Frontiers in Communication

TYPE Original Research
PUBLISHED 01 March 2024
DOI 10.3389/fcomm.2024.1259463

Check for updates

Understanding mobile use behavior, stigma and associated needs among female sex workers in Nepal: a qualitative study

Yerina S. Ranjit[1]*, Rebecca Meisenbach[1], Rikki Roscoe[1†] and Omita Joshi[2]

[1]Department of Communication, University of Missouri, Columbia, MO, United States, [2]Community Action Center (CAC)-Nepal, Kathmandu, Nepal

OPEN ACCESS

EDITED BY
Christopher M. Fisher,
Victoria University, Australia

REVIEWED BY
Kathryn Therese Mngadi,
Aurum Institute, South Africa
Sara Stifano,
University of Connecticut, United States

*CORRESPONDENCE
Yerina S. Ranjit
✉ ranjity@missouri.edu

†PRESENT ADDRESS
Rikki Roscoe,
Department of Communication Studies,
University of Kansas, Lawrence, KS,
United States

RECEIVED 16 July 2023
ACCEPTED 16 February 2024
PUBLISHED 01 March 2024

CITATION
Ranjit YS, Meisenbach R, Roscoe R and Joshi O (2024) Understanding mobile use behavior, stigma and associated needs among female sex workers in Nepal: a qualitative study. *Front. Commun.* 9:1259463.
doi: 10.3389/fcomm.2024.1259463

COPYRIGHT
© 2024 Ranjit, Meisenbach, Roscoe and Joshi. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

Female sex workers (FSWs) in Nepal continue to disproportionately experience increased HIV risk alongside individual, social, and structural barriers to accessing and using health services. Innovative methods are needed to provide improved HIV prevention information and other health services for FSWs. Mobile health (mHealth) is a mechanism that can overcome structural and social barriers. Studies show that FSWs are increasingly using mobile phones to solicit clients. Hence, this exploratory study using the Uses and Gratifications (U&G) framework aimed to understand Nepali FSWs' mobile use behavior, including the purposes they use it for. We conducted four focus group discussions. Results showed that FSWs in Nepal used mobile phones to gratify their needs to: (1) manage their profession, (2) maintain social connection, (3) to keep their sex work information hidden (4) have access to information in a stigma-free environment. The study's findings can be instrumental in developing and designing innovative health interventions to reduce HIV and STI incidents in this population.

KEYWORDS

female sex workers (FSWs), Nepal, mHealth, uses and gratification (U&G), sharing culture, stigma

1 Introduction

Nepal is one of South Asia's most economically disadvantaged countries (Asian Development Bank, 2022). A report on multi-dimension poverty that examines deprivation at various levels, such as access to nutrition, health, housing, and education, showed that 17.4% of its 30 million population experience poverty (Government of Nepal, 2021). Resources for health education and services are limited. Sexually transmitted infections (STIs), including HIV continues to affect underserved populations disproportionately. Although instances of HIV have decreased in the general population over the years, HIV still disproportionately affects those at risk, such as injection drug users, men who have sex with men (MSM), and female and transfeminine sex workers (NCASC, 2015, 2020).

Sex work has been defined as "sexual exchange for money and other valuables" (Ditmore, 2006, p. xxv). The National HIV control board estimates that more than 50,000 Female Sex Workers (FSWs) live in Nepal (Himalayan News Service, 2017). The number of sex workers has risen due to geo-political changes such as a decade-long civil war that ended in 2010 and the 2015 earthquakes, causing many women to migrate to urban locations and take up sex work as a viable economic pursuit (Sharma, 2006; Pradhan, 2009; News, 2017; Joshi et al., 2020). Recent estimates show a wide-ranging HIV prevalence of 2%−17%,

perhaps due to inconsistent reporting mechanisms (Furber et al., 2002; Silverman et al., 2008; Sagtani et al., 2013a; NCASC, 2015). FSWs continue to be disproportionately affected by HIV; they are 35–50 times more likely to have HIV than the general female population (Baral et al., 2012). Despite interventions, a report in 2010 showed that only 54.6% of FSWs had ever tested for HIV (NCASC, 2014). Heterosexual contact is still one of the most prominent ways of HIV transmission in Nepal (NCASC, 2015).

FSWs in Nepal continue to experience individual, social, and structural barriers to health services (Ghimire et al., 2011). FSWs mostly come from low socioeconomic backgrounds with limited access to education and employment opportunities (Sagtani et al., 2014). They experience social stigma surrounding sex work and HIV and experience discrimination by healthcare providers (Ghimire et al., 2011). Several structural issues, such as access to transportation, clinic hours, etc., add barriers to access to healthcare services for these women (Ghimire and van Teijlingen, 2009; Ghimire et al., 2011; Basnyat, 2014). Hence, innovative methods that reach FSWs directly by circumventing stigmatizing environments at clinics and general healthcare providers are required to improve health outcomes for this population. Mobile health (mHealth) technology is a mechanism that could provide some health services directly to this population (WHO, 2011). Studies show that FSWs increasingly use mobile phones to solicit clients (Mishra and Neupane, 2015; Navani-Vazirani et al., 2017; Ghimire et al., 2021). However, to date, there are limtied studies that examine the patterns of mobile phone usage by FSWs in Nepal. Hence, using the frameworks provided by Uses and Gratification Theory (Katz et al., 1973) and Mobile Use Behavior (Yan, 2017), this study aims to explore the mobile use by FSWs in Nepal, including the types of technology, purposes they use it for and the effect mobile use has on health-related outcomes in this population. We aim to provide insights important to design and develop mHealth interventions for FSWs in Nepal.

