

# Online Intimacies, Structural Vulnerabilities and Emerging STD Risks among Youth and Sexual Minorities

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## Abstract

This article explores the combined effects of intimate interactions occurring in digitally mediated spaces and structural vulnerabilities with a particular focus on systems of inequality and oppression that contribute to risk of acquiring STDs among youth and sexual minorities. Based on original fieldwork completed during 2024–2025 in Kerala, India, the research explores how digital partner seeking modalities are reshaping sexual networks, risk perceptions and prevention pathways. To contextualize individual practices, this analysis combines original primary field survey data with epidemiological profiles and clinical evidence on a district level. Results show an increase in the density of critical networks, replacement of partners, and decreased regulation of relationships as functions of dating and social networking applications, especially in the young, MSM and transgender women. Although sexual health risks and preventive measures are well known, self-protective practices are inconsistent, indicating a persistent gap between knowledge and behaviour. It is determined less by ignorance than by the social conditions of precarity, stigma, and differential access to youth- and minority-affirming services that make gap worse. Contemporary STD risk, the study contends, should be understood not as a consequence of individual marginality, but rather as a consequence of the changing regimes of digitally mediated intimacy operating in the context of structural inequality. The article makes a case for situating digital sexuality in a sociological understanding of risk accumulation and vulnerability, to contribute to discussions on youth, sexuality and digitalisation and to develop avenues of sociologically grounded prevention.

**Keywords:** Sociology of Sexuality, Digital Intimacy, Teen Agege's Risk, Sexual Minorities, STDs, HIV Risk, Dating Apps

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## 1. Introduction

Sociological studies have a long tradition of engaging with intimacy, sexuality and risk when social change reconfigures normative orders underpinning the personal (Giddens 1992; Beck & Beck-Gernsheim 2002). The advent of digital technologies and their rapid diffusion in the last decades have radically transformed the processes through which intimate relations are initiated, negotiated, and maintained or what scholars are starting to understand as digitally mediated regimes or intimacies (Illouz, 2007; Lupton, 2015; Couldry & Mejias, 2019). In particular but not exclusively, dating applications and location-based platforms have turned the process of choosing a partner into a technological curation, and impacted sexual networks, the temporal rhythms of interaction, and the moral economies of intimacy (Ranzini & Lutz, 2017; Hobbs et al., 2017).

These changes are far more structural than they are technological from a sociological point of view. As vertebrae (Wajcman, 2020) in the social infrastructures that digital platforms provide, they restructure opportunities, constraints, and risks with the added bug of increasing the pre-existing malaises of age, gender, sexuality and class (van Dijck, 2013; Bucher, 2018). Sociological scholarship has long stressed that risk is not just an objective likelihood of injury, but a socially manufactured phenomenon, asymmetrically located and culturally construed (Beck, 1992; Lupton, 1999). In other words, STDs are by no means merely biomedical phenomena but socially patterned outcomes—the direct result of particular conformation of intimacy, power, and institutional mediation (Brandt, 1987; Epstein, 1996).

In these dynamics, one identity cohort stands out, youth and sexual minorities. Sociological studies have long documented that young intimacy plays out in increasingly precarious contexts, amid volatile independence trajectories, ruptured lives, and growing dependence on peer networks and digital sociality (Arnett, 2015; Woodman & Wyn, 2017). For sexual minorities, stigma and confinement to heteronormative institutions producing unequal access to supportive health and social services exacerbate these conditions (Herek, 2007; Meyer, 2015). Digital platforms are a space of both empowerment and vulnerability, providing anonymity, community and visibility (usually simultaneously) but also enacting rapid partner churn, low accountability and networked risks (Race, 2015; Ashford et al., 2018).

Empirical studies in varied settings indicated that engagement of partner-seeking online precipitates earlier sexual debut, larger sexual partner counts and sexual networks

(particularly among young men and MSM) (McFarlane, 2000; Rice et al., 2012; Castro et al., 2020). Crucially, high awareness of STDs and HIV often goes hand in hand with inconsistent protective behaviours, representing a disconnect between knowledge and behaviour that cannot be reconciled solely by individual level models of behaviour (Lupton, 2013; Sanders et al., 2017). We suggest that the gap in the literature highlights a need for sociological examinations of sexual risk that are situated within specific and broader meanings, interactions, and structures of inequality.

While there is a burgeoning international literature on digital intimacy and specific sexual risks associated with HIV transmission, these works are often not grounded in sociologically-informed empirical studies from the Global South that connect specific digital and social practice to structural vulnerability. Such analysis has a powerful incentive in India — and Kerala more specifically. One could point to Kerala as an example of a relatively robust public health system, coupled with high literacy, and progressive social indicators (Jeffrey, 2010; Desai et al., 2015). However, recent evidence shows rural youth and sexual minorities continue to experience rising STD and HIV rates, indicating that success at the epidemiological level does not protect societies from new types of risk produced by social and technological change. This dimensional ambiguity of sorts, when exceptionalized for the points of intersection with local moral worlds, institutional arrangements, and inequalities, makes for a fertile ground of sociological exploration onboard the digital transformations of our times (see also Gunkel, 2003).

This article fills that gap by exploring the interaction between digitally mediated intimacies and structural vulnerabilities to understand the new STI landscape among young people and sexual minorities in Kerala. Instead of considering digital technologies as neutral tools or STDs as merely public health outcomes, we conceptualise dating applications as social sites of interaction mediated by power relations, cultural practices, and material conditions. Integrating new empirical data with sociological theory, the article promotes the conceptualization of new STD risks as the consequences of changing regimes of intimacy in contexts of inequality and precarity.

By doing so, it adds to existing debates in the sociology of sexuality, youth, and risk by providing a Global South perspective on digitally mediated intimacy. It shows how the transformations theorized in Euro-American settings play out differently—but hardly in less important ways in postcolonial, firmly literate, and quickly digitizing cultures. The present

analysis therefore aims not only to document empirical trends but also to advance sociological theorizing of the co-production of intimacy, technological advancement, and risk in modern social life.

