Period Tracking Apps and Data Privacy in India: Risks, Awareness and Empowerment Gaps

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Abstract: Period tracking apps hold out the promise of empowerment for Indian consumers, but they collect intensely personal health information – cycles, symptoms, moods – that poses very significant privacy threats. In India, where comprehensive data protection legislation is in its infancy, this sensitive data is exposed to risks: probable leaks, abuse by third parties (such as insurers or advertisers), or even state surveillance. Alarmingly, user knowledge of such threats and how apps process data is still drastically low. Most users of these tools blindly trust them without realizing the privacy trade-offs involved, thus creating a perilous gap. Such ignorance negates the very empowerment the apps provide. Real digital empowerment not only demands the tool but also knowledge and agency over one's data. In reality, tremendous gaps between user awareness, regulatory protections, and app provider transparency prevail, endangering Indian users while trying to monitor their health.

Keywords: Period Tracking Apps, Data Privacy, Empowerment gaps, Inequality, Patriarchal Norms

Introduction

Period tracking apps have become popular in India, providing millions with a virtual lifeline to deal with menstrual health, forecast cycles, and manage fertility (Hu, 2015). They hold out the promise of empowerment through information and agency over one's own body – a major leap in a society where menstrual talk is surrounded by taboo (Johnston & Chrisler, 2020). But this

ease comes at a secret price: the aggregation of intensely intimate information. With each symptom, mood shift, sex act, or irregularity logged, users are sharing information with apps that creates a remarkably intimate portrait of their identity, health, and lives. Such sensitive information is poured into the digital environment of India where there are no full-fledged data protection laws yet, enforcement is a gamble, and most users have some degree of digital literacy (Jain, 2024; Burman, 2023). The grim reality is that this intimate information is in dire danger: possible compromise revealing private lives, sale to marketers constructing detailed profiles, misuse by employers or insurers, or even exploitation on changing political regimes (Gebhart & Barnett, 2022; Privacy International, 2021). Shockingly, understanding how these apps process data, who they share it with, and the possible implications remains desperately low. Most users, intent on the material advantage, click "agree" to convoluted privacy policies without comprehending the trade-offs, and an empowerment gap is formed (Milder et al., 2023). Real empowerment is not merely accessing the tool; it's knowing the risks, exercising real control over one's data, and being assured that strong protections are in place. There is a wide gap between the potential of these apps and the current reality of data privacy in India – one ignited by low levels of user awareness, inadequate regulation, and non-transparency by app providers (Gurumurthy & Chami, 2023). This introduction dives into this critical tension, investigating the threats beneath the surface, the troubling lack of user awareness, and how this vulnerability then actually undermines the very empowerment these apps profess to provide. Can we ever really feel empowered if our most intimate health information is potentially a commodity or a vulnerability?

Research Questions

a) To what extent do such users of Indian period-tracking apps understand particular data practices (such as third-party sharing), and are those who know such particular data practices protecting themselves?

b) Which obstacles do stop the Indian users of period-tracking apps to exercise the right enshrined in (Digital Personal Data Protection Act) DPDPA 2023 over sensitive information about reproductive health?

Research Methodology

The primary sources of research on the topic are based mainly on the use of secondary data, through a large variety of scientific journal papers, policy reports, online sources on privacy,

and news media, as well as the privacy policy of specific apps. It offers critical analysis as to how period tracking apps are implemented into the context of data governance, surveillance capitalism and digital health in India. This study will involve dwelling on literature about the current status of data collection about users, the loopholes in the laws that protect users (especially weaknesses of the advertised Personal Data Protection Bill), and international criticism of menstrual surveillance. Although this secondary data contains important information on structural risks and theoretical concerns, the lack of primary data that can be gathered by using the methods of survey or interview remains a limitation of the given research. This restricts the possibility to understand the experiences of the users on the ground level in particular aspects of personal awareness, behavioural response towards app permissions, and subtle socio-cultural elements that influence trust and empowerment. There is no empirical evidence to support the findings, which can quickly transform into abstract research without much emphasis on various realities of app users in India. Further studies based on primary data would assist the quantification of assumptions, provide more context, and base the analysis on the experience of life.