Mobile Health (mHealth) has been defined as "medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices" (WHO, 2011, p. 6). mHealth provides innovative platforms to reach the target population directly through mobile phones (WHO, 2011; Hall et al., 2014; LeFevre et al., 2020; Mueller et al., 2020). So far, only one qualitative study has examined the use of mobile phone technology by FSWs in Nepal in depth (Ghimire et al., 2021). This study showed that women involved in the sex industry are gaining more economic power due to independence from intermediaries or "pimps," and through mobiles phones, they can negotiate rates with clients, solicit new ones, and maintain the clientele (Ghimire et al., 2021). No study has so far examined whether mobile phones behaviors are associated with the health of sex workers.

Evidence from low and middle-income countries show a positive impact of mHealth on health outcomes for people with various health risks (Marcolino et al., 2018). In Nepal, a recent study among people with HIV showed a significant improvement in anti-retroviral therapy (ART) pill pick-up among those who received reminder calls from nurses compared to the control group who received generic health messages (Ayer et al., 2021).

Despite the evidence of its effectiveness, there are no mHealth interventions for FSWs in Nepal. To develop and design such interventions, formative research is needed to understand the needs as well as the current status of mobile use behavior of this population, including their use of mobile phones for health. Hence, the current study aims to fill that gap in the literature. This study considers mobile phone activities and their effects by applying the uses and gratifications lens to understand various ways and purposes for which FSWs use mobile phones (Katz et al., 1973; Ruggiero, 2000; Yan, 2017).

Media use behavior has been studied extensively through the uses and gratifications (U&G) approach (Katz et al., 1973; Ruggiero, 2000). This framework states that people use media to gratify their cognitive, psychological, social, and emotional needs (Ruggiero, 2000). This theory assumes that the audience is active and their engagement in media use depends on their personal characteristis and indivudual needs such as to learn new things, to move up the social ladder, to build identity, and to receive assurances about their status in society (Katz et al., 1973). However, there are arguments that media exposure may be unintentional or merely a ritualistic behavior; since the advent and popular use of the internet technology, the U&G approach has been applied to understand why people use new communication tools borne out of computers, the internet, and mobile technologies (Quan-Haase and Young, 2010; Dolan et al., 2016).

Hence, this study proposes the research question:

> **RQ1.** *What are some health-related and other needs of FSWs that are being gratified through mobile phone use?*

2 Materials and methods

2.1 Study design

Four focus group discussions with FSWs were conducted in Kathmandu, Nepal. In total, 32 FSWs participated, with an average age of 29 and an average of 5 years (min = 6 months, max = 15 years) of experience in sex work. Each focus group consisted of 5–10 participants and lasted an average of 67 min. Of the four focus groups, three consisted of cis-gender female sex workers and one of the only transgender sex workers.

2.2 Recruitment

The first author collaborated with a community-based organization called Community Action Center (CAC)-Nepal based in Kathmandu, the capital city. This organization has provided social and health services to women at-risk for the past 30 years in and around the city. Recruitment was conducted using snowball sampling, where the program officer contacted former sex workers and was informed about the study. The former sex workers, who have worked with the organization as outreach workers, relayed the study information to sex workers in their community. Interested participants then called the Community Action Center (CAC)-Nepal office number and contacted the program officer. Follow-up phone calls screened participants based on the eligibility criteria,

which included 18 years of age and older, and self-report of sex work in the past 6 months.

2.3 Enrollment and informed consent

The fourth author conducted the focus group discussions in person. Each session began with an introduction and a description of the study. Participants were reminded to use pseudonyms to protect their identity and were also made aware that their voices were being recorded. Participants were encouraged to share their opinions and feedback verbally. After verbal consent, focus group discussions were conducted at different locations, including the office space of Community Action Center (CAC)-Nepal organization and other locations in the community convenient for the participants. For participation, the financial compensation of Nepali Rupees (NRs.) 600 ($5.3) was provided.

2.4 Study procedures

The first and the second authors developed the questions in English for focus group discussions, which was later professionally translated into Nepali. Focus groups used open-ended questions about mobile use behavior. The questions about their usage consisted of questions such as: "What do you use your mobile phones for? What do you think are the advantages and disadvantages of using mobile phones?". Probing questions like "Do you use phones to text, call, or video chat?" "How do you use your phone for work?" were asked during the discussions. Focus groups were audio-recorded and transcribed verbatim in Nepali by a native speaker, translated into English. The audio data was transcribed and translated into English by professional translators for analysis.

2.5 Ethics approval

The study was approved by University of Missouri (IRB Approval number: 2020841) and the Nepal Health Research Council (Approval number 803/2020). The study was conducted between January to April 2021.

