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The Right to Safe Abortion in India: Examining Legal Frameworks, Reproductive Health and Human Rights

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ABSTRACT: This paper critically analyses India's right to safe abortion from legal and reproductive-health and human-rights perspectives. It examines the changes in the Medical Termination of Pregnancy Act, 1971 and the changes brought about after its amendment in 2021 and the development of jurisprudence on the issue of reproductive autonomy. The research methodology is a doctrinal and qualitative approach, involving secondary sources of data (legislation, judicial decisions, government reports and scholarly publications) which evaluates the accessibility and safety of abortion services. The findings indicate that even though there have been important changes in the laws, socioeconomic factors, rural–urban differences, lack of knowledge and knowledge barriers as well as stigma and health problems continue to hinder the ability to access safe abortion. The study calls for a shift in the discussion on abortion from a legal perspective towards affordable, confidential, accessible and non-discriminatory healthcare provision to ensure women's autonomy, dignity, equality and right to health.

1. INTRODUCTION

Safe abortion is a very prominent topic at the nexus of reproductive health, individual autonomy, gender equality and human rights. Safe abortion is not only a medical problem; it's also a dignitarian and human rights matter because women have the right to decisions about their reproductive lives, to privacy, to bodily integrity and to access to medical care. A growing number of countries today acknowledge that women's health would be negatively impacted by denial or limited availability of safe abortion and that this could exacerbate social and economic inequalities. A particular significance of the issue in India is that abortion has been legalized for over half a century, but there are significant lacunas between the legal rights and women's access to safe and dignified abortion services.

In 1971, India implemented the Medical Termination of Pregnancy (MTP) Act, bringing another significant change from the approach of the Indian Penal Code (IPC) when abortion was defined as a criminal offence. The law had provisions for abortion in certain cases—such as where the woman's health or well-being might be affected, in the event of rape and in situations of contraceptive failure or foetal abnormalities. In response to some challenges in service availability, future amendments are approved (2002-2003) and further enhance the availability of service, with an extension of the gestational period to 24 weeks for certain categories of women and changes in relation to medical practitioners in conjunction with confidentiality and significant foetal abnormalities. However, the restrictions on the right to abortion remain as defined by the set of rules in the statute and are not a right to abortion for anyone simply because they choose it.

The constitutional aspect of abortion has also undergone significant changes. In its 2022 ruling on the case of an unmarried woman, the Supreme Court of India clarified the concept of reproductive autonomy, stating that access to abortion should not be based on marital status. While there is a shift towards the recognition of abortion as a part of the decisional autonomy and reproductive justice, the judgment has a number of limitations as expressed in the statutory framework, especially in terms of gestational limits and the need for doctors to authorise abortions as well as access to contraceptives for marginalised populations, notes Jain (2023).

Public Health, on the other hand, will attune to the fact that the legalisation of abortion has not been able to eradicate unsafe abortion. There have been many studies that show that poverty, lack of information, geographical factors, attitudinal barriers and the lack of access to empowered facilities affect women's access to timely and safe facilities. In analysing data about over 1.8 million women, Yokoe et al. (2019) identified a high prevalence of unsafe abortions and highlight that disadvantaged socioeconomic factors, living in rural areas and becoming pregnant at a younger age were associated with greater risks. Therefore, the right to safe abortions must be viewed not just as law, but also in terms of the availability and cost-effectiveness of reproductive healthcare, for its acceptability and quality.

In this context, the study aims at critically reviewing the right to safe abortion in India under a legal and reproductive-health and human-rights nexus. It aims to investigate if India's forward-looking legislative and judicial changes have reflected in the creation of reproductive autonomy and fair access to safe abortion in reality.

2. LITERATURE REVIEW

Hirve (2004) is an important source for understanding the evolution of India's abortion policy with a discussion on the evolution of the MTP framework and the on-going obstacles between policy laws and access to service. The study emphasizes the need for improved regulation, increased provision of rural facilities, increased awareness, financial barriers and restrictions for providers as key challenges in providing safe abortion.