Period Tracking Apps of India: An Analysis

Period tracking apps have gained immense popularity in India, particularly among women in cities and younger users who need to have better control of their menstrual and reproductive health (Broad et al., 2022). Such floating apps as *"Flo"*, *"Clue"*, *"Maya"*, *"My Calendar"*, and *"Eve by Glow"* are believed to be one of the most well-known, and their features could be adapted to various users and cultural backgrounds.

A prominent example is *"Flo"*, a worldwide-famous application, thanks to its convenient interface, and AI-managed predictive opportunities which are actively used in India (Privacy International, 2021). It does not only record periods and ovulation but also provides personal health information depending on the user statistics. Flo provides articles by medical experts as well as the community section where one can have an internal discussion anonymously about PMS (Premenstrual Syndrome), contraception, fertility, and emotional wellbeing (Flo Health, 2022). It also focuses on user privacy, in which one can store the data in a purely secure manner and what a user shares are upon the choice of the user (Federal Trade Commission, 2021).

"Clue" designed by a Berlin based firm is applauded due to its scientific and gender independent design (Clue, 2023). It does not use pink and stereotypical depictions; thus, it does not show a preference to certain menstruators. Clue enables one to monitor many symptoms like pain, discharge, mood, energy levels, sleep and it gives a more enhanced picture of the health cycle. Its plain user interphase and in-depth cycle breakdown is especially useful when one has irregular periods or PCOS (Polycystic Ovary Syndrome). Clue is open about its data policy, unlike most other apps, which is one of the reasons people prefer it among others (Johnston & Chrisler, 2020).
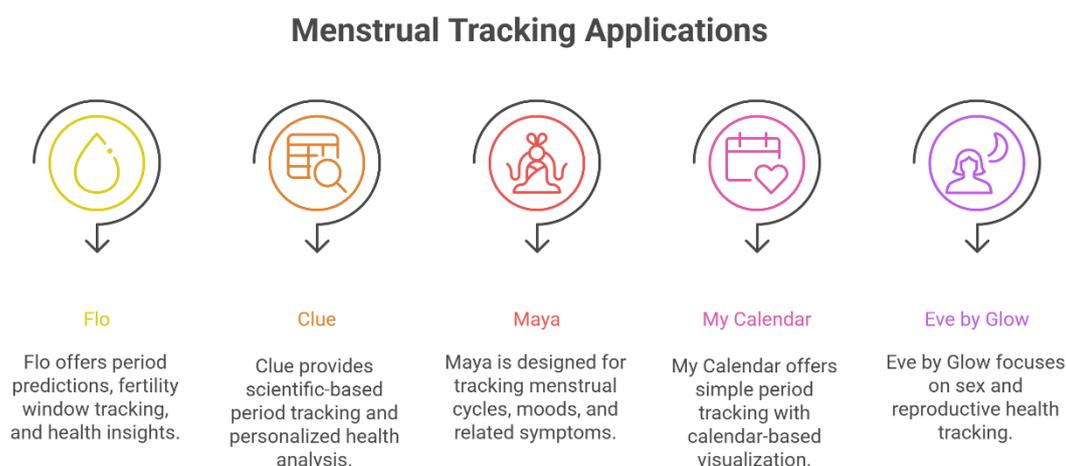
"Maya", a startup by Indian-based Plackal Tech, has become very popular in the country on account of its localisation. It uses a number of languages in India such as Hindi, Tamil and Bengali so that non-English speakers can use it (The Ken, 2020). Maya enables one to record menstruation, depression, weight, and heating, as well as sexual experience. It also gives period and fertility forecasts and also includes medication reminder and birth control. The app is easily integrated into Google Fit and its design is pleasant to the eye and intuitive to manoeuvre through, and as such, it is particularly user-friendly to first-time meditators (Bhalla, 2019).

Another popular application is *"My Calendar"* that is popular among the users who prefer a simple tracking tool that is effective. It offers a more personal and pretty appearance due to its customizable appearance and visual calendars. It monitors menstrual periods, ovulation, and fertility window and provides the purpose of note taking regarding mood, symptoms, and other aspects. It is not as full-featured as others, but its easiness and stability give it an advantage of being the choice of people who do not need numerous features that only distract them on the way to simple but effective tracking (TechCrunch, 2019).