2.6 Analysis

Qualitative data was analyzed using an iterative process where transcripts were analyzed by coding data line-by-line using a program called MAXQDA. First, the third author conducted primacy-cycle coding, creating broad descriptive categories of recurring themes, such as "mobile phone activities," and "negative impact of mobile phones." After reviewing the codes created by the third author and in the discussion, the first author consolidated the themes and developed a second-round codebook, creating concepts that aligned with the U&G approach and other interpretive concepts that explained the patterns of impacts of using mobile phones.

3 Results

With needs gratification, themes around mobile phones' positive and negative impact appeared. Regarding positive effects, participants said they use mobile phones for informational, psychological, and emotional needs, for entertainment, for social support, including safety needs, and to improve health. The data appeared to have four general themes: (1) mobile phones for communication and information needs, (2) mobile phones for managing sex work, (3) hiding sex work information on their phones, and (4) mobile phones for seeking information in a stigma-free environment. We discuss each of the themes in detail.

3.1 Mobile phone use for communication and information needs

While participants mentioned various uses and activities regarding their mobile phones, the overarching benefit of a mobile phone was mainly for interpersonal communication. Participants said they used mobile phone for having conversations with people, especially friends and family. Most of the participants have migrated to Kathmandu city from distant regions, and they use their phones mostly to communicate with them. One older participant said she uses the phone mostly to stay in touch with her grown children. She said,

> *I use mobile for my children ... I have three children; I use my mobile for those three children ... I also have my mother and brothers .... My brother-in-law ... they are all in village ... so I use mobile to contact them ... ...* (Focus Group 2)

FSWs view mobile phones as a technological advancement that allows them to communicate without delay and fulfill the need for immediacy. A participant alludes to this notion that mobile phones are a necessity despite its ills. She said,

> *In the past, people used to say they had to write a letter and send it back ... and they had to wait to receive letters ... Now, there is much use for mobile ... we cannot say we don't need mobile phones... Even if I don't know how to use Tik-Tok ... even If I don't know how to use Facebook ... still this phone has done much work because I receive a call tomorrow if there is urgent work ... phones are essential these days ... initially it was like ... letter was sent ... it was hard to send letters abroad ... there are lots of benefits of the phone these days ... people say they make a Tik-Tok ... some people die while making videos... they lose their own lives ... this mobile has also ruined the life of many ... and has also made life better ...* (Focus Group 2)

Additionally, those participants who use smartphones seemed to segregate apps based on who they communicate with. A participant said she uses one platform for her boyfriend and another to talk to the clients. Additionally, phones are seen

as an all-purpose device for entertainment and information. A participant said,

> P9: *If I have to call my boyfriend … I call him using IMO* (messaging app), *making video calls … I use my mobile for that purpose … besides I use it to play games, more to listen to news … there might be some incident* (news), *right? So, such things can be known, it's the same, and then I also use Facebook, everyone have their private talks … so we can also store our personal things in our mobile phone, right? … I use it in that way … sometimes when we have to contact* (our clients) *secretly … so if we have to contact them in private … we can also talk to them* (using mobile) *… some clients wish to have video calls … but if we have a mobile phone with us … if we have IMO, messenger, and Viber then we can talk through them … some might have their boyfriends living abroad so they can speak to them through phone … it is easy way for that …* (Focus Group 4)

Participants also said that their need for health information, to a degree, is met using mobile phones.

> P3: *I look for information… Whatever I watch is on TV … I watch about the disease … What's going on around … this and that … about new conditions… that is what I watch … like events … What's going on …*

> P1: *Like corona exists even now or not … What kind of disease has come … I watch those things …*

> **M**: *Oh! Does that mean you watch a lot of news?*

> P3: *Yes! I watch a lot of news.*

> P1: *Whatever I watch on you-tube is news … actually …*

> P3: *I watch the news more … Like what kind of medicines are available for different diseases*

> **M**: *So, you watch about that as well …*

> P2: *Which country has made the vaccine ….?*

> **M**: *Oh! So, you also watch what kind of medicines are available for different diseases?*

> P2: *Like can it be cured by ayurvedic treatment, or another medicine is required?*

> P1: *Because sometimes when something happens to us, like when we have stomach irritation (STI), then we might use ayurvedic medicines as well … right?* (Focus Group 1)

3.2 Mobile phones for managing sex work

Participants also admitted using mobile phones for their profession. Besides the ease of establishing contact with clients, a benefit of internet-enabled video messaging apps such as "FaceTime" is that FSWs can identify their clients before meeting them in person. This, instead of just negotiating over phone calls, seemed to create a sense of security because first, they could identify the person in advance, and second, a more implicit benefit was that it helped them manage expectations and give them a sense of control. The discussion here demonstrates the point,

> P4: *We have to use a mobile phone … To know like where is work for us? Do we have work or not? We have to ask that through mobile-only … Umm … Even if we have work, we have to ask "where is the work"? "What is the work" …*

> P1: *That is the purpose of mobile.*

> **M**: *That means it is used for work … So where do you work? So, mobile is used to know where to go for work. …*

> P3: *Mobile is used a lot in our work.*

> P2: *I watch things from my mobile ….*

> P4: *Umm ... I watch things from mobile as well …*

> P3: *Sometimes it is hard to ask where to go ... have to go walking…*

> **M**: *Exactly …*

> P4: *We might not have money to walk on foot … and where to go when to go … it is all decided in mobile …*

> P9: *It's convenient…*

> **M**: *And how do you do that?*

> P8: *I use mobile as well, not just today ... in the communication world ... mobile has been supported a lot ... I also use mobile to ask ... (to find clients)*

> **M**: *So mobile is used to find clients nearby ...*

> All participants at the same time: *We use mobile*

> P10: *The work is completed quickly* (efficiently)...