In an analysis of the legal availability compared to actual access that was performed by Banerjee et al. (2012) in India on rural women in Bihar and Jharkhand, they discovered that just because it is legally available did not mean people had access to it. Little mention was made of legal status of abortion, and there were both perceived and actual barriers of affordability and availability for abortion. The study also confirmed that communication and community level interventions could lead to the change of awareness and attitude of women towards safe abortion.

Likewise, Banerjee and Andersen (2012) explored the pathway to brought about abortion in Madhya Pradesh and found that women for whose abortion problems were encountered complicated routes to care. Their conclusion reinforces the value of getting information to them on time, training providers and making post-abortion services available and accessible to prevent unnecessary morbidity.

Sowmini's study (2013) specifically focussed on unmarried adolescents, and young women, and identified fear of disclosure, lack of family support, resources limitation, and social stigma as factors that delayed care for abortion. This study illustrates that no protective legalization can supplant social restrictions on women of reproductive age's reproductive choices.

Affordability, confidentiality and convenience may make a difference in the decision-making process of women for abortion, as Sri and Ravindran (2015) explored with medical abortion in rural women in Tamil Nadu. However, the authors note that whilst having access to medical abortion is a necessary condition for gender equality, it is not a sufficient one, as other aspects of social relations such as economic dependence and restrictive gender norms persist and have an impact on reproductive autonomy.

By providing estimates of abortion incidence at a global level, Sedgh et al. 2016 showed the ongoing global impact of unintended pregnancy and abortion and revealed significant variation in abortion patterns and safety by country depending on the legal environment.

Bhattacharya et al. (2017) also showed that poor women in India facing problems of accessing safe abortion in the country suffer adverse impact on the factors like requirements of bureaucracy and misconception. They conclude that their analysis supports the proposition that the law's rights must be supported by the meaningfulness of administrative and health care systems.

Empirically, unsafe abortion is associated with SE status in India as shown by the results of Yokoe et. al 2019. They found that being poor, having a low education and living in rural areas, and younger age can make women more vulnerable to unsafe abortion and abortion-related deaths.

Manning et al. (2020) explored the provider structure in India to the WHO guidelines and recommended more providers as a solution to a good care package for abortions. Their work emphasizes the need to complement clinical capacity strengthening with regulatory measures.

Kumari and Kishore (2021) have reviewed, and concluded there was a need for legislative reform, but their review of MTP Amendment Bill was done in a critical manner. They highlighted aspects of awareness, availability, accessibility, affordability, quality of services and appropriate contraceptive information as key factors in comprehensive abortion care.

Sunil (2022) has reported the abortion-seeking experiences of women in the rural areas of Tamilnadu as “an obstacle course” of misinformation, provider judgement, delays, and discriminatory experiences. The research clearly links respectful abortion services with women's reproductive and human rights.

Recently, Jain (2023) has dissected the Supreme Court's verdict on abortion and pitched the case for reproductive autonomy to be seen as a component of decisional autonomy of the body and reproductive justice. Whilst the judgment extended women beyond the marital definition to the point of protecting unmarried women, the mismatch between this and ongoing differences in the statutory structure based on the doctor and on gestations means questions of equality and autonomy go unanswered.

In general, literature reflects that, abortion is evolving from being more of a medical and criminal-law matter to being viewed as one of autonomy in reproduction, health, and human rights. However, there is a long-standing lacuna between the legal recognition of the right and its actual enjoyment of the right. Previous literature tends to report on legislation and court rulings on one hand, and health outcomes or service barriers, on the other. The present research is an attempt to redress this balance by integrating these aspects and critically exploring if the legislation of India fulfils this guarantee of safe, reliable, affordable, confidential and dignified abortion services.

3.1 Objectives:

1. Examine the law governing abortion in India in the context of the MTP Act, 1971 and amendments in this act in 2021.
2. To understand the availability of safe abortion services in India and barriers women experience.
3. To investigate safe abortion as a human right with considerations to reproductive autonomy, dignity, equality, privacy and health.

3.2 Methodology

This study would use both doctrinal and qualitative research methodology to critically discuss the right to safe abortion in India from both legal and reproductive healthcare/human rights angles. It uses secondary sources of information such as legislation, constitutional provisions, Supreme Court judgments, government reports, WHO publications, policy documents and peer-reviewed journal articles as its main sources. Relevant legislation (Medical Termination of Pregnancy Act, 1971 and the Amendment in 2021), judicial rulings and international human rights principles on reproductive autonomy, dignity, equality, privacy and health have been analysed. A descriptive and analytical strategy is employed to identify both deficiencies in the current legislation and the real value of safe abortion services for women.