"Eve by Glow" is aimed at both what to expect during a cycle and sexual health. It focuses on an audience that is younger and is eye-catchingly designed. Eve follows periods, PMS symptoms, and sexual activity as well as it provides daily health logs and quizzes (Glow Inc., 2022). The application provides an active online community; users can interact with each other and share the experience and also offer support. It also offers some learning materials that empower the users to learn more about their bodies and not merely the menstrual periods (Knop et al, 2024).

Such apps are giving power to users to have more control on their health but at the same time, the situation of data privacy is a big issue where in India digital literacy is highly diversified (Gurumurthy & Chami, 2023). In the effort to be in compliance with GDPR (General Data Protection Regulation) and other privacy policies both on the international platform, apps such as Flo and Clue, among many others, only do specific collaborations with a third party to leverage user data in targeted advertising campaigns (Gebhart & Barnett, 2022). In addition, cultural taboo and ignorance about menstrual health continue to deprive many women of using the full potentials of these tools (Menstrual Health Alliance India, 2021). In general, these apps are incredibly useful as health trackers and health educators but there is an increasing demand of regulating such apps, digital awareness, and localization to an extent that they will create a safe and inclusive environment to every user living in India.

Image 1- Menstrual Tracking Applications

Menstrual Tracking Applications

Flo	Clue	Maya	My Calendar	Eve by Glow
Flo offers period predictions, fertility window tracking, and health insights.	Clue provides scientific-based period tracking and personalized health analysis.	Maya is designed for tracking menstrual cycles, moods, and related symptoms.	My Calendar offers simple period tracking with calendar-based visualization.	Eve by Glow focuses on sex and reproductive health tracking.

Source- Image made by author complied by above mentioned references.

Theoretical Framework

There are certain theories who interrelate to explain the complex dynamics of Period Tracking Apps (PTA), Data Privacy and Empowerment Gaps in India.

I Privacy Calculus Theory: The User's Risk-Benefit Trade-off

Privacy Calculus Theory states that users make choice of whether to release their personal information based on their sub-conscious computation of perceived benefit and perceived

hazard (Dinev & Hart, 2006). How these apps are applied to PTAs in India? Users are usually young and urban women who use these apps for many physical advantages, such as predicting the cycle, keeping track of fertility, symptom-relieving process, and the lessening of stigma through digital ease (Bhalla, 2019). Nevertheless, this calculus is seldom rigorous because of two fatal distortions, namely low perceived risks (little awareness of how intimate data (menstrual cycles, sexual activity, or moods) can be used to discriminate, servile, or profile) and overvalued benefits (apps promote health insights and obscure the process of data commodification) (Milder et al., 2023; Mozilla Foundation, 2021). This is connected directly to the above-mentioned core gaps in the study: the awareness gap and the empowerment gap undermine the potential risk-benefit assessment information and the agency potential of the user in case of the risk registration, respectively. Risk perception also results in cultural stigma that questions, *"Who is going to care about my periods anyway?"* thus placing data lacking scrutiny (Johnston & Chrisler, 2020). Therefore, through Privacy Calculus Theory, one can see the distorted thinking of the Indian socio-cultural reality as one of the contributors of the vulnerability of the use of PTA.

