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Gender Disparity in Digital India: A NFHS-5 Analysis

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Keywords

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Women.

Abstract

In today's era of digital revolution, large number of women in India are still experiencing disparity in accessibility of mobile devices and their internet connectivity. Many researches have examined this phenomenon and communicated in scholarly forum from varied standpoints and datasets. We have analysed the systematic disadvantages of women by drawing from the latest National Family Health Survey (NFHS) - 5 data. NFHS has a large sample size, and by using binary logistic regression, we have evaluated the likelihood of outcomes such as mobile phone ownership and internet usage among women in India. The findings indicate a significant disparity in mobile phone possession and internet utilization among women in India, as merely 55% of women possess mobile phones, while only a scant 34% engage with the internet. This issue is especially pronounced among women from marginalized groups, including those from lower castes, older age brackets, lower economic strata, minority religious communities, and those with limited educational attainment. With digitalization emerging as a fundamental pillar of progress, it is imperative to address and eliminate structural impediments to bridge the digital divide for women. Enhancing women's digital participation can amplify their socio-economic prospects, increase healthcare utilization, substantially diminish social inequality, and promote gender equity.

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Introduction

In an era where digitalization has become the cornerstone of development, digital connectivity stands as a transformative force in every facet of human existence. The digital landscape, once a distant frontier, has become an integral part of daily life, shaping how we connect, work, learn, and access essential services (Singh, 2022). As the world inches towards a fully digitalized future, the undeniable reality is that digital inclusion should not be a luxury but a fundamental right and a catalyst for personal and societal growth (Mathijsen, 2024). However, beneath the sweeping wave of digital progress lies a persistent and alarming gender divide, particularly evident in societies like India, where patriarchal structures often magnify the challenges faced by women (Asrani, 2021). The real challenge lies in dismantling the barriers that hinder certain socio-economic groups, particularly women, from fully participating in the digital revolution (Garg, 2021).

The Mobile Gender Gap Report 2022, for instance, reveals a 14% gender disparity in mobile ownership, with 83% of men and 71% of women owning mobile phones. The gap is even wider for internet usage- 51% of men have internet access, compared to only 30% of women, resulting in a 41% gender gap (Shanahan et al., 2022). This significant divide leaves many women without internet access, hindering their ability to obtain important information from mobile health (M-Health), Internet Based Information System (E-Health), Electronic Health Records (EHR), and telemedicine thus exacerbating their digital divide and limiting their access to health information and other related information (Srishti & Raj, 2018). These disparities are not isolated incidents but are influenced by various factors, such as education, professional training, finance, and asset holding. This creates a broader digital gender gap that hampers women's economic empowerment, health seeking behaviour and restricts their participation in the labor market (Vimalkumar, 2021). The challenge is compounded by socio-economic, structural, psychological, and institutional barriers hindering women from owning affordable mobile phones (Singh, 2018). The digital gender divide also extends to computer self-efficacy, with women experiencing lower levels than men, impacting their overall engagement with technology (Shettigar, 2023). Income, education, and household demographics significantly determine household digital adoption, with education, age, and class influencing individual ICT use capabilities (Nath & Barah, 2017).

To draw a landscape from where the gender gap exists so high, it is pertinent to delve deeper, unravelling the intricate web of structural constraints that exacerbate the divide among women in digital inclusion. In doing so, society can endeavour to facilitate equitable distribution of digital benefits, breaking the vicious circle of disadvantage perpetuating the existing divide and aligning our efforts with the broader agenda of sustainable and inclusive development. To moor our modest attempt, we have tried to learn from the work of Lupton, Crenshaw, and Castells to delineate our framework.

Conceptual Framework

Lupton (2014) examines the intersection of digital technologies and social practice and how these technologies influence social life and human interactions. She highlights that digital technologies are deeply embedded in social interactions, shaping how we communicate, form relationships, and engage with communities. Socio-economic status, therefore, significantly affects access to and proficiency with digital tools, underscoring the multifaceted nature of digital inequalities and their impact on marginalized groups.

Crenshaw's concept of intersectionality is crucial for understanding digital stratification. She argues that social categories such as class, race, caste, and age intersect and overlap, creating unique experiences of privilege or disadvantage. Crenshaw further emphasizes that systems of power such as racism, sexism, and classism are interconnected and do not operate independently. This interconnectedness creates inequalities within society. The experiences of individuals are not simply additive but intersect in complex ways, leading to distinct challenges that differ from those faced by more privileged groups (Crenshaw, 1991). Crenshaw's work, therefore, is pivotal in our framework to examine the nuanced and layered nature of digital exclusion, highlighting how these intersecting identities contribute to unique forms of digital inequality.