> P4: *Yes! Everything seems to be easy ...*

> P9: *There is convenience* (Focus Group 1)

Another example from focus group 4.

> P1: *It is straightforward, contacting them by phone, it's easier.*

> P3: *Yes, because we don't have to meet (in person), just one call is enough to share things.*

> P4: *They (client) ask us to come to this place or that place ... and if we reach that place, we find them (client) waiting for us.*

> P7: *We don't have to wait longer; we don't have any worry that they won't recognize us ... they just come by themselves ... so it's straightforward... that is why we use mobile.*

> P4: *If we make a video call, we can identify the person, right?*

> P3: *If they say, "I cannot identify you," then we can instantly click the photo and send it; it's easy.* (Focus Group 4)

Another participant said that mobile phones provided a sense of security because they could access others in case of violent incidents.

> *But when violence occurs, then they can call a person who is nearest, right? Calling and relaying about the situation or can say to meet these different things can be done with the help of mobile.* (Focus Group 3)
>
> *If violence is going on, then at that time, it's not possible to call because that person will be present there; when after they leave and there is no place to go, then calling at that time or calling police, calling to police directly by myself, as the number is known so, they (police) will come.* (Focus Group 3)

3.3 Hiding sex work information on their phones

Because sex work is highly stigmatized, and FSWs use their phones to manage their communication with their clients, they use different methods to hide their sex work information on their phones. This is especially true for women who live with their families. Like many other South Asian countries, Nepal has a sharing culture where it is a norm to share information that may be considered private in Western cultures, such as health or marital problems (Chadda and Deb, 2013; Manzar and Chaturvedi, 2017). Additionally, it is common practice to share material commodities, including mobile phones, with family members, including children (Ahmed et al., 2017; Sambasivan et al., 2018). Not sharing can be considered anti-social, and hiding information on the phone could raise suspicion (Ahmed et al., 2017). However, sharing mobile phones could pose a risk of divulging their hidden involvement in sex work, which could ensue stigmatization and discrimination in the form of social ostracism (Toubiana and Ruebottom, 2022). The discussion here demonstrates this point:

> P4: *I keep two SIM cards. After having two SIMs, I use one at the house for my family and relatives, and the other is used only for my work.*

> P4: *I come out of the house, hiding the phone, turn on the mobile and talk "How are you? Where should I come?" and then I go* [to meet the client].

> P8: *And once we come out of the house another SIM card is turned on. We have tricks.*

> P1: *So, we don't even know if someone is calling in our mobile number. We don't know that.*

> P8: *It's like that ...*

> **M**: *So, do you change the SIM card time and again or what do you do?*

> P1: *We change the SIM card most of the time ... time and again ...*

> **M:** *You all change?*

> P1: *We don't change for our family but for outsiders.*

> P8: *For "friends" [client]*

> P1: *When we there's a lot of pressure to work.*

> P8: *When it is difficult.*

> P1: *When it is very difficult, then we have to throw it* [SIM Card] *away. In that case, it is better to throw away the SIM of Rs. 100 and buy another SIM of Rs. 100 than to take heavy stress.*

> P8: *That is easy.*

> P1: *The easiest thing to do.*

> P4: *Sometime someone wins the heart and later the same person search for us through the SIM card and say "Where are you? I will kill you." Yes, they say that...*

> P9: *They file cases ... different things happen ...*

> P4: *"I'm going to kill you; you keep wandering off with someone else ... I will cut your legs" they* [Clients] *say that ... but if we don't use the same SIM, whom will they call and threaten of cutting legs?*

These quotes demonstrate that FSWs use various strategies to hide their sex work information from the family. Still, the same strategy becomes helpful in protecting themselves from harassment from clients. Participants also spoke about how they manipulated certain security features of the phone.

> *P1: I have changed all the settings. No one can see the phone call from outside, no one sees the message from outside.*

> ***M**: Why? What did you do?*

> *P1: One must go to the call log to see the phone calls and must go to the inbox to see the message or messenger box to see messages. But one cannot hear any notification or ring from the mobile...No, nothing is displayed on the screen of the mobile. No notification, no information displayed at all. Everything is hidden inside, and I also have a password set so no one can touch my mobile anyway... Passwords are not shared with anyone, so everything [apps] is password protected. Now it is better to password-protect all the apps than to change the SIM card. The mobile can be left anywhere. Then? That is the best idea.*

3.4 Mobile phone use to avoid stigma experiences

Participants also seem to use their mobile phones to avoid stigmatizing experiences. Sexual health is still a taboo topic in Nepal, and seeking health services may place FSWs in situations where they have to reveal certain private information, such as their sexual identity (for transgender FSWs) and profession, to healthcare providers. Hence, mobile phones and the ability to access health information on the internet via social media apps such as YouTube fulfills their need for privacy and safety from stigmatizing situations. This conversation in the focus group with transgender FSWs demonstrates this point.