Image 2- Privacy Calculus Theory in Period Tracking Apps
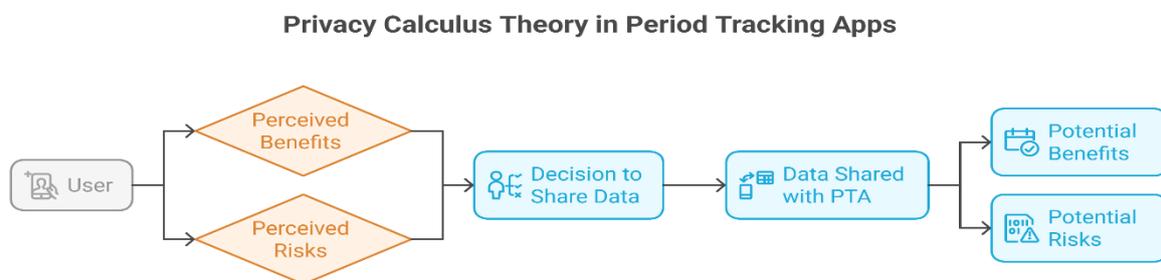
Source- Image made by author complied by above mentioned references.
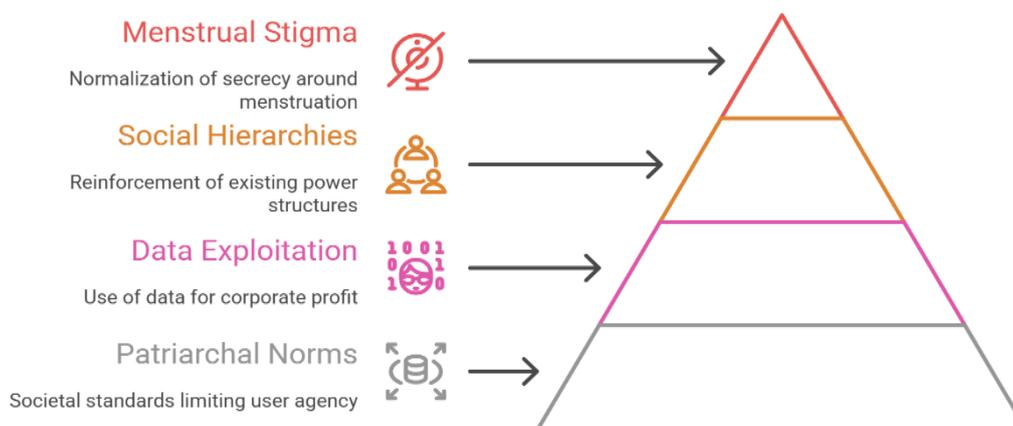
II Feminist Data Studies: Power, Control and Structural Inequality

In Feminist Data Studies, the way data practices reproduce and mimic an already established set of power is discussed critically, the idea of technological neutrality is criticized (D'Ignazio & Klein, 2020; Fotopoulou, 2020). When this theory is applied with respect to Period Tracking Apps (PTAs) in India, it reveals deep structural disparities. To begin with, PTAs usually impose patriarchal rules because they focus more on regulating reproductive health based on fertility and partner-oriented aspirations (such as ovulation palms to conceive) that reflect the

expression of social control over a reproductive body not focusing on holistic and user-friendly health. Second, data exploitation is imminent: it is the corporations who get money based on explicitly intimate information about the user (mostly women and gender-diverse people), whereas the risks on the other hand, such as discrimination in the workplace or marriage, are even more on the user itself (Noble, 2018). The social hierarchies in India are arrived at by this exploitation and are therefore more threatening to the marginalized groups (low caste/socio economic status, and rural dwellers). Thirdly, prevalent menstrual stigma in India is part of the instrument used to naturalize secrecy, undermining its users as data consumers trying to assert and right to information as abused and normalized. This is directly connected to the central gaps of the study: these power imbalances introduce the structural obstacles to empowerment, with low awareness being guaranteed by the systematic absenteeism of the female voice in the development of technologies and policy (Gurumurthy & Chami, 2023; Menstrual Health Alliance India, 2021). At the same time, the dread of stigma has an active role of silencing resistance, which leaves the users unable to collectively act against the data abuses soft resistance causes the development of the empowerment gap as well, making users shy away to engage in challenging data abuses even when they know about them (Masika & Bailur, 2015). In this way, Feminist Data Studies exposes the gendered and social control systems in which PTAs in India became embedded and make worse.

Image 3- PTA Data Practices and Social Impact

PTA Data Practices and Social Impact

Menstrual Stigma
Normalization of secrecy around menstruation

Social Hierarchies
Reinforcement of existing power structures

Data Exploitation
Use of data for corporate profit

Patriarchal Norms
Societal standards limiting user agency

Source- Image made by author complied by above mentioned references.

