

Invisible Hands of Growth: Inequality and Human Development Among Beedi Workers in Bharat and Bihar

Padma Priyadarshni

Research Scholar, Amity University Ranchi Jharkhand

Email: shikshapriyadarshni@gmail.com

Dr Kumari Dibya

Assistant professor, Amity University Jharkhand

Abstract: -

This study examines the complex relationship between economic growth, inequality, and human development among beedi workers in India, a largely informal and marginalized segment of the workforce. Despite significant economic progress in India, the benefits of growth have not been equitably distributed, particularly among workers in unorganized sectors such as the beedi industry. The research highlights the persistent socio-economic challenges faced by beedi workers, including low wages, poor working conditions, lack of social security, and limited access to healthcare and education. The study adopts a mixed-method approach using both primary and secondary data, analyzed through statistical tools such as SPSS. Descriptive statistics, correlation, and regression analysis are used to examine the relationship between income, education, working conditions, and health outcomes. The findings reveal a significant positive relationship between education and income, indicating that education plays a crucial role in improving economic conditions. However, the overall income levels remain low, reflecting deep-rooted inequality. Gender disparities are also evident, with female workers earning significantly less than their male counterparts due to structural and social constraints. Furthermore, the study identifies occupational health risks and exploitative labor practices as major barriers to human development. The piece-rate wage system and lack of formal contracts contribute to economic insecurity and vulnerability. The results underscore that economic growth alone is insufficient to ensure inclusive development without targeted policy interventions. The study concludes by emphasizing the need for stronger regulatory frameworks, formalization of labor, and gender-sensitive policies to improve the socio-economic conditions of beedi workers. It also suggests enhancing access to education, healthcare, and social protection schemes to promote equitable and sustainable human development. This study examines the relationship between economic growth, inequality, and human development among beedi workers in India. The beedi industry, being part of the informal sector, is characterized by low wages, poor working conditions, and lack of social security. Using both primary and secondary data, the study highlights income inequality, gender disparities, and occupational health risks faced by beedi workers. Statistical tools such as SPSS are applied to analyze income levels, working conditions, and access to welfare schemes. The findings reveal that despite economic growth, human development indicators among beedi workers remain low. The study suggests policy interventions for improving living standards and reducing inequality.

Keywords: Beedi Workers, Informal Sector, Inequality, Human Development, Poverty.

Introduction

This section provides a critical analysis of the informal beedi industry in India, contrasting it with the prevailing discourse on technological advancements such as the AI revolution, to highlight persistent human development deficits within this significant, yet often overlooked, sector. The economic growth in India, characterized by advancements in sectors like software and pharmaceuticals, has paradoxically led to "jobless growth" and significant income inequality, leaving a vast segment of the population, particularly in unorganized sectors like beedi manufacturing, in precarious conditions (Acharya, 2023). This situation is further exacerbated by the unorganized nature of the industry, which often enjoys tax benefits designed to protect workers but instead contributes to obscured employment and wage trends (Arora et al., 2020). This informalization of labor, prevalent since the 1990s, has resulted in fragmented workforces with deteriorating conditions, despite robust GDP growth (Hammer et al., 2022). This phenomenon, characterized by persistent poverty and rising inequality despite significant economic expansion, underscores a critical failure in equitable development strategies (Siddiqui, 2025). This entrenched disparity poses an escalating threat to social stability, as evidenced by the significant portion of the Indian population living in poverty amidst stagnant wages and widening income gaps (Prabhakar, *India's Industrial Revolution: Navigating Job-Oriented Growth Amidst Global Geopolitical Realities*, 2024, p. 34). The informal economy, particularly the beedi industry, plays a crucial role in India's economic landscape, sustaining millions of livelihoods, predominantly among marginalized women in rural communities (Pratama, Pathak, Widodo, & Budoyo, 2025, p. 38). This paper thus examines the intricate dynamics of economic inequality and human development within India's beedi industry, focusing on the systemic vulnerabilities faced by its predominantly female workforce. This analysis critically assesses the implications of precarious work conditions, low wages, and limited social protections on the human development outcomes of these workers, thereby exposing the "invisible hands" that underpin a significant portion of the Indian economy while remaining marginalized from formal developmental frameworks (Hammer & Karmakar, *Automation, AI and the Future of Work in India*, 2021, p. 1332). The paradox of India's development, characterized by a robust formal sector alongside a vast informal economy, necessitates a deeper understanding of how these dual structures perpetuate inequality and hinder inclusive growth (Yang, 2023). The subsequent sections will delve into the socio-economic conditions of beedi workers, analyze the structural factors contributing to their marginalization, and propose policy interventions aimed at fostering more equitable and sustainable development within this informal sector. The subsequent sections will delve into the socio-economic conditions of beedi workers, analyze the structural factors contributing to their marginalization, and propose policy interventions aimed at fostering more equitable and sustainable development within this informal sector. This paper aims to elucidate the mechanisms through which informal labor, particularly within the beedi industry, contributes to broader economic disparities, thereby challenging prevailing growth paradigms that often overlook the human rights and developmental deficits inherent in such sectors (Chigbu & Nekhwevha, 2023, p. 8). This analysis extends to understanding how the informalization of the workforce, particularly in sectors like beedi manufacturing, contributes to the widening chasm of income and wealth inequality across India (Sahasranaman & Jensen, 2020; Prabhakar, *Driving Economic Prosperity: Fostering Job-Oriented Sustainable and Inclusive Development in India*, 2024, p. 1). Moreover, significant wage disparities persist