> P1: *In my case, if any problem [health] occurs... even though till now I haven't faced a big health problem ... but I would prefer going to a clinic. With mobile, if I need any information, I would search and look for it, right? But before going to the clinic, we will know a little bit about what's going on with me...*

> P4: *Before* (mobile phones), *about this sexual health, issues of these sexual diseases, this and that, it was embarrassing to ask outside. So, we can search for such information on Google, and it is also available on YouTube. Searching for the information related to STIs and diseases related to STIs.*

> **M**: *Umm ... what were you saying .... Participant number 3?*

> P3: *As he had said already, in addition to that, in any our health problem, we use the phone to call our friends, as they might have some idea about that. If I have a health problem, I can ask, "I have this problem... where should I go?". Calling friends whom we can reach immediately and say, "Hey, this-and-that is going on... where can I go? or do you know any place to go? Where is it? Will it be solved?" can be asked. And normally, if something happens to me, I mostly go through YouTube. From there, we can see where to go for treatment; how to solve problems.* (Focus Group 3)

The same participant recounted a time she felt discriminated against at a hospital. She said,

> P3: *While going for the checkup at the hospital, the doctors themselves sometimes want to have a* (sexual) *relationship with you. And sometimes, when we have to fill out the* (intake) *forms for the hospital, there are only two choices [for gender]: male or female. When we put "other"* (gender)*, we have faced problems ... they say these people are "Metis"* (transgender)*, so sometimes they won't even do the check-ups. Those doctors who understand won't cause problems, but those who don't understand us, tease us. Not all doctors have good hearts. Some behave well with us, and some don't. These are our problems.* (Focus Group 3)

Thus, these quotes demonstrate the stigmatizing experiences sex workers face when seeking healthcare services. It also demonstrates how they circumvent these negative experiences by seeking sexual health information online on their mobile phones.

4 Discussion

The main aim of this study was to understand the mobile phone use behavior of FSWs in Nepal to provide insights to developing effective mHealth interventions for STI and HIV prevention among this population in Nepal. We used the uses and gratifications (U&G) framework to understand FSWs' various activities with their mobile phones. Using this framework, media scholars have identified various motivations such as social interaction, information seeking, passing time, entertainment, social support, escape, relaxation, and convenience utility, to name a few (Whiting and Williams, 2013; Falgoust et al., 2022). However, this is the first study that utilizes the framework to understand the motivation behind mobile phone use by a specific population who are at high risk of violence and sexually transmitted infections such as HIV. The results revealed that FSWs in a resource-limited setting like Nepal, also aim to fulfill similar gratifications as other populations, and their needs to are similar to what has previously been established in the literature.

What is unique about FSWs in the current study, however, is that they must constantly strategize to hide their sex work information in a culture that promotes sharing personal and material commodities, including electronic goods such as mobile phones (Chadda and Deb, 2013; Manzar and Chaturvedi, 2017; Sambasivan et al., 2018). Mobile phones are commonly shared among family members because of the prohibitive costs of smartphones with internet abilities. In the case of these women, they are mostly the sole breadwinners. However, sharing their phones with their children could expose their hidden sex work information. Hence, they use strategies such as changing their SIM cards frequently and manipulating the alert and security features of the phone to avoid drawing someone's attention to their phone. These findings are similar to Sambasivan et al.'s (2018) study, where they examine how women (who are not sex workers) in India, Pakistan, and Bangladesh navigate privacy in a culture where they have limited control over their mobile phones in households dominated by men. Besides this dilemma, FSWs use mobile phones mainly for social and information purposes.

FSWs reported using mobile phones to achieve certain social goals rather than merely using them habitually (Hiniker et al., 2016). The main purpose for mobile phone use was for connecting with others interpersonally using the calling feature, while features such as online banking or sharing rides were mentioned less frequently. Calling or conversing with people in one's social network can fulfill the need for social and emotional connection (Choi and Toma, 2014).

Prior research shows that FSWs in Nepal have been gaining independence from middle managers by finding clients and negotiating with them directly via mobile devices (Ghimire et al., 2021). While the apparent purpose is to establish and maintaining contacts with clientele, participants in the current study mentioned that being able to identify clients via video chat before meeting provided them with a sense of security and control. Most FSWs in Nepal face violence, with many reported incidents of rape and assault by clients (Sagtani et al., 2013b). Being able to video chat with a client before meeting them is not adequate to protect FSWs from violence, but it allows them to evaluate their risks to a certain degree. This finding is similar to the data from sex workers in the Global North countries where women express greater control on the choice of clients due to digital communication prior to meeting clients, which allow them to screen clients for safety (McDonald et al., 2021). Hence, using mobile phones seems to instill a sense of agency in FSWs by providing them with some degree of choice, meeting their safety needs.