III Digital Literacy & Capability Approach: Skills vs. Empowerment

The Digital Literacy & Capability Approach does not aggravate the barrier at the village level (Sen, 1999; Nussbaum, 2012; Kleine, 2013). Applying this to Period Tracking Apps (PTAs) in India, one can see the vital gaps: even with a higher interest in the apps in India, despite the improvements in English literacy in the recent decades, users, and rural users in particular, tend to lack the technical literacy necessary to read complex privacy policies, customize options, or identify malicious design practices, so-called dark patterns (Gurumurthy & Chami, 2017). But real realization requires even more: resources (time, mental capacity), institutional help (property to turn to the court), and self-efficacy (belief that one can act). Even in India, the field of digital literacy does not outline health data privacy, and the rights mentioned in the DPDPA 2023 (e.g., data erasure) do not apply unless users have the opportunity to enforce them in practice (Internet Freedom Foundation, 2023). This is the direct cause of the empowerment gap: even conscientized users are unable to act as result of deficits in skills, resources, or non-existence of support systems. This is why awareness does not equal to empowerment, just as deprivation of capability perpetuates vulnerability.

Image 4- Empowering Privacy Management

Empowering Privacy Management

Source- Image made by author complied by above mentioned references.

**IV Contextual Integrity (CI): Violating Trust Norms**

The theory of context-sensitive privacy (Contextual Integrity (CI) theory) states that the breach of privacy occurs when the flow of information is inexpensive to the context specific norms. When applied to PTAs in India, such data disclosed by their users is intimate health information offered in the context of reproductive health management with the norms of confidentiality and the restricted use (Broad et al., 2022). The violation of CI is committed in the following cases:

a) Data is supplied to the advertisers (e.g. targeting advertisements on sanitary products) (Privacy International, 2021; Mozilla Foundation, 2021).

b) The sensitive inferences (e.g., fertility pattern) are sold to insurers/employers (which is discriminatory) (Klein, 2020).

c) Without protection, data is transferred across borders (e.g. to servers in the U.S.) (Chaudhary, 2025).

The cultural context in India makes it even worse: the secret of menstruation is hidden already, and the leaking of unauthorized data becomes a two-fold backstabbing, taking advantage of the cultural prohibition and increasing distrust. This immediately relates to the study gaps: the ignorance about data flow preconditions the occurrence of these violations to remain unnoticed, and the empowerment gaps (technologic and juridical incompetency in the given case) fail to prompt users to enforce context-specific norms, e.g., to require the storage

of their data in the country of residence based on the DPDPA 2023 (Gurumurthy & Chami, 2023). So, CI redefines the PTA risks as structural and underlying betrayal of the trust, which is perpetuated by disenfranchisement of the system and cultural silence.

Image 5- Privacy Violation Pyramid
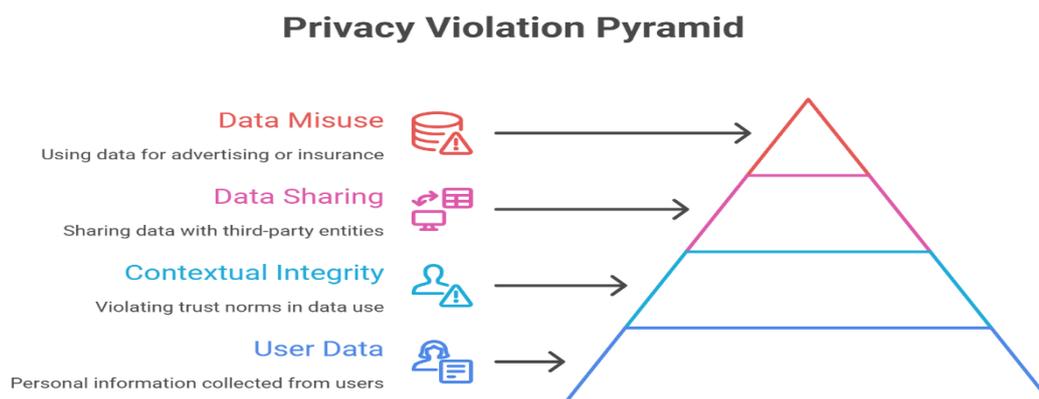
Source- Image made by author complied by above mentioned references.