The seminal work of Castells (2000) is useful as it contends that the foundation of a network society is grounded in a binary division between inclusion and exclusion, as exemplified by digital inequalities between the privileged and the disadvantaged. This type of exclusion differs from previous models, as persistent barriers to accessing information and communication technologies can shape prevailing social networks. Nonetheless, Castells maintains an optimistic outlook, suggesting avenues for social change. He believes that marginalized groups can drive structural transformations by challenging the inherent capitalist informationalism of the network society. Castells views social movements and collective identities as a remedy for the digital divide, though such solutions depend on advancements in information and communication technologies. While a comprehensive network society transformation may be impractical, Castells argues that continued efforts towards positive change must be undertaken in order to address the persistent digital inequalities and exclusion within the network society.

After drawing from and integrating the insights of these three scholars, we move in the next section to discuss the data source as well as the detailed process of analysis.

Data and Research Process

This research drew on data from the fifth round of the National Family Health Survey (NFHS-5), conducted between 2019 and 2021, which investigated a wide range of demographic, socio-economic, and health-related factors across India. NFHS-5 collected data from a substantial sample, interviewing 724,115 women aged 15-49 years. The survey achieved impressive response rates, with 97% for women. NFHS is distinguished by its

large sample size as well. Drawing from NFHS-5, the outcome variables considered in our study have two questions: (1) whether respondents have a mobile phone or not and (2) whether they can use the internet or not. Both variables are dichotomous. The exposure variables considered in the study include educational status, caste, residence, religion, age, and wealth, as guided by existing literature.

The study examined variations in mobile phone affordability and internet use among women based on socio-demographic and economic characteristics using descriptive statistics. The chi-square test was used to assess the statistical significance of variations in the dependent variable. Binary logistic regression was also used to examine the influence of independent variables on the use of digital technologies like mobile phones and the internet. Additionally, a bivariate logistic regression analysis was performed. The logistic regression results were reported as odds ratios and their corresponding p-values and 95% confidence intervals.

Profile of the respondents

Below, in table 1 presents the socio-economic and demographic profile of the study sample. Around 16.64% of women respondents are aged 15-19 years, closely followed by those aged 25-29 years (16.21%) and 20-24 years (15.90%). Respondents aged 30-34 years constitute 14.09%, while the 35-39 years and 40-44 years age groups account for 13.79% and 11.49%, respectively. Women aged 45-49 years constitute about 11.89% of the female population. The majority of the women, around 75%, are Hindu, followed

by Muslims at 12.73%, Christians at 7.59%, and others at 4.76%. A significant proportion, 73.78%, reside in rural areas. Nearly 19.44% of the women are from the poorest households. When looking at caste, we find that 39.43% of women belong to Other Backward Castes (OBC), followed by Scheduled Tribes (20.54%), Others (20.10%), and Scheduled Castes (19.93%). As the table (1) below shows, almost one-fifth of the women lack formal education, while only 14.43% have completed higher education. The remaining women have either completed primary or secondary schooling.

Women with mobile phone and the internet use

The percentage of mobile phone ownership and internet use among women based on different background characteristics is also illustrated in Table 1. Women aged 25-29 years have the highest prevalence of mobile phone ownership, while those aged 15-19 years have the lowest prevalence among all age groups. Regarding internet use, which indicates digital skills, women aged 20-24 years show the highest prevalence, whereas those aged 45-49 years demonstrate the lowest digital skills for internet use among all age groups. Religious affiliation also plays a role in mobile phone and internet access. Christian women have the highest access to mobile phones, followed by women from other religions, Muslims, and Hindus. In terms of internet use, women from Other religious groups show the highest use of the internet, while Muslim women have the lowest. Geographical location is another significant factor, with mobile phone ownership and internet use

being higher among women in urban areas. Economic status also influences these metrics, with the poorest women in India having the lowest access to both mobile phones and the internet. Caste and educational background further differentiate access levels. Women from Other castes have higher access to mobile phones and better internet skills. Conversely, women with no formal education have the lowest access to mobile phones and minimal internet skills.