4. RESULT AND ANALYSIS

This paper compares and contrasts secondary quantitative data from existing literature that describes abortion in India to answer the question of how well the current legal environment contributes to providing safe and accessible abortion care. Four dimensions are analyzed: scope of abortion, the way the abortions are carried out and performed and, prevalence and determinants of unsafe abortions, and the consequences of the enactment of law reforms in 2021.

Table 1: Estimated Incidence and Nature of Abortions in India, 2015

Indicator	Number/Percentage
Estimated total abortions	15.6 million
Abortions in health facilities	3.4 million (22%)
Medication abortions outside health facilities	11.5 million (73%)
Other abortions outside facilities	0.8 million (5%)
Medication abortions – overall	12.7 million (81%)

Surgical abortions	2.2 million (14%)
Abortion rate per 1,000 women aged 15–49	47.0
Unintended pregnancy rate per 1,000 women aged 15–49	70.1

Source: Singh et al. (2018).

Data shows that abortions in India were on a very high scale as it is projected that 15.6 million abortions occur in 2015. Only 22%, however, were obtained in the health facilities, while around 73% were outside the health facilities, and were conducted as medication abortions. Medication abortion was the sole technique responsible for 81% of all abortions. The results here show that legalisation has not worked to guarantee women get abortions in formal health care facilities. The large proportion of abortions occurring outside facilities highlights the importance of improving information, accessibility, affordability, confidentiality and referral mechanisms for safe abortion care.

Table 2: Unsafe Abortion among Pregnant Women in India

Indicator	Number/Percentage
Total pregnant women studied	1,876,462
Total abortions identified	89,447
Abortions among pregnancies	4.8%
Unsafe abortions	58,266
Proportion of abortions classified as unsafe	67.1%
Abortion-related maternal deaths	253
Abortion-related deaths among pregnancies	0.3%

Source: Yokoe et al. (2019).

Yokoe et al. (2019) investigated data for 1,876,462 pregnant women in nine states in India. Of the 89,447 abortions identified, 58,266 (67.1%) were classified as unsafe. This study also documented 253 maternal deaths related to child mortality and abortion. These statistics reflect a huge disconnection between legal access to abortion services and safe abortion services that are available. The socioeconomic vulnerability and low access to health services were linked to unsafe abortion.

Table 3: Socioeconomic and Demographic Risk Factors for Unsafe Abortion

Risk factor	Adjusted Odds Ratio (aOR)
Illiteracy	1.48
Rural residence	1.26
Poorest asset quintile	1.45
Muslim women	1.16
Scheduled Caste	1.08
Age 20–24 years	1.13
No surviving children	1.30
All surviving children female	1.12
Use of family planning	0.69
Antenatal care	0.69

Source: Yokoe et al. (2019).

The study results confirm that social and economic factors have a strong effect on unsafe abortion. Women that were illiterate were 48% more likely to have experienced an unsafe abortion, and women in the poorest asset category were 45% more likely to have had an unsafe abortion. This was 26% more likely for a rural woman than an urban woman. Conversely, an adjustment resulting in lower odds of unsafe abortion was observed for antenatal care and use of family planning services, with both showing a 0.69 adjusted odds ratio. Thus, efforts to improve women's education, awareness of reproductive health and family planning services and rural healthcare infrastructure can make a significant contribution to the reduction of unsafe abortion.

Table 4: Factors Associated with Abortion-Related Maternal Death

Factor	Adjusted Odds Ratio (aOR)
Maternal age 15–19 years	7.79
Rural residence	3.28
Scheduled Tribe	4.06

Source: Yokoe et al. (2019).

There are significant inequalities – in particular in the field of abortion-related mortality – that are revealed during the analysis. The odds of a mother dying of abortion were 7.79 times greater for adolescents aged 15-19 than for mothers with children aged 18-35. Rural women had 3.28-time higher chances, and the women belonging to the Scheduled Tribes had 4.06 times higher chances. The results demonstrate an important equality aspect to the right to safe abortion. When vulnerable groups are at a significantly higher risk of unsafe abortion and death, a formally available legal service is not fully effective.