**V Socio-Technical Systems (STS) Theory: The Interlocking System**

According to the Socio-Technical Systems (STS) Theory, privacy outcomes are a result of highly interconnected relations among technology, users and contexts of socio-policies where none of the parties operates independently (Nissenbaum, 2011). The Indian genre of Period Tracking App (PTA):

a) There are vulnerabilities caused by technology (e.g. opaque algorithms, default data-sharing settings, "freemium" models, etc.) (Milder et al., 2023).

b) The tools are utilised with a different degree of digital literacy, faithfulness and cultural predispositions to periods stigma (Gurumurthy & Chami, 2023).

c) Exploitation is made possible by society/Policy layers such as low enforcement of the DPDPA 2023, a data-predatory economy, and the established societal taboos (Internet Freedom Foundation, 2023).

As an example, a free app (technological design) takes advantage of the lack of position of users to choose (social context) and the non-existent strong regulatory controls in the Indian environment (policy) to systematically normalise the risk (D'Ignazio & Klein, 2020). Such a

mutually reinforcing process directly feeds the gaps that are the focus of study: the awareness gap is a product of technical complexity (e.g., incomprehensible data flows) compounded by a discourse of silence about menstruation that sends an enquiry-averse signal (Masika & Bailur, 2015). At the same time, the gaps in empowerment exist given that the policy failures (e.g., unenforced rights) and stigma (hinder group action) do not give users an opportunity to put an end to damaging practices.

Image 6- Factors Influencing Privacy Outcomes in India
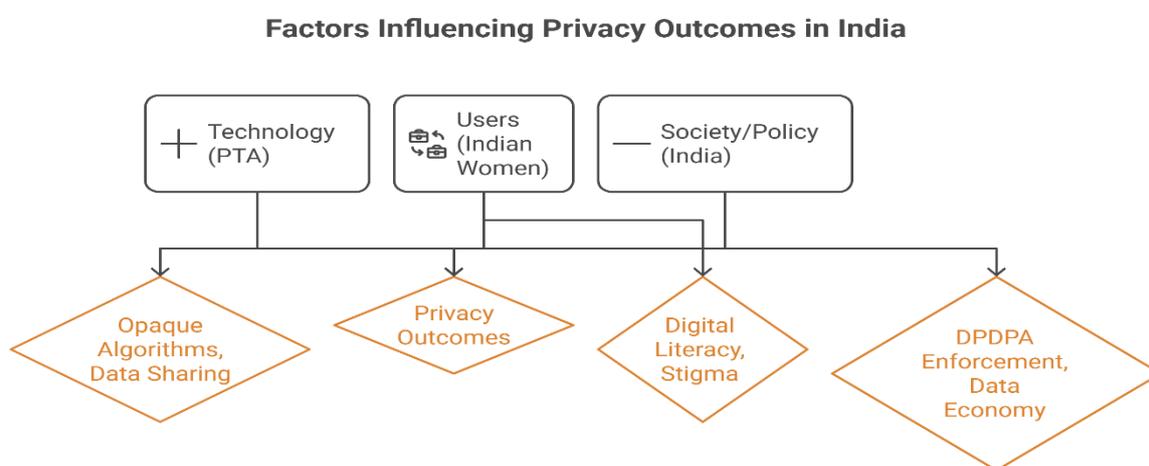
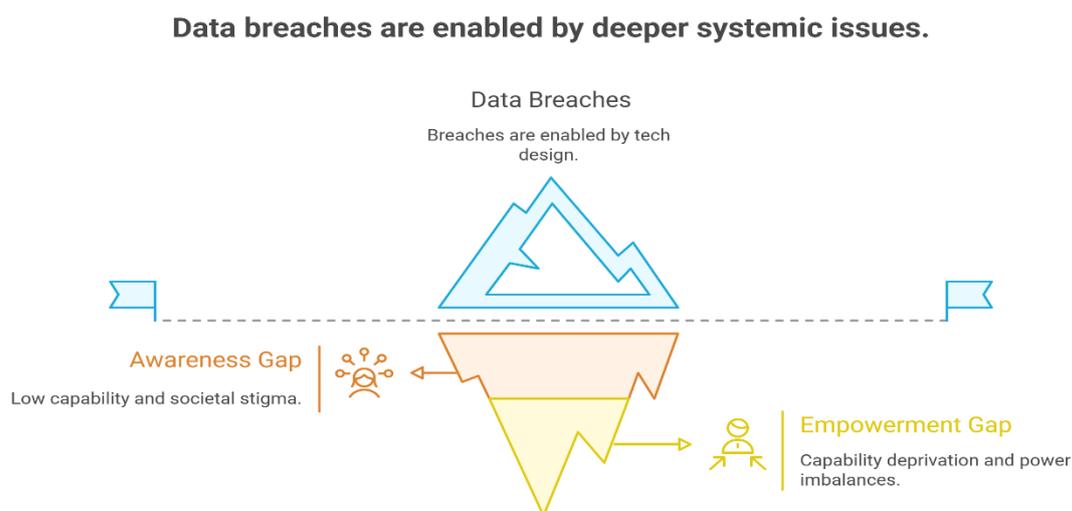Source- Image made by author complied by above mentioned references.