Table 1 Socio-demographic profile of the respondents and percentage of women using internet and having mobile phone

Variables	Sample (N)	Percentage (%)	Percentage of women having mobile phone	Percentage of women with internet use
Age (in years)				
15–19	106,521	16.64	34.80	42.90
20–24	101795	15.90	62.34	50.31
25–29	103,808	16.21	66.26	42.12
30-34	90212	14.09	64.94	34.59
35-39	88,292	13.79	59.96	25.72
40-44	73590	11.49	52.14	19.15
45-49	76,117	11.89	46.47	13.67
Religion				
Hindu	479,708	74.92	53.11	32.68
Muslim	81,529	12.73	55.73	32.04
Christian	48607	7.59	72.22	44.87
Others	30491	4.76	63.74	46.53
Residence				
Urban	167,896	26.22	70.39	52.91
Rural	472,439	73.78	50.10	27.54
Wealth				
Poorest	124,456	19.44	33.20	10.60
Poorer	136,256	21.28	46.25	20.54
Middle	135,041	21.09	55.81	31.01
Richer	128,947	20.14	65.78	44.72
Richest	115,635	18.06	78.07	67.73
Caste				
Others	124456	20.10	66.20	46.77
Schedule caste	121,239	19.93	48.59	28.43
Schedule tribe	124,945	20.54	53.05	30.40
OBC	239,819	39.43	54.07	32.88
Education				
No education	143079	22.34	33.61	5.12
Primary	74734	11.67	46.17	11.51
Secondary	330091	51.55	58.37	38.44
Higher	92431	14.43	86.10	82.30

Source: NFHS-5

Estimates of the Multivariate Analysis for the Internet Use

Table 2 reports the results of logistic regression that highlight significant factors influencing women's likelihood of using the internet and its association with diverse socio-economic factors among women in India. The results indicate that age is an important factor in digital literacy among women in India. Compared to the 15-19 age group, women aged 20-24 have 4% lower digital literacy. The likelihood of internet use decreases

further with increasing age, with women aged 25-29, 30-34, 35-39, 40-44, and 45-49 having 24%, 39%, 58%, 72%, and 81% lower internet use, respectively, compared to the 15-19 age group. Additionally, the likelihood of internet use is significantly lower among Muslim women compared to Hindu women, while Christians and women of other religious affiliations have higher levels of digital literacy. The results also indicate that region is an important factor, with women in rural areas having 29% lower likelihood of being digitally literate than their urban counterparts. Additionally, wealth influences digital literacy, as women in the Poorer wealth category have 84% higher digital literacy than those in the Poorest category. Furthermore, women in the Middle, Richer, and Richest wealth quantiles have 2.99, 4.73, and 10.37 times higher internet use compared to the Poorest category. This study further identifies that women's caste status affects their likelihood of internet use. Women in Tribal communities had higher odds of internet use compared to those in Scheduled Caste and Other Backward Classes communities, who had lower odds than women from the Other caste category. Education level is also crucial, with women holding primary, secondary, and higher education credentials being more likely to use the internet than those without formal education. The results indicate that women's internet usage is influenced by geographic location, religious affiliation, caste, age, wealth, and educational attainment, revealing disparities and inequalities in women's access to digital technologies.

Estimates of the multivariate analysis for Mobile Phone Ownership

The odds ratios of mobile phone ownership associated with various socio-economic factors among women in India is represented in table 2. The findings indicate that age is a critical factor affecting mobile phone affordability. Women aged 20-24 are 2.84 times more likely to own a mobile phone than those aged 15-19. This likelihood further increases for middle-aged groups, reaching 4.18 times for ages 25-29, 4.65 times for ages 30-34, and 4.24 times for ages 35-39. However, the affordability is lower among women in the older age groups of 40-44 and 45-49, being 3.19 times and 2.73 times, respectively, but higher than the reference group. Religious affiliation is also a significant factor influencing mobile phone ownership among women in India. The study findings indicate that Muslim women are slightly more likely to own mobile phones than their Hindu counterparts. Furthermore, Christian women and those belonging to other religious groups demonstrate 2.56- and 1.40-times greater odds, respectively, of owning mobile phones than Hindu women. Women in rural regions display a 0.25 times lower probability of mobile phone ownership than their urban peers. The study findings indicate that wealth significantly influences mobile phone ownership among women in India. Women in the "Poorer" wealth category are 0.46 times higher likely to own mobile phones compared to those in the "Poorest" category. Furthermore, women in the "Middle" wealth quintile are 1.89 times more likely, while those in the "Richer" and "Richest" quintiles are 2.38 times and

3.30 times more likely, respectively, to own mobile phones compared to the "Poorest" category. Caste is also a significant factor influencing mobile phone ownership among women in India. Specifically, those from Scheduled Caste, Scheduled Tribe, and Other Backward Classes backgrounds exhibit 0.26, 0.9, and 0.19 times lower odds, respectively, of owning a mobile phone compared to women from other caste groups. Additionally, educational attainment plays a crucial role, as women with primary education are 52% more likely to own a mobile phone than those without formal schooling. Furthermore, the odds of mobile phone ownership increase significantly for women with secondary (2.80 times) and higher (7.93 times) levels of education relative to those without formal education. These socio-economic factors have a collaborative role in determining mobile phone affordability among women in India.