## **2. Research Problem**

The social organization of sexual relations has been fundamentally reshaped by the dissemination of forms of intimacy that are digitally mediated, especially among the young and sexual minorities. Although the sociological literature has described how digital platforms have altered processes of partner selection, self-presentation, and emotional economies there has been less attention to how these transformations intersect with structural vulnerabilities to generate patterned sexual risk. Existing research has largely either focused on individual-level behavioural explanations of sexually transmitted diseases (STDs) or employed a public-health framework that insufficiently addresses the social contexts through which risk is produced and normalized.

The core research questions this article seeks to answer is: how are new forms of digitally mediated intimacies (i.e., those that use social media, texting, etc) interacting with structural vulnerabilities to create new STD risks for youth and sexual minorities? It is a sociological problem because it encompasses how technology-mediated interaction, inequality, and institutional context shape risk far beyond the reach of individual attention or intention (Mertens and Evers 2023).

**Evolving Sexual Risk:** The article develops the thesis that new epidemiological make available of STD risks should be considered as the consequences of regimes of intimacy in the making, instead of essentially what arise from separate high-risk behaviours. That is, partner-seeking platforms that are digitally mediated are social infrastructures that enhances dynamic network density and the pace of intimate interaction whilst loosening institutionalized forms of social regulation. Those dynamics have a disproportionate impact on youth and sexual minorities whose intimate lives are influenced by economic precarity, stigma and still limited access to spaces of support. In such contexts, routine (and normalization) of risk eclipses high levels of STDs knowledge.

This approach inspired by this thesis leads this article to the following research questions:

- How do digital platforms reshape sexual relationships and sexual networks between youth and sexual minorities?
- To what extent do structural conditions including precarity, stigma, and institutional exclusion mediate the association between digital intimacy and STD risk?
- How do men and women make sense of, navigate, and ‘stabilize’ sexual risk within online mediated, intimate encounters?
- What do we learn sociologically when STD risk is understood as a process embedded in social networks rather than a choice about the behaviour of individuals?

This study aims to contribute to sociological discussions of intimacy, risk, and inequality by answering these questions with original empirical research. The point is to show that digital technologies are more than tools for existing modalities of sex but fundamentally transform the social norms and conditions on which intimacy and vulnerability are produced. Insofar it treats emerging STD threats as an indicator of more general transformations of intimate life in late capitalist societies, between high-speed digitalisation and permanently high social inequality, the article opens challenges for a new type of risk literacy.

### **3. Theory and Literature Review**

Concepts of intimacy in sociology have long stressed the social structuring of sexual relations as opposed to being simply private, or reflexive expressions of instinct. Previous work by classical and contemporary theorists has demonstrated the importance of cultural scripts, institutional arrangements, and the varying power relations between men and women at different historical moments in understanding intimacy (Giddens, 1992; Simon & Gagnon, 2003). These arrangements have undergone a deep transformation in contemporary societies, where intimate life has become more reflexive, more individualised, and less regulatable by normative frameworks (marriage, kinship, community) (Beck & Beck-Gernsheim, 2002; Jamieson, 2004). Such transformations offer a vital theoretical context for us to make sense of the social production of sexual risk.

#### **3.1 Intimacy, Individualization, and Sexual Scripts**

The idea of a "transformation of intimacy" points out that modern relationships are characterized by choice, self-fulfilment and negotiated meaning, rather than obligation (Giddens, 1992). This move can provide us more freedom, but also demands that we learn to handle uncertainty, trust and risk within intimate encounters. Developing sexual script theory

elucidates the processes through which sexual norms are learned, performed, and restaged through social interaction, not instinct (Simon & Gagnon, 2003). As the first curve of the model suggests, scripts function at the cultural, interpersonal, and intrapsychic levels, thereby coordinating expectations regarding partner choice, condom use, disclosure, and emotional involvement.

Digital-mediated environments deeply reconfigure these scripts. Online platforms entail new qualities of immediacy, abundance and disposability, making visual impressions and algorithmic date-matching more widely privileged over continuous social embeddedness (Illouz, 2007; Ranzini & Lutz, 2017). Sociological research indicates that these relevant contexts lead to relationship instability and increasing partner mobility, particularly for younger users who are in transitional periods of identity construction and peer influence (Hobbs et al., 2017; Timmermans & De Caluwé, 2017).

### **3.2 Risk as a Structurally Configured Social State**

Risk is an expression, not just of a neutral probability, but of social construction defined by power, culture, and inequality (Beck, 1992; Lupton, 1999). Sexual risk is not, from this perspective, simply a matter of individual choice or ignorance. Instead, it originates in social practices embedded in social context that carve up vulnerabilities, differential across populations. Research indicates that sexual risk is linked to structural factors of economic precarity, gendered power relations, stigma and institutional exclusion (Farmer, 2004; Parker, 2011).

Risk in sexual relationships is managed by trust and desire, and through layers of symbolic meanings that often trump rational choice (Lupton 2013). For instance, condom use has been conceptualized not only as a health behaviour but also as a social and moral signal, and some studies even consider it as something that may compromise intimacy or trust (Kippax et al., 1993; Sanders et al., 2017). Such dynamics are further amplified in digital interactions marked by brevity, anonymity, and the weak social sanctions of interactions mediated by computers.

### **3.3 Digital Platforms as Social Infrastructures**

Digital sociology does not see platforms as neutral tools, and indeed sees platforms as infrastructures that systematically engineer social interaction through their design, algorithms, and economic incentive structures (van Dijck, 2013; Bucher, 2018). Dating apps

organize spectacles, desirability, and interactions using filters based on proximity, attractiveness, and the need for instant gratification. This type of architecture promotes increased connectivity while maintaining limited structural continuity of relationships, resulting in homo- and hetero-social networks that are saturated yet disaggregated (Race 2015; Ashford et al. 2018).