Additionally, accessing information about STIs, either on the internet or by asking a friend, seemed to assuage their fear of being discriminated against by healthcare providers. Prior research shows that the judgmental attitude of service providers and perceived stigma are barriers that prevent FSWs from seeking health information and services (Ghimire and van Teijlingen, 2009; Ma et al., 2017). The current study shows that the experience of FSWs in Nepal is similar to the institutional barriers experienced by sex workers across the globe, and thus supports the idea that mobile phones can potentially provide health information in a stigma-free environment (Ma et al., 2017).

The current study is the only study that has examined how FSWs in Nepal use their mobile phones, and how these digital devices may be contributing to their needs for health information and services, and safety needs. The U&G framework used to analyze the data informs us of the social support and safety needs that FSWs seek to fulfill through this communication tool. It offers many important insights into mobile phone use by FSWs in Nepal. It, however, has limitations. One of the important limitations of this study is that we conducted focus group discussions instead of one-on-one interviews. Since sex work is a hidden and taboo topic, several women in the focus group discussions did not openly contribute their thoughts and opinions. Some of the dominant voices were of women who had been in the profession for a long time and had undergone some training programs with the NGO. Future studies should conduct in-depth interviews to elicit additional responses from the participants that they might have yet to be willing to share in a focus group setting. Additionally, the data is specific to FSWs in Nepal and may not be generalizable beyond this context.

5 Conclusion

This study found that FSWs in Nepal use technology to gratify their professional, social, health, information, and safety needs. First, the study found that women use mobile phones to connect and communicate with clients; second, they maintain a social connection with family and friends using mobile phones; third, they use different strategies such as changing SIM cards and passwords on apps to keep their sex work information hidden from family members, especially given the sharing cultural context of Nepal; fourth, mobile phones are a medium for them to seek health information online or from a social contact which helps from avoid the stigma they may face from direct contact with healthcare providers; and finally, being able to identify clients in

advance provided some level of assurance of the clients' identity contributing to their sense of safety. This study provides strong evidence that mobile phone engagement is high among the urban sex workers of Nepal and hence, offers an immense opportunity to design and disseminate health information and services to this population.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving humans were approved by IRB, University of Missouri, Columbia, Missouri 65211 and Nepal Health Research Council. The studies were conducted in accordance with the local legislation and institutional requirements. The Ethics Committee/institutional review board waived the requirement of written informed consent for participation from the participants or the participants' legal guardians/next of kin because female sex workers are a vulnerable group and can be targeted by authorities.

Author contributions

YR: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Writing – original draft, Writing – review & editing. RM: Conceptualization, Methodology, Writing – review & editing. RR: Methodology, Writing – review & editing. OJ: Investigation, Project administration, Writing – review & editing.

Funding

The author(s) declare financial support was received for the research, authorship, and/or publication of this article. Funding for this study was provided by the Research Council, University of Missouri (URC-20-048).

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fcomm.2024.1259463/full#supplementary-material

References

Ahmed, S. I., Haque, M. R., Chen, J., and Dell, N. (2017). Digital privacy challenges with shared mobile phone use in Bangladesh. *Proc. ACM Hum.-Comput. Interact.* 1(CSCW), 1–20. doi: 10.1145/3134652

Asian Development Bank (2022). *Economic Indicators for Nepal.* Nepal: Economy. Available online at: https://www.adb.org/countries/nepal/economy (accessed June 1, 2022).

Ayer, R., Poudel, K. C., Kikuchi, K., Ghimire, M., Shibanuma, A., Jimba, M., et al. (2021). Nurse-led mobile phone voice calls reminder and on-time antiretroviral pills pick-up in Nepal: a randomized controlled trial. *AIDS Behav.* 25, 1923–1934. doi: 10.1007/s10461-020-03122-7

Baral, S., Beyrer, C., Muessig, K., Poteat, T., Wirtz, A. L., Decker, M. R., et al. (2012). Burden of HIV among female sex workers in low-income and middle-income countries: a systematic review and meta-analysis. *Lancet Infect. Dis.* 12, 538–549. doi: 10.1016/S1473-3099(12)70066-X

Basnyat, I. (2014). Lived experiences of street-based female sex workers in Kathmandu: implications for health intervention strategies. *Cult. Health Sex.* 16, 1040–1051. doi: 10.1080/13691058.2014.922620

Chadda, R. K., and Deb, K. S. (2013). Indian family systems, collectivistic society and psychotherapy. *Indian J. Psychiatry* 55, S299–S309. doi: 10.4103/0019-5545.105555

Choi, M., and Toma, C. L. (2014). Social sharing through interpersonal media: patterns and effects on emotional well-being. *Comput. Human Behav.* 36, 530–541. doi: 10.1016/j.chb.2014.04.026

Ditmore, M. H. (2006). *Encyclopedia of Prostitution and Sex Work.* Westport, CT: Greenwood Press.