Table 5: Rural Urban and Socioeconomic Dimensions of Unsafe Abortion

Indicator	Odds Ratio
Unsafe abortion among poor households	1.26
Rural women with uneducated spouse	1.92
Rural–urban difference	Significant
Unmet need for family planning	Significant association

Source: 2022 study using Andersen's behavioural model.

These results are further validated by other studies on the close association of unsafe abortion with socioeconomic disadvantage and rural–urban inequities. The odds ratio for poor households is 1.26 and for rural women with uneducated husbands is 1.92. Unmet family-planning needs was another study factor. Safe abortion therefore, is not an autonomous individual service but is dependent on the other components of reproductive-health care and on the socio-economic context.

Table 6: Major Changes Introduced by the MTP Amendment Act, 2021

Legal provision	Earlier framework	2021 framework
Termination with opinion of one RMP	Up to 12 weeks	Up to 20 weeks
Termination requiring two RMPs	12–20 weeks	20–24 weeks for prescribed categories
Upper gestational limit for specified categories	20 weeks	24 weeks
Substantial foetal abnormalities	Restricted by gestational limits	No upper limit, subject to Medical Board
Confidentiality	Statutory protection	Strengthened

Source: Government of India, Ministry of Health and Family Welfare.

This amendment would greatly expand access to abortions, marking an important legislative change in 2021. A requirement of one registered medical practitioner now remains in place up to 20 weeks and it has also been raised to 24 weeks for some types of women. The law also allows for termination after 24 weeks where there are serious abnormalities (to 24 weeks under the law).

OVERALL INTERPRETATION

The evidence indicates very clearly that significant implementation gaps exist between the abortion rights and guarantees guaranteed in the law and actual access to safe abortions under the law in India. Despite steadily evolving laws and policies, evidence indicates that the vast majority of abortions in India happen outside formal health services and are more likely to occur for women at high risk to be carried out unsafely. Based on the findings then, it is recommended that legal reform be complemented by the development of the physical facility and services to support reproductive services, training of reproductive health providers, improving access to family planning services and ensuring reproductive health providers are protected against confidentiality breaches, improving the availability of reproductive-health-specific information, and improving reproductive-health-related products and essential inputs.

In the context of the right to safe abortion, the results justify the thesis that the right to abortion is not restricted to the permission to terminate a pregnancy but is also a component of maintaining health, dignity, autonomy of the body, the right to privacy and equality. The 2021 amendment has these to say that, while it has made massive steps forward, the fact of the continuing inequities in socioeconomic and geographical respect highlights the need for more to bring formal legal recognition into effective reproductive autonomy.

5. DISCUSSION

The data gathered reveals that the framework of the law around abortion in India has been becoming increasingly liberal over time, but even the legalisation of abortion does not lead to equitable provision of abortion services. The MTP Act, 1971 and the MTP Amendment Act, 2021 have wetted down many legal hurdles, but the empirical evidence highlights persisting inequities which stem from socioeconomic status, rural living, age, education, health service access etc. This makes a fundamental difference between de jure and de facto reproductive rights and reproductive autonomy.

Abortion services are in high demand in India; the estimated 15.6 million abortions in 2015, among which about 73% were induced by medication contraception done outside health facilities. Despite the relatively small share of abortions in health facilities, it is likely that women often have to look elsewhere for abortive care, as it is unavailable in these formal health facilities. Self-managed medical abortion is a safe method for medical abortion, provided that suitable medication and information are provided; however, lack of information, misapplication, delayed, and lack of professional assistance creates health risks. However, there is a need for reliable levels of information, trained providers and effective referral pathways, alongside legal availability, in order to meet the need for abortion. Therefore, alongside abortion being available in the law, information must be made available, trained health-care providers, and effective referral pathways must exist.

The results on concept of unsafe abortion are especially important from a human rights point of view. In a study done by Yokoe et al, (2019) an estimated 67.1% of the abortions identified were reported as being unsafe. Another analysis also revealed that illiteracy, rural living and poverty status were associated with increased risk of unsafe abortion. This information has shown that not all women have equal access to abortions. Thus, a seemingly gender-neutral legal envelope can actually have different effects when women's economic, educational and geographical power or ability to exercise their rights are far different.