Dating-app use is positively related to younger ages of sexual debut with first partner, partner-seeking behaviours, achieved numbers of opposite-sex partners and sexually transmitted infection exposure, but evidence is largely limited to men who have sex with men (MSM) and young adults (McFarlane, 2000; Rice et al., 2012; Castro et al., 2020). And notably these studies show that although sexual health risks were understood at a high level the actual uptake of protective behaviours was variable; this finding further reinforces the limited explanatory power of cognitive or educational explanations.

### **3.4 Analysis of Sexually Minoritized Adolescents and Systemic Vulnerability**

Under conditions of increased structural vulnerability, Youth and sexual minorities, find digital intimacy. The long transitions to adulthood, labour-market precariousness, and fragmented life courses have been central to youth sociology, and have meant that, more than ever, youth romance, friendships, and community are rooted in peer networks and digital spaces (Arnett, 2015; Woodman & Wyn, 2017). Digital platforms can be a critical site of visibility and connection for sexual minorities, especially when offline spaces remain stigmatized or unsafe (Herek, 2007; Meyer, 2015).

Concurrently, these groups are also overexposed to sexual risk given intersecting class, gender and structural inequity. Research illustrates that stigma and discrimination restrict access to affirmative health services, disincentivise disclosure and create a context that endorses risk-taking in exchange for intimacy and affirmation (Parker & Aggleton, 2003; Race, 2015). This means digital environments can both mitigate and exacerbate vulnerability simultaneously, depending on their interaction with local social structures.

### **3.5 Gaps in the Existing Literature**

The sociological literature on digital intimacy and sexual risk is rapidly expanding, but is uneven in two critical regards. A lot of the empirical work is restricted to Euro-American contexts, which impedes theoretical generalization across different social environments. Second, research from the Global South rarely engage with literature that is concerned with

intimacy, risk, and inequality as social processes. Instead, studies are based too narrowly on epidemiological or behavioural frameworks.

This article responds to these gaps by locating new STD risks in a sociological understanding of digitally mediated intimacy and structural vulnerability in a context in the Global South. The study aims to supplement knowledge of sexual risk in contemporary societies through a relational, structural understanding by overcoming individualistic explanations using an integration of theory with original empirical data.

#### **4. Method and Research Design**

Mixed-method research design is applied in the study, combining data from a quantitative field survey with qualitative contextual background. This is based on the idea that sexual risk — which, via a digital medium, is largely quantified — cannot be reduced to numbers but necessitates proper sociological assessment of social practices, meanings, and structural circumstances. Quantitative data contextualize the observed behaviours and distributions of risk, while qualitative observations provide context and analytical richness that underpin findings

The study is based on an empirical case study from Kerala, India during 2024–2025. The case study was chosen not as; an exception, but in an analytical sense, Kerala is an archetypical site for the possible emergence of new forms of sexual risk—it is a heavily literate, fast digitizing society with a health infrastructure that works comparatively well<sup>28</sup>.

##### **4.1 Study Population and Sampling**

This study concentrates on two analytically central populations: adolescence and sexual minorities. Youth is used here to refer to 15–24-year-olds, as it encompasses both internationally recognized demographic conventions and sociological research that spans transitional life stages. Men who have sex with men (MSM) and transgender women are examples of sexual minorities, a term that describes social groups positioned within dominant sexual and institutional orders in ways that spectrally and peripherally marginalise them.

These populations are also hidden and stigmatized, so purposive and snowball sampling approaches were used. Community contacts, networks of peers, and field level engagement in urban and semi urban localities were used to identify initial participants. However, snowball sampling enabled to reach networks that are never reachable through probability sampling where subsequent participants were referred by previous ones. This approach is limited in

statistical generalizability, but it is suitable to sociological research on sensitive issues in which trust and access are key (Jasinski and Rey, 2010).

## **4.2 Data Collection**

The study utilized primary data gathered through structured field survey conducted in person. The survey instrument was designed to collect socio-demographic characteristics, digital platform use, sexual partnering practices, condom use, testing behaviour, and self-reported STI experiences. We focused on the importance of dating apps and social media in the initiation of sexual encounters, including how often they were used, partner turnover, and the temporal proximity between online and offline contact.

Aside from survey responses, the research also involves qualitative field observations based on informal conversations, contextual notes, and interactions through data collection. These materials were not considered formal qualitative interviews in the sense that they were not subjected to the same processes of coding and thematic interpretation as regular qualitative interviews, but were rather used to provide interpretive cover and to embed survey findings within social lived environments.

Selectively used secondary data sources, i.e., district-level epidemiological profiles and peer-reviewed clinical studies conducted in India, were employed to triangulate findings and strengthen analytical rigor. Rather, these sources were not employed to replace primary data but to contextualise local patterns in the light of wider empirical tendencies.

## **4.3 Analytical Strategy**

Analysis of data took place over two related, but distinguishable, video-stages. First, quantitative survey data were categorized into thematic dimensions that aligned with the research questions (e.g. fidelity practices, partner characteristics), including sexual network features and vulnerability indicators. Descriptive statistics were used to highlight trends and differences in the sample.

Second, the theoretical lenses outlined above were used to interpret these patterns in a sociological way. Instead of considering behaviours to be independent variables, the analysis focused on the way that digital practices, structural constraint, and cultural meaning interact with each other to create routinized risk (p.48). Qualitative field observations operationalized and clarified participants' meanings of intimacy, trust, and protection in the context of

digitally mediated encounters, what they are mediated by, and what they are imposed by, adding transparency to the explanatory capacity of the findings.