Dolan, R., Conduit, J., Fahy, J., and Goodman, S. (2016). Social media engagement behaviour: a uses and gratifications perspective. *J. Strateg. Mark.* 24, 261–277. doi: 10.1080/0965254X.2015.1095222

Falgoust, G., Winterlind, E., Moon, P., Parker, A., Zinzow, H., Madathil, K. C., et al. (2022). Applying the uses and gratifications theory to identify motivational factors behind young adult's participation in viral social media challenges on TikTok. *Hum. Factors Healthc.* 2:100014. doi: 10.1016/j.hfh.2022.100014

Furber, A. S., Newell, J. N., and Lubben, M. M. (2002). A systematic review of current knowledge of HIV epidemiology and of sexual behaviour in Nepal. *Trop. Med. Int. Health* 7, 140–148. doi: 10.1046/j.1365-3156.2002.00844.x

Ghimire, A., Samuels, F., and Mainali, S. (2021). Changing patterns of commercial sex work amongst adolescent girls in Nepal: the role of technology. *Eur. J. Dev. Res.* 33, 1390–1408. doi: 10.1057/s41287-021-00455-4

Ghimire, L., Smith, W. C. S., and van Teijlingen, E. R. (2011). Utilisation of sexual health services by female sex workers in Nepal. *BMC Health Serv. Res.* 11:79. doi: 10.1186/1472-6963-11-79

Ghimire, L., and van Teijlingen, E. (2009). Barriers to utilisation of sexual health services by female sex workers in Nepal. *Glob. J. Health Sci.* 1, 12–22. doi: 10.5539/gjhs.v1n1p12

Government of Nepal (2021). *Multidimensional Poverty Index: Analysis Toward Action*. Available online at: https://www.undp.org/nepal/publications/nepal-multidimensional-poverty-index-2021 (accessed June 1, 2022).

Hall, C. S., Fottrell, E., Wilkinson, S., and Byass, P. (2014). Assessing the impact of mHealth interventions in low- and middle-income countries – what has been shown to work? *Glob. Health Action* 7:25606. doi: 10.3402/gha.v7.25606

Himalayan News Service (2017). *Number of Sex Workers Increasing*. The Himalayan. Available online at: https://thehimalayantimes.com/kathmandu/number-sex-workers-increasing/ (accessed May 22, 2021).

Hiniker, A., Patel, S. N., Kohno, T., and Kientz, J. A. (2016). "Why would you do that? Predicting the uses and gratifications behind smartphone-usage behaviors," in *Proceedings of the 2016 ACM International Joint Conference on Pervasive and Ubiquitous Computing* (New York, NY: ACM), 634–645. doi: 10.1145/2971648.2971762

Joshi, R., Andersen, P. T., Thapa, S., and Aro, A. R. (2020). Sex trafficking, prostitution, and increased HIV risk among women during and after the 2015 Nepal earthquake. *SAGE Open Med.* 8, 1–5. doi: 10.1177/2050312120938287

Katz, E., Blumler, J. G., and Gurevitch, M. (1973). Uses and gratifications research. *Public Opin. Q.* 37, 509–523. doi: 10.1086/268109

LeFevre, A. E., Shah, N., Bashingwa, J. J. H., George, A. S., Mohan, D. (2020). Does women's mobile phone ownership matter for health? Evidence from 15 countries. *BMJ Global Health* 5, 1–6. doi: 10.1136/bmjgh-2020-002524

Ma, P. H., Chan, Z. C., and Loke, A. Y. (2017). The socio-ecological model approach to understanding barriers and facilitators to the accessing of health services by sex workers: a systematic review. *AIDS Behav.* 21, 2412–2438. doi: 10.1007/s10461-017-1818-2

Manzar, O., and Chaturvedi, U. (2017). "Understanding the lack of privacy in the Indian cultural context," in *New Delhi: Digital Empowerment Foundation*. Available online at: https://defindia.org/wp-content/uploads/2017/09/Understanding-the-Lack-of-Privacy-in-Indian-Cultural-Context.pdf (accessed June 1, 2022).

Marcolino, M. S., Oliveira, J. A. Q., D'Agostino, M., Ribeiro, A. L., Alkmim, M. B. M., Novillo-Ortiz, D., et al. (2018). The impact of mhealth interventions: systematic review of systematic reviews. *JMIR Mhealth Uhealth* 6:e23. doi: 10.2196/mhealth.8873

McDonald, A., Barwulor, C., Mazurek, M. L., Schaub, F., and Redmiles, E. M. (2021). ""It's stressful having all these phones": investigating sex workers' safety goals, risks, and practices online," in *30th USENIX Security Symposium (USENIX Security* 21), 375–392.