STS, therefore, shows that the crisis in PTA privacy in India cannot be addressed by focusing on the eradication of a single layer- a systemic attack must be waged against technology redesign, stigma-resistant policy enforcement, and societal empowerment.

Synthesis of How Theories Explain India's PTA Privacy Crisis

Issue	Theoretical Integration
Risks	STS exposes how tech design + weak regulation enable breaches. CI defines harm as *contextual betrayal*. Feminist theory highlights gendered impact.
Awareness Gap	Privacy Calculus fails due to low capability (literacy) and societal stigma (feminist/STS). CI violations thrive in secrecy.

Empowerment Gap	Capability deprivation + power imbalances (feminist) + technical complexity (STS) disable action. DPDPA rights exist but aren't *actionable*.

Image 7- Data breaches are enabled by deeper systemic issues

Source- Image made by author complied by above mentioned references.

Key Interdependencies in the Indian Context

- **Stigma → Low Awareness → Inadequate Calculus:** Cultural silence prevents users from questioning data practices (Feminist → Privacy Calculus).

- **Literacy Gaps → CI Violations → Disempowerment:** Users cannot detect/stop inappropriate data flows (Capability → CI).

- **Weak Regulation + Tech Design → Exploitation:** DPDPA 2023 lacks teeth, enabling apps to externalize risks onto users (STS → Feminist).

Discussion and Findings of the Study

The secondary data analysis conducted in the paper reveals a very disturbing ecosystem on the use of period-tracking app (PTA) in India to include systemic privacy risks, inadequate

regulation and socio-cultural obstacles. These results conclude that commonly used PTAs, which tend to be developed by international programmer teams that work on a "freemium" basis collect copious tracts of personal information like menstrual periods, sexual activity, moods, and physical ailments. App developers keep this information, but more often than not, this information is given to third party advertisers, analytics services and even in cross border data brochures (Mozilla Foundation, 2021). Repurposing of sensitive health data to be used commercially in profiling is a direct contravention of contextual integrity as the data is being used beyond the consent and expectation of the user, and as such it may expose the user to discrimination, stigmatization and profiling.

The review of the Digital Personal Data Protection Act (DPDPA) 2023 of India indicates huge gaps in the identification of these infringements. Though the Act treats health data as sensitive personal data, the broad exemptions under the heading of legitimate uses, mixed implementation mechanisms, and the absence of clear prohibitions against the monetization of the reproductive data undermine the protective value of the Act to a significant degree (Internet Freedom Foundation, 2023). Moreover, the architecture by consent of the Act is inappropriate to reflect the real scenario of the application of the PTA, since digital literacy inequality, power, and information inequality is glaring. Either the privacy terms are in complicated legal language or menstrual stigma makes the users simply accept privacy terms even without understanding them well. The cultural practice of patriarchal norms and taboos around menstruation in India have become the means of normalization of the silent sharing of individual information in the gendered digital sphere, defining a special cultural dimension of the worldwide issue of digital surveillance.