#### **4.5 Ethical Considerations**

As research on gay men and sexual subjectivity can be sensitive, ethical considerations were an inherent aspect of the research design. Participation was on a voluntary basis, informed consent was obtained for all participants, and anonymity was assured. Identifiable information was not documented in data collection phase and detailed information was provided to participants about their freedom to withdraw any time. Data collection was approached in such a way that discomfort could be minimized and stigma was not reinforced.

#### **4.6 Methodological Limitations**

There are limitations to the study findings that need to be taken into account. Since non-probability sampling is employed, the results cannot be generalized to the overall population. Self-reported sexual practice and infection data are susceptible to recall bias or social desirability bias. Though these constraints are familiar to sociological work on sexuality and are minimized via triangulation, thoughtful engagement in the field, and theoretically grounded interpretation.

### **5. Results and Analysis**

This section details on results from the new field study conducted with youth and sexual minorities in 2024–2025. The empirical material is (a) the structured survey obtained in the field and (b) the institutional records of cases accessed in the field with service providers and civil society groups. The liability, however, of these records was that they were not external epidemiological statistics, they rather functioned as field-embedded documentary data illustrating the modalities in which some dimensions of STD risk is rendered visible, recorded and interpretable within peacetime demands of everyday institutional practice. Analytically distinct phases of the analysis are organised around a central sociological mechanism connecting digital intimacy and structural vulnerability.

#### **5.1 Digital Intimacy as an Interactional Regime**

Among the numerous ways that respondents initiate intimate contact based on the fieldwork data, digitally mediated interaction is one of the most common methods. Dating applications

and social media platforms served not as ancillary tools, but in most cases the primary staging ground for people to arrange and negotiate sexual interaction. Consequently, the most evident phenomenon from the field is not so much the digital technology adoption, but the formation of a new interactional regime that is fast, abundant, and disposable.

It is particularly observable in the ways that respondents move within a ranked ecology of platforms. Instead of engaging with one central app, users flitted seamlessly between global and cross-generational dating apps, niche geosocial platforms for gay men, video-based friendship and chat apps, and narrow-casting vernacular or region-specific dating apps. As described in the field data and summarized in Table 1, those platforms together enacted the requirements of the first contact and meeting. As such, digitally mediated interaction has emerged as a primary modality of first sexual contact in modern intimate life.

The Interactional Regime Shaping Sexual Scripts: Immediacy, Not Continuity; Choice, Not Obligation Interviews certainly helped flesh out this theme, as respondents often described instances in which they matched online and met shortly after—often with little or no conversation beforehand. These practices reduce the potential for embedding human relationships and accountability into processes, and breed lower social capital — exacerbating the lack of traditional cues for trust, intent or risk. This regime works to normalise exposure — a form of liveliness of the senses — not just by compressing the time between connection and completion, but also through an arrest of the ethical negotiations that typically accompany intimacy, reducing it to a mundane and uneventful fact of provincial intimate life. Rather, risk, in this context, ceases to function as a departure from normative intimacy, and becomes an implicit part of the deal of being a part of digitally mediated sexual cultures.

**Table 1.** Digital Platforms Used for Meeting Partners (Field Study, 2024–2025)

<b>Platform Category</b>	<b>Common Apps Named</b>	<b>% of Respondents Naming Platform*</b>
Global dating apps	Tinder, Bumble	33.6
Gay geosocial apps	Grindr, Stick, Jack'd	32.2
Friendship / chat-based apps	Dosti, Ginger	12.7
Indian/vernacular dating apps	Arike, QuackQuack, Aisle	11.3

Informal digital spaces	Instagram, WhatsApp groups	10.2
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\*Multiple responses allowed.

The list of platforms mentioned by respondents shows a plural and stratified digital ecosystem via which intimate contacts are established. Geosocial applications-specifically global dating applications (33.6%) and gay geosocial applications (32.2%)-are responsible for the largest proportion of reported applications, and nearly two-thirds (65.8%) of all applications reported. This focus indicates that digitally mediated intimacy is mainly arranged using service spaces which are specifically for dating or sexual networking, rather than on incidental or informal digital spaces. That shows a second tier of lower-threshold entry points to intimate networks: Friendship and chat-based applications (12.7%) and Indian or vernacular dating apps (11.3%). These platforms serve as something of a limbo between, especially for younger users and for those in search of anonymity or cultural acceptance. The smallest proportion is found in informal digital spaces such as social media and messaging groups (10.2%), indicating that most interactions are routed through purpose-built applications rather than incidental social interaction. The almost parity between global dating apps and gay geosocial apps indicate somewhat different but parallel routes into digitally mediated intimacy. General platforms are the most prominent across the general youth population, yet niche geosocial applications serve just the same important function for sexual minority networks. In sum, the table shows how sexual interactions are organized not by siloed platform choice, but rather by the behaviour in a more integrated digital ecosystem defined by multiple, overlapping forms of apps.

The analysis shows that intimacy mediated digitally is not platform-based but is system-based, or rather, well, platform-agnostic. DYNAMIC ABSTRACT young people are more likely to use dating apps also geosocial app are common among MSM and transgenders. Salim, Zakat and other chat apps are an accessible gateway into sexual networks, and these friendship apps mostly provide a bridge between friendship and intimacy. Apps are used by sex workers to transfer solicitation to semi-private digital arenas, where less public visibility is obtained. Ashley et al.'s (2022) theoretical implications indicate that immediacy and immediacy on such platforms are highly prioritized, facilitating transient interactions that lack depth of communication. The design encourages fast movements to in-person meetings, whilst disrupting conventional trust signals and causing delays in sexual health conversations. Adolescents and young adults give in to temptation but tend to approach these

mediums with curiosity — exploration mixed with exposure during identity construction. Less stigma occurs offline for sexual minorities on these platforms at the price of increased vulnerability in closely connected networks. Thus, risk is crystallized as a post-modern principle of digital intimacy characterized by rapid exchanges and uncertainty in relationships, which transforms late-modern intimacy into the managed risk and temporary trust.

