affect each other in a bidirectional way [33, 73]. Sexual activity is seen to have positive impact on the autonomic nervous system, cardiovascular system, cognitive faculty, and immunity [78–81]. Sexually active people, in one study, have been shown to have high salivary IgA antibody levels [78]. Regarding the mechanism of sexual activity in improving mental health, studies postulate a role of hypothalamo-pituitary–adrenal (HPA) axis, endorphins, endogenous sex hormones, oxytocin and prolactin [82]. Role of HPA axis in stress modulation and thus resilience is well-documented in the literature. Behavioral effects of sexual activity encompass improvement in stress, anxiety, negative self-image, poor self-esteem and low confidence [82]. Sex is shown to have positive influence on trust, intimacy, emotion expression and use of mature defence mechanisms [83], and ultimately global well-being. Covid-19 has affected sexual function of individuals at multiple levels, including desire, arousal, orgasm, satisfaction, genitopelvic pain symptoms [11, 33]. Details of the possible aetiology of the different sexual dysfunctions during the current pandemic is beyond the scope of this chapter.

There is an increase in virtual sexual activities and masturbation because of the possibility of disease transmission or lack of cohabiting partner [84]. There are certain other aspects of sexuality that must be reviewed. Relationship dynamics is naturally one of them. Expression of intimacy and relationship dynamics have been affected in this situation due to various reasons. Getting housebound, loss of outside recreational activities, alteration of routine, breach of personal space and lack of private time due to constant presence of other family members, anxiety and stress due to social and economic uncertainty are to name a few [11, 66]. There is evidence of worsening of previously strained relationships due to forced cohabitation and poor social network support, further taking a toll on mental health and resilience of the individuals [85, 86]. A recent study among 789 participants in the U.K. showed that many of them used sex more often to cope during the lockdown as compared to before [87]. However, that was associated with less adherence to social distancing regulations and better emotional comfort. Younger age, living with partners/spouses, and male gender were associated with coping through sexual practices. Thus, it has been emphasized

that maintaining sexual health is important to avoid the secondary health hazards arising out of Covid-19 [33]. More at risk of negative health effects are the minorities like LGBTQ community. Stigma, discrimination, higher risk of immunocompromise and infection, economic constraints, decreased access to healthcare, loss of opportunities of community bonding and connectedness put them at a higher risk of stress and its unfavourable outcomes, hampering resilience [52, 88].

Connectedness is as significant as all other components of sexual health, as mentioned in the previous section. Though individual sexual health encompasses more personal connectedness and bonding with the partner, it does not function as a stand-alone and here social connectedness comes in. Social connectedness leads to social cohesion, strengthening of the “social capital”, positive effects on the mental health and development of resilience [89, 90]. Community-based exercises are now being evaluated to develop community resilience [89], and the significance of community resilience in fighting a global pandemic cannot be overemphasized [91]. The discussion on sexual health is incomplete without talking about sexual rights. Fulfilment of sexual rights is duly acknowledged in by the WHO while defining sexual health [68]. Both inaccessibility and violation of sexual and reproductive health rights have been noticed across many countries during this pandemic, in terms of access to contraception and abortion, cessation of sexual education, sexual violence, etc. [92]. This may lead to increased vulnerability of the individual [93], shacking resilience and health. **Figure 2** depicts the multiple facets of sexual health and their association with psychological resilience.