Table 2 Estimates of the logistic regression analysis for the Internet Use and Having Mobile Phone (Weighted Data)

Background Characteristics	Internet Use				Having Mobile Phone			
	Odds Ratio	P-value	95% Confidence Interval		Odds Ratio	P-value	95% Confidence Interval	
			Lower	Upper			Lower	Upper
Age								
15-19	Ref				Ref			
20-24	0.96	0.16	0.91	1.01	2.84	0.00	2.70	3.00
25-29	0.76	0.00	0.72	0.80	4.18	0.00	3.97	4.41
30-34	0.61	0.00	0.52	0.65	4.65	0.00	4.40	4.91
35-39	0.42	0.00	0.40	0.45	4.24	0.00	4.01	4.49
40-44	0.28	0.00	0.26	0.30	3.19	0.00	3.01	3.38
45-49	0.19	0.00	0.18	0.21	2.73	0.00	2.57	2.90
Religion								
Hindu	Ref				Ref			
Muslim	0.91	0.00	0.86	0.96	1.07	0.00	1.02	1.13
Christian	2.06	0.00	1.92	2.21	2.56	0.00	2.40	2.74
Others	1.72	0.00	1.59	1.86	1.40	0.00	1.31	1.50
Residence								
Urban	Ref				Ref			
Rural	0.71	0.00	0.68	0.74	0.75	0.00	0.72	0.78
Wealth								
Poorest	Ref				Ref			
Poorer	1.84	0.00	1.72	1.97	1.46	0.00	1.40	1.53
Middle	2.99	0.00	2.80	3.19	1.89	0.00	1.80	1.98
Richer	4.73	0.00	4.42	5.06	2.38	0.00	2.26	2.51
Richest	10.37	0.00	9.62	11.18	3.30	0.00	3.10	3.50
Caste								
Others	Ref				Ref			
Schedule caste	0.75	0.00	0.71	0.79	0.74	0.00	0.71	0.78
Schedule tribe	1.18	0.00	1.10	1.25	0.91	0.00	0.86	0.96
OBC	0.82	0.00	0.76	1.86	0.81	0.00	0.78	0.85
Educational Status								
No education	Ref				Ref			
Primary	1.73	0.00	1.58	1.89	1.52	0.00	1.42	1.60
Secondary	5.06	0.00	4.72	5.42	2.80	0.00	2.69	2.92
Higher	25.31	0.00	23.33	27.47	7.93	0.00	7.42	8.46

Source: NFHS-5

Discussion

To reiterate, and with focus, we see that elderly women possess the fewest mobile phones, indicating age-related deprivation. They are also less likely to use the internet, which limits their access to e-health resources such as digital patient portals, online health information, and teleconsultations. The findings further indicate that Christian women have the highest number of mobile phones, while Muslim women have the lowest. Similarly, Christian and other religious women enjoy relatively better digital affordability compared to Hindu and Muslim women, a trend linked to the overall economic prosperity of communities such as Christians, Jains, and Zoroastrians (Tong, 2022). The digital divide impacts Muslim women the most in terms of internet usage. While Muslim women have higher mobile-phone use and their internet engagement remains lower. This disparity can be attributed to several plausible mechanisms. First, access to a mobile phone does not automatically translate to autonomous, smartphone-based internet access. Second, lower levels of digital literacy and education among these women may significantly reduce their propensity for internet engagement. Third, cultural constraints might restrict women's internet use, even when a device is available. Finally, economic limitations could lead to internet access not being prioritized (Dubey et al., 2024). Christian women improved digital access enhances their use of e-health services, including digital prescriptions and virtual health records, leading to better health-seeking behaviours. In contrast, limited digital access among Muslim women hinders their ability to utilize m-health platforms for maternal care, mental health support, and chronic disease management. This Limited m-health and e-health access perpetuate existing health inequities, as underserved groups struggle to access timely medical advice and care. Regional disparity is also stark. Urban Indian women are nearly 25 percent more likely to own mobile phones compared to their rural counterparts. In rural areas, community, school, or district-level computer training centres are typically residents' first point of contact, but hands-on computer experience is infrequent. Rural women face difficulties accessing e-health platforms due to poor internet infrastructure, limiting telehealth consultations and digital medical records. Structural poverty factors limit internet affordability in rural India. Policies are needed to bridge the divide between the connected and unconnected. Furthermore, low-income families struggle to afford reliable broadband access, exacerbating learning disparities and constraining educational attainment. The study reveals that wealth inequality leads to a secondary form of inequality for underprivileged women, termed digital inequality, exacerbating their lack of access to necessary digital resources. Financial constraints limit access to digital health tools, reducing preventive care engagement and timely treatment, particularly for chronic and maternal health conditions. Our analysis also reinforces the correlation between the longstanding marginalization of the lower caste and the emerging digital divide that disproportionately impacts women. To fully understand the unique causes and consequences of digital exclusion for this population, it is vital