The report also indicates the connection between abortion and social inequality. Women in rural areas, and adolescent women, Scheduled Tribe women and women in low income households have more barriers and risks. Adolescents are especially vulnerable as they may not be economically independent, fear disclosure and suffer social stigma. Other providers' care access concerns, including those related to family acceptance and social judgement, may further impact care access for unmarried women. It is not only an individual legal right, reproductive autonomy can be understood within the framework of the social milieu in which reproductive choices are made.

The MTP Amendment Act 2021, is a significant step towards moving towards a rights-based approach. Extending the gestational period to 24 weeks for certain categories of women, safeguarding confidentiality and accounting for unmarried women's situations allege an attempt to better adapt the abortion law to the needs of current reproductive-health behaviors.

However, the Indian system continues to be heavily regulatory in nature and uses medical opinions and categories. In a few instances access remains dependent on a statutory condition and/or medical certificate.

This Constitutional aspect of the development of reproductive autonomy is worthy of note. Indian judicial discourse is increasingly associating reproductive issues with privacy, dignity, body and personal liberty. No one can deny that it is an important step, towards equality, that unmarried women are not discriminated against in having access to abortion. Nevertheless, the continuing existence of the "gestational restrictions" and disparities in access due to differently available healthcare suggest that their judicial recognition must be complemented with institutional mechanisms that allow for the application of these principles.

The study also indicated safe abortion should be embedded in the general reproductive-health system. Services and products such as family planning services, family planning contraceptives, sexuality education, antenatal care and post-abortion care can help to decrease and change circumstances that increase the likelihood of unsafe abortion. The association of lower odds of unsafe abortion with family-planning use, and antenatal care services and practices, reinforces the need for a comprehensive reproductive health strategy and not an exclusive focus on abortion in medical care.

The central question, therefore, from a human-rights point of view is not just whether abortion is legal but whether women can make reproductive decisions freely and safely, without discrimination, confidentially and voluntarily. There are several conditions necessary for a meaningful right to safe abortion, which include reasonable availability of abortion services, availability of the services at an affordable price to users, geographical accessibility, good information, and competence by the abortion provider as well as freedom from stigma and coercion to the user.

The discussion as a whole indicates that while the abortion law in India has liberalised considerably, there are important issues which pose problems for its implementation. The evidence underpinning this indicates a move away from a permission-based approach to a stronger rights-based and autonomy driven approach, whilst also ensuring appropriate consideration of medical safety. To make the formal legal framework into substantive reproductive rights, public healthcare infrastructure should be strengthened, a larger number of trained providers should be available, access to healthcare needs to be improved in rural areas, confidentiality should be respected, and accurate information should be provided to evade socio-economic inequalities.

6 CONCLUSIONS

The study concludes with the increasing formal recognition and regulation of abortion in India in the wake of the Medical Termination of Pregnancy Act, 1971, the amendment in the year 2021 and the developments of constitutional jurisprudence in India. The presence of a progressive legal framework alone, however, hasn't yet ensured equitable access to safe abortion services. Despite being a major public health achievement of the last decade, women's ability to make reproductive choices remains constrained by social disadvantage and poverty, rural living, lack of awareness, stigma, and provider and healthcare infrastructure barriers. Safe abortion should not be considered only as a legal medical intervention but as an integral part of reproductive autonomy, dignity, privacy and equality and the right to health. Previous research found that protecting the right to safe abortion is an important challenge where formal recognition and its actual implementation of the right remain disconnected.

6 RECOMMENDATIONS

The effort to implement the MTP framework should be strengthened in India by creating more affordable and quality services of aborting, in off-reach areas, and more skilled health providers. Woman should be given accurate information through accessible Public-health programmes about the legal abortion process, as well as medical-abortion methods, contraception and Post Abortion Care. The confidentiality and treatment without discrimination should be adhered to, especially for women not in their married state, adolescent girls and the poor and vulnerable. Administrative and medical hurdles must be reduced to the extent that this is clinically safe, and healthcare facilities must set-up effective referral pathways for those cases that need specialised medical attention. Lastly, future legal and policy changes should have a more rights-based approach that emphasizes the rights of reproductive autonomy, bodily integrity, dignity, privacy, equality in the country's abortion policies.