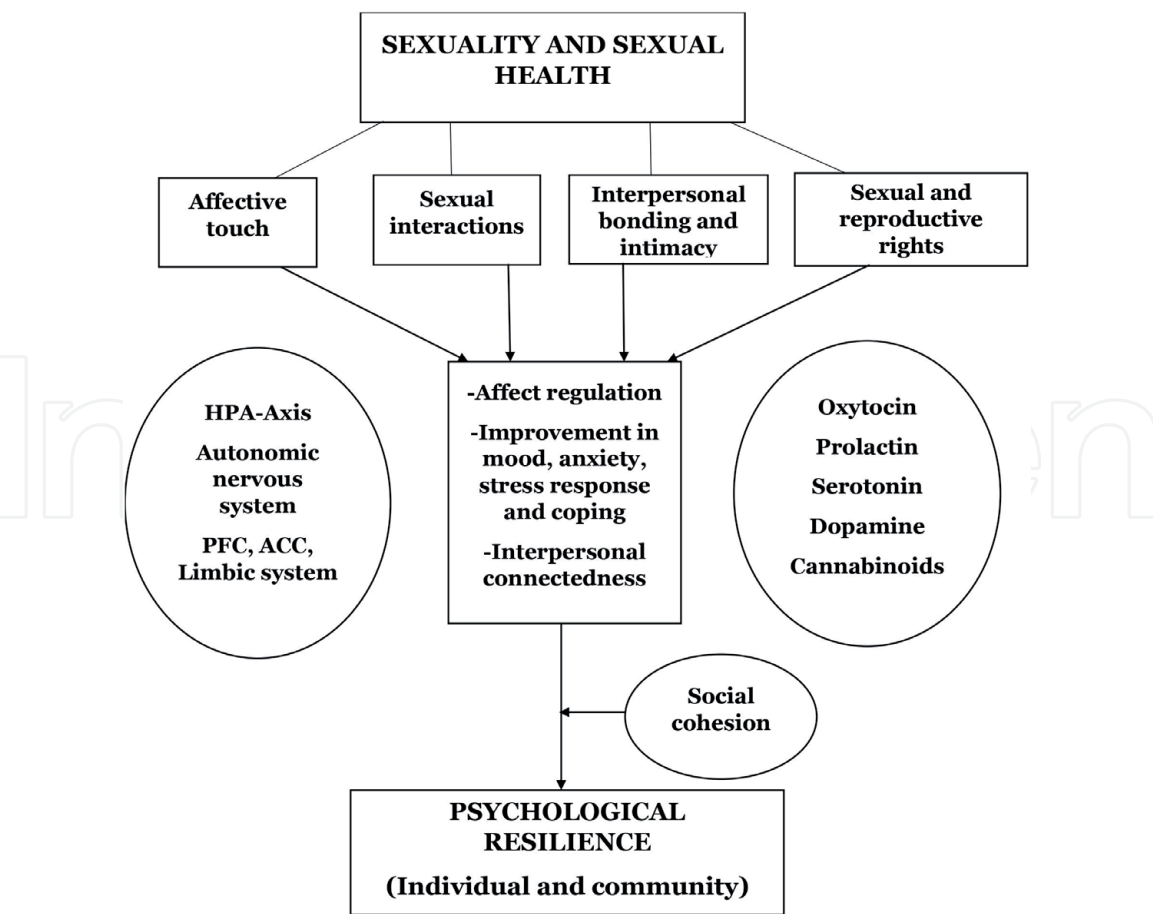


Figure 2.
Associations (neurostructural, physiological and neurochemical) between sexuality, sexual health and resilience.

5. Dealing with uncertainty during crisis: strategies to improve psychosexual wellbeing

Healthy expression and practices of sexuality along with preserved sexual rights help in emotional bonding and resilience. This has been discussed in the previous sections. Nearly after a year of the pandemic, many nations are being threatened at present with the second wave with resurgence of cases and repetition of precautionary measures such as lockdown. The risks of separation, fear of intimacy and re-living trauma of the recent past can further contribute to the uncertainty and worsen psychosexual health. Deprivation of sexual pleasure has been associated with depressive and anxiety symptoms, loneliness, grief, domestic abuse, substance misuse and poor coping with stress, though direct causal relations are poor [94]. Various public health agencies such as the International Society for the Study of Women's Sexual Health (ISSWSH) and Centre for Disease Control and Prevention (CDC) have advocated guidelines for safe sexual practices [95, 96]. Based on the risks involved with COVID-19, relationship dynamics, dating, sexual activities and expressions of intimacy have been modified. Sexuality has increasingly borrowed virtual forums as digital intimacy has emerged as the "new normal". There has been ambiguity related to presence of SARS-CoV-2 in body fluids. Recent studies have detected it in semen [97] but not in vaginal secretions [98]. However, the study samples were small which question the reliability of the findings. Further, the transmission through non-vaginal modes of sexual intercourse is unknown. As mentioned before, complete or partial abstinence is a possible solution, but pragmatically not always feasible. Masturbation and other self-stimulatory practices using sex toys are safe but needs hygienic measures. Few words of caution deserve mention. In the absence of original data, early pregnancy needs to be considered as an at-risk period for possible teratogenicity of the COVID-19 virus [99]. Also, people with medical comorbidities, without vaccination and immunocompromised states need to better avoid sexual intercourse as a preventive measure, especially if the partner has high risk of exposure.