## 5.2. Youth Transitions, Precarity and Risk Tolerance

Fieldwork data show that respondents aged 15–24 constitute the most active segment within digitally mediated sexual networks. Their engagement is not marginal or episodic but regular and sustained across multiple platforms. This concentration cannot be attributed to lack of awareness, as most young respondents demonstrated basic familiarity with STDs, modes of transmission, and preventive practices. What distinguishes this group is not informational deficit but their social location within prolonged and uncertain transitions to adulthood.

**Table 2:** Youth Engagement with Digital Intimacy and Risk Practices (Field Study, 2024–2025)

Indicator	Percentage (%)
Used dating / friendship apps to meet partners	82.4
Initiated first sexual contact via digital platform	69.1
Reported multiple partners in last six months	61.7
Inconsistent condom use	54.3
Aware of basic STD prevention methods	91.2

Indicators are highly dependent on the use of digital platforms for initiating intimate contact, as more than four-fifths of respondents (82.4%) reported using dating or friendship applications to meet partners. Majority of them (69.1%) reported that their first sexual encounter was mediated through device, evidencing the importance of the mediated interactions in the early development of romantic relationships. At the same time, 61.7% stated having multiple sexual partners within 6 months prior, indicating rapid partner turnover among digitally mediated networks.

This involves protective practices that seem inconsistent within this context. While 91.2% of the respondents were aware of basic STD prevention methods, more than half of them

(54.3%) described inconsistent condom use. The reported high levels of preventive knowledge for behaviours, coupled with even higher levels of exposure-related behaviours, suggests that knowledge does not necessarily equal adherence to protection practices in digitally mediated encounters. Altogether, the indicators represent a scenario where digital access, partner multiplicity and unequal protection coexist not counter to elevated quantities of informational knowledge.

### 5.3. Sexual Minority Networks and Density Effects

Among men who have sex with men and transgender women, field data reveal a different configuration of risk, shaped less by frequency of encounters and more by network density. Participants consistently described overlapping sexual and social circles organised through a limited set of digital platforms. These platforms functioned as shared spaces where friendship, intimacy, and sexual exchange frequently intersected.

**Table 3:** Network Characteristics and Exposure among Sexual Minority Respondents (Field Study, 2024–2025)

Network Indicator	MSM (%)	TGW (%)
Used the same app for social and sexual contacts	74.6	81.9
Reported overlapping partner networks	63.8	69.4
Met partners linked through mutual contacts	58.2	61.7
Repeated encounters within the same network cluster	55.1	59.6

Network metrics show high and consistent levels of network overlap and recirculation among MSM and transgender women. Most reported using the same digital applications for social and sexual purposes (74.6% MSM; 81.9% TGW) suggesting little separation between friendship and sexual networks. Overlapping partner networks were reported by more than three-fifths of respondents in each group (63.8% MSM; 69.4% TGW), indicating repeated interaction with one another in integrated social circles, rather than isolated sexual events.

Usage of intermediaries through shared acquaintances was also prevalent, with 58.2% MSM and 61.7% TGW reporting encounters that were mediated, indicating indirect linking of

partners within common digital environments. More than half of respondents in each group reported multiple contacts within the same network component (55.1% MSM; 59.6% TGW), consistent with ongoing circulation in a closed population (Table 1). These measures suggest that sexual minority respondents are positioned within comparatively dense and overlapping networks of intimate interaction, with transgender women showing higher concentration on each of the dimensions we measured.

These patterns indicate that exposure accumulates through repeated circulation within tightly connected networks rather than through sporadic high-risk behaviour. Even when individual practices such as partner number or condom use did not appear extreme, the structure of the network itself amplified vulnerability. A single exposure event had the potential to reverberate across multiple connections due to the density and overlap of ties.

#### 5.4 Temporal Stability and Normalisation of Risk

Field-accessed institutional records for 2024–2025 indicate a stable monthly inflow of approximately 100 new STD/HIV detections. Rather than reflecting episodic surges or outbreak-like dynamics, this temporal regularity points to ongoing and routinised transmission pathways embedded within everyday social interaction. The absence of sharp fluctuations suggests that exposure is sustained through repetitive practices rather than exceptional events. This stability is mirrored in the age distribution of new detections. Youth aged 15–24 account for an increased share of cases compared to earlier periods, indicating a shift in vulnerability toward younger cohorts whose intimate lives are increasingly organised through digital platforms.

**Table 4:** Age Profile and Transmission Characteristics of New STD/HIV Detections (Field-Accessed Records, 2024–2025)

<b>Dimension</b>	<b>Category</b>	<b>Share / Percentage</b>
<b>Age group</b>	Below 15	Marginal
	15–24	15.4
	25–34	Highest share
	35–49	Moderate
	50+	Lower
<b>Transmission route</b>	Heterosexual contact	62.6
	Homosexual/Bisexual contact	24.6

	Injecting drug use	8.1
	Other / unspecified	Remaining

Age distribution reveals that individuals aged 25–34 years are the largest proportion of new detections, and those aged 35–49 years are the next largest group, whilst those aged 15–24 years make up 15.4% of cases. Cases in the under-15s are few and those over 50 still make up a relatively low proportion of cases. This suggests that incidence is focused in the sexually active working-age groups, with only a minor contribution from younger individuals.

Transmission-route data show heterosexual contact is responsible for nearly two-thirds (62.6%) of detections, with homosexual and bisexual contact 24.6%. A smaller proportion is due to injecting drug use (8.1%), with the remainder due to other or unspecified routes. The transmission profile is therefore dominated by sexual transmission. The 15–24 age band does not have the biggest share (15.4%), but as its duration of sexual exposure in the circles of sex is so much shorter, this indicates early entry into transmission networks rather than cumulative lifetime risk. By contrast, the prevalence among 25–34-year-olds reflects longer exposure time and increased network participation for that entire age group, indicating an accumulation of risk through early adulthood rather than separate onset.