first to recognize the historical deprivation experienced by the Scheduled Caste community (Raj & Raj, 2004). Many Scheduled Caste-majority villages are home to low-wage workers with irregular, meagre incomes. This, coupled with extended income loss, significantly limits the Scheduled Castes' ability to afford phones, computers, and internet access (Rajam et al., 2021). Caste based deprivation also limits access to digital health resources, reinforcing health inequities in preventive care and chronic disease management. The digital divide is correlated to education and ultimately impacting health outcomes, as our findings indicate a strong positive relationship between mobile phone ownership and usage and women's educational attainment in India. Educated women are more capable of acquiring mobile phones than their uneducated counterparts. The lack of digital tools among individuals with poor educational backgrounds reflects their limited earning potential. Owning electronic devices often imposes additional financial strain on low-income households, which are already burdened by other essential expenses. Women with limited education frequently have incomes that fall well below the cost of digital technologies. Furthermore, impoverished families may struggle to afford reliable internet access, further exacerbating educational disparities and constraining learning levels. Uneducated women face a significant disadvantage in digital accessibility compared to their educated peers, ultimately impacting health-seeking behavior.

The intricate structural nexus of digital affordability and accessibility issues among women can be understood through Lupton's concept of digital sociology, where she emphasizes the role of economic capital in accessing digital technologies, indicating that women from lower wealth quintiles have less economic capital, making it difficult for them to afford mobile phones and internet services. Lupton criticized the focus on economic factors alone, emphasizing that social, cultural, and symbolic forms of capital also contribute to the reproduction of power and hierarchies. Technological inequality mirrors broader social stratification, meaning the existing wealth and caste inequality in India translates directly into digital inequality, limiting their digital participation.

As Castells's network society framework offers, those who cannot afford internet access or lack proficiency in its use are considered less valuable in the job market. Education is crucial in developing these skills, placing women from poorly educated backgrounds at a significant disadvantage. This inequality is further exacerbated when considering residence, as over half of India's population lives in rural areas, where women face a substantial gap in mobile phone and internet usage compared to their urban counterparts.

For example, Crenshaw explains individuals are often disadvantaged by multiple sources of oppression related to their gender identity, religion, age, and other identity markers. These intersecting identities shape the specific experiences and challenges people face. The findings indicate that dominant socio-cultural factors, such as religion and age significantly influence the adoption of technological resources.

Conclusion

Initiatives to provide internet access in schools and public spaces can help reduce these disparities. Proper monitoring of cybercrimes against minority communities and women can enhance internet access. Sensitization drives on social platforms should be implemented. Additionally, training programs for the elderly need to be initiated to make them more productive and create an inclusive society for elderly women. These efforts will help overcome systematic barriers and make a more equitable society for women, regardless of their caste, class, education, age, religion, or region. This initiative will create opportunities to integrate marginalized groups into e-health and m-health platforms, enhancing their access to healthcare services. The study also reveals a significant digital disparity for women in India, raising concerns about sustainability and equity in society. As society advances in the digital sphere, where digital skills have become a necessity, it is crucial to bridge the digital gender gap for all. Addressing this gap will open new opportunities for women and reduce its impact. Digital literacy will enhance their productivity and provide access to health informatics. Additionally, it can enrich women's lives by offering access to diverse forms of entertainment, social connections, and information, thereby contributing to their overall well-being and empowerment. Empowering women digitally in India will also support the achievement of Sustainable Development Goal (SDG) 4, which aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all," and SDG 5, which seeks to "achieve gender equality and empower all women and girls."

To address this issue, the government should focus on bridging the gendered divide in literacy and residence. Additionally, telecom industries must expand their digital network reach to remote regions currently excluded from the digital inclusion discourse. Improving infrastructure in these areas will provide rural women with necessary access to digital resources. Furthermore, public and private stakeholders should organize comprehensive digital literacy and awareness campaigns to enhance rural women's proficiency with computers, laptops, and smartphones. These initiatives could include hands-on training sessions, community workshops, and awareness drives to ensure that rural women are not only able to access digital technologies but also use them effectively.

Ethical Statement: This research paper is based on a secondary data, National family Heath Survey, which is available in the public domain. Therefore, there is no conflict of interest in the research and its communication.

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