Digitally mediated sexual interactions through the use of technology include cybersex, electronic sex, chat/cam sex, virtual sex, sexting, etc. With time, the broad rubric of cybersex includes digital sex (online sexting, nudes, mutual virtual masturbation) as well as pornography [100]. Expressing love through digital platforms has been termed as "sexual renaissance of the Gen Z" during the COVID-19 pandemic. Long-distance relationships and travel restrictions have further encouraged sexual experimentation (thirst traps of Instagram, sharing nudes, recording the same, digitally sharing pornography, sexting, etc.) [101]. The consumption and free availability of 'premium' pornographic content have been steadily rising during the pandemic-related lockdown [102]. Various NGOs and human-rights agencies have vouched for the safety and rehabilitation of the commercial sex workers which has further led to them adapting the virtual platform, thus bolstering cybersex. Virtual intimacy is a 'two-way path'. It is fraught with various ethical, moral, cultural and legal dilemmas and social acceptability. Besides, it also needs adequate bandwidth and technology mindedness. Nevertheless, it is a safe and anonymous way of exploring sexuality without the risk of STDs, risk of unplanned pregnancies and fear of infections [103]. Besides, cybersex allows for "an appreciable amount of uncertainty and surprise" that allows for sexual experimentation and eroticism [104]. Online fetish concerts, queer sex parties and LGBTQI+ Pride festivals have been arranged over digital media. However, besides the virtual exploration being devoid of "up close and personal touch" that is restricted during pandemics, it also runs the risk of online extortion, cyber-bullying, cyber-fraud, cyber-security threats, revenge pornography, online sexual harassment, dating scams, and online stalking. This is of

special concern in children and adolescents and has various ramifications based on the legal systems of different countries [105]. Digital sexuality cannot be discussed without talking about the changing ‘faces’ of digital intimacy. Watson et al. [106] has shown that digital modes of contact are being used more frequently now to overcome the problem of physical distance. Video-chat, and phone-call are seen to be most commonly employed method to stay connected. As a midway between the physical closeness and physical distancing imposed during the COVID-19 pandemic, digital intimacy can play an important role, thereby giving expression to the emotional and sexual needs of the people [107]. Doubtlessly, there are many caveats while implementing safe and healthy digital intimacy, including digital theft, inaccessibility of the medium, or lack of knowledge regarding the use [103]. Yet it can be considered as the need of the hour for bonding between partners. Though digital expression of love is unconventional and has not been encouraged socio-culturally [103], the pandemic may pave the path towards a paradigm shift in the concept of intimacy and sexuality all across the world.

The CDC recommends a minimum distance of 6 feet to prevent viral transmission, which precludes any form of personal intimacy [96]. However, the risk assessment needs to be personalized with mutual consent of the partners/couples. Informed decision making about the frequency, mode and duration of sexual activity should be an informed decision rather than based on misinformation (see the guidelines in **Table 1**). For example, kissing, hugging, fondling, touching and intercourse can be allowed in couples who are asymptomatic, have been practicing precautions and do not have a recent-history of high-risk contact [46, 95, 107]. However, it is important to bear in mind, that nations with a high case-load and rapid rise of cases may have significant number of asymptomatic carriers, the risk of which cannot be neglected. If any of the partners is symptomatic, CDC clearly