Large attributable shares for homosexual and bisexual contact an illness at least partly spread by small subpopulations of sexual minorities, who would have a disproportionately high per-network exposure intensity, if they did not engage in individual higher frequency of behaviour. This distribution suggests that the transmission is focal within connected networks, and repeated circulation raises exposure irrespective of the population size.

The relatively lower percentage related to injecting drug use (8.1%) indicates that non-sexual transmission routes are limited or play only a minor role in the contemporary epidemiological picture and reinforces the primacy of sexual-network dynamics in generating new detections. The combination of these findings which show average high levels of sexual transmission within several age cohorts suggests that risk is embedded in the very fabric of daily sexual interaction, rather than being limited to an explicit high-risk behaviour or marginal group.

Both age and transmission-route distributions read together suggest that younger cohorts are entering sexual transmission pathways earlier and older reflect cumulative exposure in stable network structures. However, this overlap of dominant age groups with transmission routes (sexual within age ranges) implies vulnerability is due to placement and continuity of

network rather than age. This quantitative correspondence reinforces the interpretation that newly detected infections arise from recurrent engagement in long-standing sexual networks as opposed to short-term or age-specific risk events. The increased representation of the 15–24 age group reflects more than biological susceptibility or informational gaps. Field observations indicate that youth are positioned at the intersection of early digital experimentation, delayed socio-economic stabilisation, and peer-oriented sexual cultures.

### 5.5.Spatial Concentration and Urban Digital Ecologies

New detections are unevenly distributed across space, with a clear concentration in urbanised districts characterised by dense digital connectivity, migration flows, and student populations.

**Table 5:** District-wise Concentration of New STD/HIV Detections (Field-Accessed Records, Last Three Years)

District	Number of Cases
Ernakulam	850
Thiruvananthapuram	555
Thrissur	518

The district-wise distribution reveals a significant concentration of new cases in Ernakulam (850 cases), Thiruvananthapuram (555), and Thrissur (518), indicating an uneven spatial distribution of detections. Ernakulam, with over 50% more cases than Thrissur and 35% more than Thiruvananthapuram, stands out as a dominant cluster. The proximity of case counts between Thiruvananthapuram and Thrissur suggests multiple urban nodes, reflecting consistent exposure through interconnected districts rather than isolated hotspots. This pattern indicates that population density, mobility, and frequent interactions correlate with higher detection rates, emphasizing the role of specific spatial contexts in shaping new case detections over time. The clustering of cases in these districts corresponds to environments marked by anonymity, mobility, and platform-mediated sociality. Urban digital ecologies facilitate frequent partner change and rapid circulation across networks while weakening informal social surveillance. As a result, exposure becomes spatially patterned, concentrating in locations where digital access and social anonymity intersect.

## 5.6. Digital Partnering and Behavioural Convergence

Primary field survey data provide insight into how these structural and spatial patterns translate into everyday practices. A substantial majority of respondents reported meeting partners through digital platforms, with encounters often characterised by short lead times, limited negotiation, and inconsistent protection.

**Table 6:** Digital Partnering, Behavioural Practices, and Exposure Indicators (Field Survey, 2024–2025)

<b>Indicator</b>	<b>Percentage (%)</b>
Used apps/social media to meet partners	78.0
Initiated first sexual contact digitally	69.1
Multiple partners (last six months)	64.5
Inconsistent condom use	52.7
Reported STI co-infection	38.2
Aware of basic STD prevention methods	91.2

The data surely tells us that digitally mediated contact is the primary mode of partner initiation, with a great majority of respondents indicating that apps or social media use to meet partners (78.0%). More than two-thirds (69.1%) said the first sexual contact had taken place digitally once again emphasising the importance of digital and online at the starting point in intimacy. Many reported having several partners in the past 6 months (64.5%), indicative of high partner turnover in a narrow time window. Inconsistent condom use was reported by just more than half of respondents (52.7%) and STI co-infection was reported by more than one-third (38.2%). Representatively overwhelming (91.2%) was the awareness regarding the basic preventive measures related to STI.

High levels of digital initiation (78.0%) coupled with high rates of first sexual contact taking place digitally (69.1%) suggest that digital platforms are not merely ancillary but likely structurally integral to the assembly of sexual networks. This closeness of these two values indicates a low burden of transition from digital interaction to physical interaction. The most common factors multiple partnerships (64.5%) and inconsistent condom use (52.7%) suggest the exposure is driven by continuous interconnectedness rather than a single occurrence. The reported STI co-infection (38.2%) is lower than what would be expected, given the

proportion reporting inconsistent protection; the data suggest graduated exposure, in which not all risky interactions lead directly to infection but cumulatively result in infection over time.

Although prevention awareness is at a high level (91.2%), along with inconsistent use of condoms and reported co-infection knowledge-I do not work as a barrier within these interactions. Behavioural outcomes, however, seem decoupled from being informed, suggesting that decisions are driven by interactional conditions and not lack of prevention awareness. The indicators digital initiation, partner multiplicity, and intermittent protection cohere around a temporal pattern. The order of decreasing proportion awareness, then digital initiation, followed by partner multiplicity, protection inconsistency, and co-infection implies a tiered sifting of exposure: a potentially very large digitally-surveyed group funnels to smaller populations through a cascade of paired health events. Our ordering or pattern provides support for the idea that risk is not defined by singular acts of high-risk behaviour but is instead structured over time through a history of low-risk digitally mediated encounters.

### **5.7. Structural Vulnerability and Risk Accumulation**

Across age groups and sexual identities, vulnerability is unevenly distributed. Youth, MSM, and transgender women experience overlapping forms of precarity linked to employment instability, housing insecurity, stigma, and constrained access to affirmative services. These conditions shape not only exposure but also how risk is perceived and tolerated. Rather than discrete “high-risk behaviours,” the data reveal risk accumulation over time, produced through repeated participation in digitally mediated networks under conditions of constrained choice. Temporal stability in new detections, concentration within specific age groups and districts, and convergence of behavioural indicators collectively point to STD exposure as a patterned outcome of everyday social organisation rather than episodic deviation.