The information on these findings indicates that the basic governance structures on data in India is out of step with reality of PTAs operation and user requirements. According to the Science and Technology Studies (STS) and Feminist Data Studies, the DPDPA would not balance structural inequalities, power issues between genders, and technological indecipherability on the approach of formal consent only (D'Ignazio & Klein, 2020). The outcome is a digital ecosystem in which the reproductive data of users is exposed to extraction, inference and monetisation processes- usually without their informed consent. In as much as the researchers speak of the "awareness gaps" (the users are unaware of how their data is utilized) and the "empowerment gaps" (the users do not have the tools or platforms that could enable them exert their rights), these findings have been more or less theoretical in nature.

Little or no primary data on the assessment of risks by users, and how stigma works on digital practice, and the articulation of empowerment among the surveyed across caste, class, and geography are other aspects that cannot be concretely measured in the study.

Therefore, although the study has powerful structural critique, it does not comprehend the lived experience of vulnerability in full. There have been questions left unanswered, including whether the users think in-line the advantages of tracking balance against possible risks, or the difference between rural and the urban women in trust and awareness. The theoretical foundations of such an approach as Privacy Calculus (Masika & Bailur, 2015), which presupposes risks to be measured with perceived benefits which individuals are to balance, cannot be empirically tested without utilizing primary data. The drawback reduces the capacity of the study to present user-centric solutions, which are based on behavioural evidence. The integration of quantitative surveys to assess the level of awareness in users, qualitative interviews regarding the stigma and trust in both, the app and the vernacular, and the usability test to determine transparency and privacy options of the app are necessary considerations in future research in dramatic urgency.

This is a drawback of the study in its significance; nevertheless, the study has significant policy and advocacy implications. To begin with, the regulators are compelled to give health data a sense of urgency by tightening the purpose limitation, prohibiting the monetization of reproductive data, and introducing a redressal system that is easy to use. Second, scientists should not be stopped at the structural analysis, but come up with actionable knowledge based on primary user interaction. Third, the tech industry has to be taken to account: design companies must make use of privacy-by-design concepts, remove dark patterns and provide clear, multilingual privacy settings. Last but not least, civil society has a role to play in reducing the cultural stigma behind digital silence promoting not only gender-sensitive digital literacy but data rights too.

In a nutshell, therefore, this secondary researched study provides a critical conceptual analysis of the way PTAs in India meet the intersection of surveillance capitalism and poor legal protection as well as socio-cultural susceptibility. It is emphasised why it is so important that empirical validation is urgently needed to transform these theoretical risks into effective and fair forms of protection. Until there is such primary data available, policy reform would have to occur on a precautionary basis, acknowledging the urgency of coming up with some

form of digital rights protection of menstruators in the currently rapidly-changing data environment in India.

Conclusion

It is shown in this paper that Period Tracking Apps in India exist at a perilous nexus of technological abuse, legal insufficiency and socio-cultural disadvantages. On the one hand, PTAs have concrete advantages, involving ensuring menstrual health in a stigmatized situation; on the other hand, these data interventions represent the symbolic ideal of surveillance capitalism: intimate reproductive health data is regularly commercialized, provided to third parties (including cross-border organizations), and used to profile, subjecting the user to discrimination, harassment, and loss of choice. Although such legislation exists in India through The Digital Personal Data Protection Act (DPDPA) 2023, the legislation is critically under prepared to solve these ills. It has loopholes (e.g., in cases of the so-called legitimate uses), is poorly enforced and, due to insufficient data on health topics protection, does not curb the predatory collection of such data. They add to this the fact that the pressure of menstrual stigma and patriarchal practices obscure the voice of question, and an overlapping combination of language, digital literacy and rural-urban differences form a considerable limit of empowerment, users are incapable of taking measures and carrying out rights, even in the face of risk awareness. Restricted by the use of secondary data, this discussion unveils that, in the absence of the immediate, multi-dimensional effort of empowering DPDPA enforcement (banning monetization of reproductive data, local storage requirements), building stigma-sensitive digital literacy programs, and encouraging the privacy-by-design feature in vernacular interfaces, PTAs will reproduce a pattern of disempowerment. After all, conveniences should not turn into surveillance against women: privacy of menstrual data should be considered not as a regulatory obligation but the right of bodily integrity and gender equity in the Indian digital world tomorrow.

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