Aspects of sexuality	Specifics	Attributes/recommendations
Couples/partners	Solitary activity	<ul style="list-style-type: none">• Abstinence• Masturbation• Pornography use
	Living together	<ul style="list-style-type: none">• <i>Sex recommended:</i> with asymptomatic or equally high-risk partners,• For partners with comorbidities: sex only recommended if both of them reside at home• Contraceptive practices for recreational sex• <i>Sex to be avoided:</i> Symptomatic partner and those in quarantine after exposure
	Not living together	<ul style="list-style-type: none">• Cybersex• Digital intimacy• Pornography
	New partners	<ul style="list-style-type: none">• In-person sex need to be avoided• Cybersex
	Pregnancy	<ul style="list-style-type: none">• Possible risk of teratogenicity• More adverse effects of infection
	Individuals with HIV and other STDs	<ul style="list-style-type: none">• Added protective measures• Sex recommended: only if quarantined together and asymptomatic (with required precautions)• Prioritize PEP

Aspects of sexuality	Specifics	Attributes/recommendations
Sexual interactions	Kissing	<ul style="list-style-type: none">• Only in healthy and unexposed couples
	Oral sex	<ul style="list-style-type: none">• Only in healthy and unexposed couples
	Vagina intercourse	<ul style="list-style-type: none">• Can be allowed
	Anal intercourse	<ul style="list-style-type: none">• Allowed, provided faeco-oral transmission can be avoided
	Masturbation	<ul style="list-style-type: none">• Safest
	Digital sexual practices	<ul style="list-style-type: none">• Safe alternatives: Erotic conversations, mutual masturbation, chat rooms, sexting, cybersex, video dates, nudes, etc.
Sexual disorders and dysfunctions	Basic principles	<ul style="list-style-type: none">• Stress, uncertainty and panic will increase the disorders• Mental health problems (depression, anxiety, PTSD, etc.) will increase the disorders• Contributed by domestic violence• Treatment need to be prioritized• Tele-counselling• Public awareness about safe sexual practices guidelines during the pandemic• Increase safe home confinement in couples, foster emotional bonding and quality time
	Discrepancies in sexual pleasure/desire	<ul style="list-style-type: none">• Fear and death anxiety can contribute to differences in sexual interest and perceived pleasure• Chronic stress• Physical distancing
	Erectile dysfunction	<ul style="list-style-type: none">• Highest risk in older men, frontliners and those with comorbidities• Sensitive to socio-economic stressors• Poverty and stigma• Substance abuse
	Orgasmic disorders	<ul style="list-style-type: none">• Increased performance anxiety• Reduced perceived sexual pleasure• Anxiety, low mood, irritability, sleep problems, panic due to the pandemic
	Penetration disorders	<ul style="list-style-type: none">• PTSD, fear of illness and prolonged home confinement due to lockdown• Lifestyle and dietary changes (obesity)• Lack of privacy• Interpersonal discord in couples
Miscellaneous		<ul style="list-style-type: none">• Mutual respect and consent in couples• Informed decision making• Fighting misinformation and sexual myths• Emotional support• Enjoying quality time• Open and direct communication• Facilitate “COVID-free” time• Seek professional help (couple therapy, sex therapy, IPT, etc.) when needed

PTSD: Post Traumatic Stress Disorder; IPT: Interpersonal Therapy; HIV: Human Immunodeficiency Virus; STD: Sexually Transmitted Diseases; PEP: Post-exposure prophylaxis.