**Table 7:** Sequential Dimensions of Risk Accumulation (Derived from Field Data)

<b>Dimension</b>	<b>Quantitative Indicator (from earlier tables)</b>	<b>Accumulative Implication</b>
Early entry	15–24 age group: 15.4% of new cases	Exposure begins early in sexual life course
Digital initiation	69.1% first sexual contact via	Low threshold from contact to

	digital platforms	encounter
Partner turnover	64.5% multiple partners (6 months)	Repeated exposure within short intervals
Network density	>60% overlapping networks (MSM/TGW)	Circulation within bounded clusters
Spatial concentration	Top 3 districts dominate detections	Reinforcement through urban interaction density
Temporal stability	~100 new cases monthly	Sustained, routinised transmission

These indicators align in a sequence rather than acting independently. Rapid initiation into sexual networks (proportion of 15–24-year-olds among all partners), is accompanied by high digital initiation, which is also associated that high partner turnover over short reference periods. At the network level, these interactions are not dispersed, but cluster among overlapping circles embedding in them, most obviously among sexual minority respondents. Spatial concentration also makes repetition more strongly as interactions are localised in the same points of the same urban districts across time. The non-stop monthly influx of new detections demonstrates the continuity of this sequence instead of burst occurrences.

This proportional arrangement over dimensions means that risk is not a step function, but rather a filter. That massive digitally-emergent population funnels first into narrow bands that then experience multiple interactions, slipstreaming networks, and incremental exposure before actual infection can be detected. The relatively stable numbers of monthly detections, when considered in the context of high levels of digital initiation as well as partner turnover, suggests that new cases arise through recirculation through existing pathways rather than expansion into new populations or territories. When age entry, mediation, and clustering align, exposure trajectories are reinforced over time, as individuals remain within the same interactional environments across encounters. When this happens, network density magnifies this effect: If exposure events are connected rather than independent, the odds of one event triggering another are also magnified.

In total, the table shows that risk accumulation via time stacking (early start → multiple exposures), network amplification (contact overlap), and place embedding (urban clustering). No one of these factors explain the detections; their alignment leads to ongoing visibility over time. Notably, this alignment accounts for why stable behavioural proportions maintain

a continuous influx of new cases without the escalation of aggregate-level risk behaviour at the individual-level.

## **6. Discussion**

The results suggest the course of new STD and HIV risks is less dependent on episodic behavioural inflections but rather the routinisation of digitally mediating intimacy within pattern structured social contexts. The steady monthly influx of new detections as seen in 2024–2025 reflects previous epidemiological profiling in Kerala which has established that transmission is embedded in normal social behaviours rather than driven by outbreak dynamics (Department of AIDS Control, Government of India, 2013; Kerala State AIDS Control Society, 2018). That kind of temporal stability indicates that exposure is now taken for granted in certain interactional contexts.

Mediated platforms act as the organizing infrastructures by which intimacy is begun and repeated. High proportions of respondents making first sexual approaches via digital methods, coupled with rapid serial mixing and little negotiation prior to meeting signal existing patterns described in national mapping and estimation exercises which suggest that app-based environments are increasingly structuring sexual networks (NACO, 2019a, NACO, 2019b). This study extends that thinking as these platforms reduce the temporal distance between contact and encounter, limiting windows for trust calibration and ongoing risk negotiation.

This process is further elucidated by age-specific patterns. Although most new detections are still among adults in their late twenties and thirties, the increasing proportion of those aged 15–24 points to an earlier introduction to exposure pathways. This corresponds with international evidence about Generation Z, wherein early exposure to digital environments, increased peer influence, and a higher dependence on online spaces for identity exploration and intimacy are noted (Elizabeth Glaser Paediatric AIDS Foundation, 2020). Crucially, neither the field data nor the Gen Z report suggest that the drive towards this vulnerability is about a lack of information. This, instead, mirrors the drawn out making and remaking of economic and relational security, and prioritizing experimentation and testing in the social worlds of digitally mediated intimacy.

The use of transmission-route distributions emphasizes that network structure matters. Even though the number of sexual minorities (homosexual and bisexuals) are very small compared to heterosexuals, the large contribution of homosexual and bisexual contact suggests that in

India as in many countries there has been substantial prior evidence of concentrated epidemics in key populations (NACO, 2019). In the field, exposure is enhanced through relational proximity, as when overlapping partner networks and repeated encounters within bounded clusters serve as indicators of proximity. This pattern persists in the global evidence that MSM and transgender women are more vulnerable to HIV because of high density and structural marginalization, not because of individual overabundance (UNAIDS, 2024; Nguyen et al., 2023).

This dual dynamic is particularly acute in the experiences of trans women. While digital platforms mitigate offline stigma and surveillance, both global (UNAIDS, 2024) 2024-unaids-global-aids-update- and national evidence indicates that discrimination, economic precarity, and hindrances to gender-affirming care exacerbate vulnerability and hinder sustained prevention (UNAIDS, 2024). While a somewhat more progressive policy environment with respect to exclusion has ameliorated some aspects of exclusion in Kerala, the current results suggest that concentration of digital networks continues to create epidemiological risk that existing service models have yet to penetrate. These dynamics are further reinforced by spatial concentration. The detection clustering in districts like Ernakulam, Thiruvananthapuram and Thrissur relate to previous district level analyses (Department of AIDS Control, Government of India, 2013) which have identified migration, students and urban anonymity as vulnerability factors. Urban ecologies are exacerbated by digital connectivity through cyclical movement about partially overlapping populations, allowing local transmission corridors to persist over temporal scales.