REFERENCES

- [1] Banerjee, S. K., Andersen, K. L., Buchanan, R. M., & Warvadekar, J. (2012). Woman-centered research on access to safe abortion services and implications for behavioral change communication interventions: A cross-sectional study of women in Bihar and Jharkhand, India. *BMC Public Health*, 12, 175. <https://doi.org/10.1186/1471-2458-12-175>
- [2] Banerjee, S. K., & Andersen, K. (2012). Exploring the pathways of unsafe abortion in Madhya Pradesh, India. *Global Public Health*, 7(8), 882–896. <https://doi.org/10.1080/17441692.2012.702777>
- [3] Bhattacharya, S., Abu Bashar, M., & Singh, A. (2017). So near, yet so far: Access to safe abortion services remains elusive for poor women in India. *BMJ Case Reports*, 2017, bcr2017220980. <https://doi.org/10.1136/bcr-2017-220980>
- [4] Hirve, S. S. (2004). Abortion law, policy and services in India: A critical review. *Reproductive Health Matters*, 12(Suppl. 24), 114–121. [https://doi.org/10.1016/S0968-8080\(04\)24017-4](https://doi.org/10.1016/S0968-8080(04)24017-4)
- [5] Jain, D. (2023). Supreme Court of India judgement on abortion as a fundamental right: Breaking new ground. *Sexual and Reproductive Health Matters*, 31(1), 2225264. <https://doi.org/10.1080/26410397.2023.2225264>
- [6] Kumari, S., & Kishore, J. (2021). Medical Termination of Pregnancy (Amendment Bill, 2021): Is it enough for Indian women regarding comprehensive abortion care? *Indian Journal of Community Medicine*, 46(3), 367–369. https://doi.org/10.4103/ijcm.IJCM_468_20
- [7] Manning, V., Ganatra, B., Gandhi, M., & Patil, A. (2020). Adapting the WHO recommendations on health worker roles for safe abortion to a country setting: A case study from India. *International Journal of Gynecology & Obstetrics*, 150(S1), 55–64. <https://doi.org/10.1002/ijgo.13001>
- [8] Sedgh, G., Bearak, J., Singh, S., Bankole, A., Popinchalk, A., Ganatra, B., Rossier, C., Gerdt, C., Tunçalp, Ö., Johnson, B. R., Jr., Johnston, H. B., & Alkema, L. (2016). Abortion incidence between 1990 and 2014: Global, regional, and subregional levels and trends. *The Lancet*, 388(10041), 258–267. [https://doi.org/10.1016/S0140-6736\(16\)30380-4](https://doi.org/10.1016/S0140-6736(16)30380-4)
- [9] Sowmini, C. V. (2013). Delay in termination of pregnancy among unmarried adolescents and young women attending a tertiary hospital abortion clinic in Trivandrum, Kerala, India. *Reproductive Health Matters*, 21(41), 243–250. [https://doi.org/10.1016/S0968-8080\(13\)41700-7](https://doi.org/10.1016/S0968-8080(13)41700-7)
- [10] Sri, S. B., & Ravindran, T. K. S. (2015). Safe, accessible medical abortion in a rural Tamil Nadu clinic, India, but what about sexual and reproductive rights? *Reproductive Health Matters*, 22(44 Suppl. 1), 134–143. [https://doi.org/10.1016/S0968-8080\(14\)43789-3](https://doi.org/10.1016/S0968-8080(14)43789-3)
- [11] Sunil, B. (2022). Running an obstacle-course: A qualitative study of women's experiences with abortion-seeking in Tamil Nadu, India. *Sexual and Reproductive Health Matters*, 29(2), 1966218. <https://doi.org/10.1080/26410397.2021.1966218>
- [12] Yokoe, R., Rowe, R., Choudhury, S. S., Rani, A., Zahir, F., & Nair, M. (2019). Unsafe abortion and abortion-related death among 1.8 million women in India. *BMJ Global Health*, 4(3), e001491. <https://doi.org/10.1136/bmjgh-2019-001491>