Table 1.
Suggested recommendations for safe sexual practices in various groups during the COVID-19 pandemic.

recommends self-quarantine without any form of intimacy or bedroom sharing for at least 7–14 days after the symptoms have started, or till full resolution of symptoms, or at least being fever-free up to 72 hours without any medicines [96]. A safe approach is to self-quarantine with partners if exposure has already occurred. This involves an acceptable amount of risk with the benefit of physical proximity and support. Adequate testing and treatment are necessary in all cases after proper professional guidance. This is especially vital in couples who have newly entered relationships, are exploring sexuality, have been physically distanced soon after marriage or any/both of them are frontline workers [107]. Adequate precautionary measures, hygiene and risk assessment are necessary in the latter. Adequate contraceptive measures and understanding of the reproductive risks are essential in the sexually active population [95, 107]. Indiscriminate sexual activity and in-person sexual experimentation are better avoided as it involves HIV and other STDs, that can further compound the risk and course of COVID-19. Frequent digital contact between distanced couples has been shown to improve emotional bonding and perceived sense of support. **Table 1** provides a summary of various attributes and recommendations for safe sexual practices during the ongoing pandemic. This is based on all the available guidelines discussed above.

Eventually, resilience is not just about physical proximity and sexuality is not merely about intercourse. Closeness is a process that helps navigate through adversities building up emotional support. As per Banerjee and Rao [37], “communication is the key and informed mutual decision-making” help relationships. The authors also highlight the brighter side of the lockdown when the long-due time of closeness with partners and families has eventually come to reality [107]. This quality time can be spent to “generate love and intimacy, to mend strained relations, and fostering new avenues of trust and hope.” [107] There can be perceived differences in sexual satisfaction between the couples with change of lifestyle and working patterns during the pandemic, and these discrepancies need to be sorted out mutually, and if needed, with professional help. Eventually social cohesion within family calls for understanding differences, respecting gender rights, open and direct communication and informed decision making. The process of sexuality is no different [108]. Besides, there can be socio-cultural adaptations of the guidelines related to sexual practices during the pandemic.

Sexual activity has a positive effect on mental state, cognitive abilities and immunological responses, and needs to be advocated for cohabiting couples during the outbreak [33, 107]. The authors propose that considering the well-researched benefits of sexuality on physical health and psychological resilience, safe sexual interactions need to be facilitated rather than discouraged by all health agencies and professionals to tide over the uncertainty and crisis of these troubled times. Sound sexual health between couples is indeed one of the ways to foster bonding, improve relationships and strengthen support, all of which help positivism and coping during stress [10]. Relationship conflicts and discord are common during these times, and impaired sexual relationships often form a responsible link. Of special mention are people with pre-existing sexual dysfunctions which can get exacerbated due to the fear, change in arousal patterns, altered frequency of sexual encounters, behaviour of their partners and physical distancing [109, 110]. Performance anxiety can be heightened thereby triggering premature ejaculation and erectile problems. On the other hand, increased prevalence of psychiatric disorders like depression, anxiety, PTSD, insomnia, etc. can in turn worsen sexual dysfunctions especially erectile dysfunctions and anorgasmia [110]. The central tenet remains: with social distancing and home confinement, couples need to discuss, decide and agree upon safe and practical ways to foster healthy sexual practices among them to stay connected, resilient and tide through the adversities.

6. Conclusion

The ongoing COVID-19 pandemic and consequent precautionary measures have several long-term implications on sexuality, sexual practices, relationships dynamics, and emotional interactions between couples. The frontline workers, socio-economically vulnerable groups, individuals with psychiatric disorders and sexual dysfunctions, age and sexual minorities are at more risk. Uncertainty and fear of infection are the two persistent factors during this pandemic which has impacted sexuality besides other psychosocial outcomes. Research into the sexual effects of COVID-19 is however still in its infancy. It is known that preserved psychosexual health leads to better coping and resilience but the processes underneath need to be explored during the outbreak. Both population-based longitudinal studies and qualitative methods to understand the lived sexual experiences of cohabiting and long-distance couples are necessary to develop tailored interventions. Safe sexual practices have been recommended in the guidelines including digital intimacy, but their real-life implementation remains challenging. Couple therapies, family therapies, sex therapies, interpersonal therapies and supportive work can help bolstering healthy sexual relationships during these uncertain times of COVID-19 to build resilience both during and after the post-pandemic aftermath.

Conflict of interest

None.

Author details

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