Mishra, S. R., and Neupane, S. R. (2015). Differentiated typology of sex work and implication for HIV prevention programs among female sex workers in Nepal. *Front. Public Health* 3:36. doi: 10.3389/fpubh.2015.00036

Mueller, S., Soriano, D., Boscor, A., Saville, N. M., Arjyal, A., Baral, S., et al. (2020). MANTRA: Improving knowledge of maternal health, neonatal health, and geohazards in women in rural Nepal using a mobile serious game. *Front. Public Health* 8:584375. doi: 10.3389/fpubh.2020.584375

Navani-Vazirani, S., Heylen, E., Deardorff, J., Srikrishnan, A., Vasudevan, C., Solomon, D., et al. (2017). The role of sex work pay in moderating the effect of mobile phone solicitation on condom practices: an analysis of female sex workers in India. *HSOA J. AIDS Clin. Res. STDs* 4, 1–16. doi: 10.24966/ACRS-7370/100008

NCASC (2014). *Country Progress Report on HIV/AIDS Response Nepal*. Government of Nepal. Available online at: https://www.unaids.org/sites/default/files/country/documents/NPL_narrative_report_2014.pdf (accessed June 1, 2022).

NCASC (2015). *Integrated Biological and Behavioral Surveillance Survey Among Female Sex Workers in Kathmandu Valley, Nepal: Round V - 2015*. Ministry of Health. Available online at: https://www.aidsdatahub.org/sites/default/files/resource/ibbs-fsw-nepal-kathmandu-valley-round-5-2015.pdf and https://www.ncasc.gov.np//uploaded/publication/Reports/IBBS/IBBS2015/IBBS%20Full%20Report_FSW_KTM_Rd5_2015.pdf (accessed June 1, 2022).

NCASC (2020). *HIV Epidemic update of Nepal*. Government of Nepal. Available online at: http://www.ncasc.gov.np/WAD2020/Factsheet-2020-S.pdf (accessed June 1, 2022).

News, B. B. C. (2017). *Nepal Profile - Timeline*. Available online at: http://www.bbc.com/news/world-south-asia-12499391 (accessed June 1, 2022).

Pradhan, G. (2009). Nepal's civil war and its economic costs. *J. Int. Glob. Stud.* 1, 114–131. Retrieved from: https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=89d13b13c2df28ad6c95643bf759af5ee1cee74c

Quan-Haase, A., and Young, A. L. (2010). Uses and gratifications of social media: a comparison of Facebook and instant messaging. *Bull. Sci. Technol. Soc.* 30, 350–361. doi: 10.1177/0270467610380009

Ruggiero, T. E. (2000). Uses and gratifications theory in the 21st century. *Mass Commun. Soc.* 3, 3–37. doi: 10.1207/S15327825MCS0301_02

Sagtani, R., Bhattarai, S., Adhikari, B., Baral, D., Yadav, D., Pokharel, P., et al. (2014). Understanding socio-economic contexts of female sex workers in Eastern Nepal. *Nepal Med. Collect. J.* 16, 119–124. Retrieved from: https://www.researchgate.net/profile/Reshu-Sagtani/publication/292151024_Understanding_socio_economic_contexts_of_female_sex_workers_in_eastern_Nepal/links/56ab357408ae8f386567f379/Understanding-socio-economic-contexts-of-female-sex-workers-in-eastern-Nepal.pdf

Sagtani, R. A., Bhattarai, S., Adhikari, B. R., Baral, D., Yadav, D. K., Pokharel, P. K., et al. (2013a). Alcohol use, HIV risk behavior and experience of sexually transmitted infections among female sex workers of Nepal. *Clin. Epidemiol. Global Health* 1, 73–78. doi: 10.1016/j.cegh.2013.05.003

Sagtani, R. A., Bhattarai, S., Adhikari, B. R., Baral, D., Yadav, D. K., Pokharel, P. K., et al. (2013b). Violence, HIV risk behaviour and depression among female sex workers of Eastern Nepal. *BMJ Open* 3, 1–6. doi: 10.1136/bmjopen-2013-002763

Sambasivan, N., Checkley, G., Batool, A., Ahmed, N., Nemer, D., Gaytán-Lugo, L. S., et al. (2018). ""Privacy is not for me, it's for those rich women": Performative privacy practices on mobile phones by women in South Asia," in *Fourteenth Symposium on Usable Privacy and Security (SOUPS 2018)*, 127–142.

Sharma, K. (2006). The political economy of civil war in Nepal. *World Dev.* 34, 1237–1253. doi: 10.1016/j.worlddev.2005.12.001

Silverman, J. G., Decker, M. R., Gupta, J., Dharmadhikari, A., Seage, G. R., Raj, A., et al. (2008). Syphilis and Hepatitis B co-infection among HIV-infected, sex-trafficked women and girls, Nepal. *Emerg. Infect. Dis.* 14, 932–934. doi: 10.3201/eid1406.080090

Toubiana, M., and Ruebottom, T. (2022). Stigma hierarchies: the internal dynamics of stigmatization in the sex work occupation. *Admin. Sci. Q.* 67, 515–552. doi: 10.1177/00018392221075344

Whiting, A., and Williams, D. (2013). Why people use social media: a uses and gratifications approach. *Qual. Mark. Res.* 16, 362–369. doi: 10.1108/QMR-06-2013-0041

WHO (2011). *mHealth: New Horizons for Health Through Mobile Technologies: Second Global Survey on eHealth*. Available online at: http://www.who.int/goe/publications/goe_mhealth_web.pdf (accessed June 1, 2022).

Yan, Z. (2017). *Mobile Phone Behavior*. Cambridge: Cambridge University Press. doi: 10.1017/9781316417584