In fact, instead of taking risks in a disconnected fashion, behavioural indicators exhibit a steady evolution. At the extreme end of digital initiation is a subset who report multiple partners, intermittent protection, and eventual co-infection. Above the steep gradient of new knowledge gained from narrowly tailored behaviour change for protection, interactional norms frames negotiation of protection as disruptive to spontaneity or trust, a pattern that is repeatedly reported in behavioural surveillance (UNODC, 2009) and translation of findings to policy (NACO, 2019); part of what we call a knowledge-practice gap. Doing deviant acts is not what puts you at risk; rather, it is routine work within normalised interactional regimes. In combination, findings indicate that the risk for STD and HIV exposure is engendered by the convergence of early digital presence, dense social networks, spatial fixation, and life-course ambiguity. No single dimension accounts for the trends we see, and their alignment produces endurance of the outcomes we study across time. It is not hard to discern why, despite its high

literacy rates, vast health systems, and elaborate social protection system Kerala continues to document new cases at a low but steady rate.

Existing policy frameworks in the state have already highlighted decentralised planning and targeted interventions, as well as social protection for key populations (Kerala State AIDS Control Society, 2018; NACO, 2019). The current analysis indicates that future responses will also need to grapple with the interactional and infrastructural conditions that produce intimacy today. Digital platforms → not neutral channels: social environments → structured exposure However, in isolation, the problems of youth digital ecologies, minority network concentration, and life-course precarity are unlikely to be superseded despite widespread knowledge and service availability, resulting in an ongoing risk of transmission, as well defined in the conditions documented here.

The patterns identified in this study underscore the need to recalibrate prevention efforts toward early, institutionally grounded interventions. Given the increasing entry of adolescents into digitally mediated sexual networks, comprehensive sex education within schools assumes renewed significance—not merely as biological instruction, but as a social and ethical framework addressing consent, digital intimacy, peer influence, and risk negotiation. Educational research in India has consistently demonstrated that structured curricular engagement with social awareness and value formation enhances students' capacity to navigate complex social risks (Author, 2025b; Author & Francis, 2024).

Beyond formal schooling, the findings point to the importance of cultivating civic responsibility as a form of behavioural infrastructure that enables young people to recognize and respond to shared vulnerabilities. Civic-oriented social education has been shown to shape everyday risk perception, ethical accountability, and collective responsiveness, particularly in contexts marked by rapid social and technological change (Author, 2025c). Community-based sensitization, anchored in local socio-cultural realities, can further strengthen such efforts by situating sexual health awareness within lived social environments rather than abstract health messaging (Author, 2025a).

Finally, the intersection of adolescent vulnerability, digital anonymity, and structural inequality calls for preventive frameworks that acknowledge how risk accumulates under conditions of constrained choice. Legal and social research highlights that gaps in systemic protection—whether in education, welfare, or regulation—often magnify exposure among younger and marginalized populations (Author, 2025b). Addressing STD risk among

adolescents therefore requires coordinated attention to educational reform, civic ethics, and gender-sensitive engagement, ensuring that awareness translates into sustained protective capacity rather than episodic caution (Author et al., 2024).

This study reveals a systemic risk by emphasizing the emergence of stable detection patterns through cumulative and routine processes rather than episodic noncompliance. Rather, the main danger is not of rapid escalation, but of the slow burn of exposure through banal intimate acts, a trajectory that is increasingly characteristic of generations raised on digital media.

## **7. Conclusion**

This study indicates that routine patterns of digitally mediated intimacy are sustaining new STD and HIV risks, not merely incidental or exceptional behaviour. Based on quantitative evidence collected in the field, the analysis shows how exposure is shaped by entry into sexual networks at an early age in the digital era, subsequent cycles of partner turn-over, a dense network structure, and geographical concentration using urban digital ecologies. These are sequential, and reinforce each other cumulatively, producing stable patterns of new detections over periods of time without escalation in the level of per capita risk behaviour at the individual level.

The findings reveal a persistent disjunction between preventive awareness and protective behaviour. High levels of knowledge coexist with inconsistent protection, indicating that risk is negotiated within interactional contexts shaped by immediacy, trust assumptions, and weak relational accountability. Among adolescents and young adults, early digital initiation intersects with prolonged transitions to socio-economic stability, increasing cumulative vulnerability across the life course. Among sexual minorities, network density amplifies exposure through relational proximity rather than frequency alone, binding inclusion and vulnerability within the same digital spaces.

By integrating age, transmission routes, behavioural indicators, and spatial concentration, the study advances a structural understanding of sexual risk as an outcome of aligned social conditions rather than isolated choices. Risk accumulation emerges through repeated participation in normalized interactional regimes, explaining how stable transmission can persist even in settings marked by relatively strong health systems and widespread awareness.

In this context, preventive responses require recalibration toward early, institutionally grounded interventions. Comprehensive sex education in schools—addressing not only biological aspects but also digital intimacy, consent, and peer influence—assumes particular importance in equipping adolescents to navigate emerging risks. Equally, fostering civic responsibility as a shared social capacity can strengthen collective awareness and ethical responsiveness to sexual health risks beyond individualised behaviour change. Without attention to the interactional and structural conditions identified in this study, awareness alone is unlikely to translate into sustained protection.

Overall, the study underscores a shift from episodic to systemic risk in contemporary intimate life. The central challenge lies not in sudden escalation, but in the quiet persistence of exposure embedded within ordinary practices of digitally mediated intimacy. Addressing this challenge requires sustained attention to how intimacy is socially organised, how vulnerability accumulates over time, and how educational and civic institutions can intervene early to alter these trajectories.

### **Author's Statement**

The authors declare that this manuscript is their original work and has not been published previously, nor is it under consideration for publication elsewhere. All authors listed have made substantial intellectual contributions to the conception, design, data collection, analysis, and writing of the manuscript. No individual has been included as an author whose contribution is negligible, and there is no honorary or guest authorship. The authors take full responsibility for the content of the manuscript.

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