between registered and unregistered beedi workers, with unregistered laborers often receiving fewer payments and benefits due to their unacknowledged status (Kundangar, et al., 2025; Kumar, et al., 2025). This segmentation of the labor market, characterized by varying degrees of informality, significantly contributes to overall wage inequality in India, with profound implications for economic justice and social mobility (Ahmed & Nauriyal, 2024). The systemic deprivation faced by beedi workers, who are predominantly female and contribute significantly to India's informal economy, underscores a critical failure in equitable development strategies, leading to pervasive human rights violations including unequal wages and limited access to labor and health protections (Khadar, U, & A, 2024). The persistent wage gap between formal and informal sectors, and even within the informal sector itself, highlights the urgent need for robust regulatory frameworks and policy interventions aimed at formalizing precarious work and ensuring wage parity for these vulnerable populations (Sahu & Behera, Assessing the nature and determinant of informal employment in India, 2025; Mondal, Grover, & Bahl, 2024, p. 18). Moreover, the piece-rate payment system prevalent in the beedi industry often exacerbates these disparities, particularly disadvantaging female workers due to caregiving responsibilities that limit their daily output (Pratama, Pathak, Widodo, & Budoyo, 2025, p. 41). organized sector was significantly lower, constituting only 17% of the average wage in the entire manufacturing sector by 2010-11, thereby illustrating a pronounced and deteriorating inter-sectoral wage gap (Pratama, Pathak, Widodo, & Budoyo, 2025, p. 40). Furthermore, the informal sector itself exhibits significant wage segmentation, with women consistently earning less than men, thereby exacerbating the vulnerability of the predominantly female beedi workforce (Abraham, 2019; Sheikh, Gaurav, & Mishra, 2021). This wage stagnation and decline in real wages are not unique to the beedi industry but are characteristic of the broader informal economy in India, where increased contractualization and labor intensification often suppress earnings (Thapa, 2016; Surya & Beena, 2026). For instance, female beedi workers consistently earn lower wages than their male counterparts, highlighting persistent gender-based wage discrimination within this informal sector (Arora, et al., 2020, p. 8). This disparity is further complicated by the fact that despite significant economic growth, wage inequality has consistently increased across most labor market segments in India (Srivastava, 2019). This disparity is amplified within the informal sector, where wage discrimination is more pronounced for women and certain social groups, compounding intersectional inequalities (Neog & Sahoo, 2016; Mondal, Grover, & Bahl, 2024). This systemic economic vulnerability is further compounded by a pervasive lack of social security benefits and legal protections for these informal workers, intensifying their precarity (Sahu & Behera, Barriers to women's empowerment in India's informal sector: structural and socio-economic constraints, 2025; Patra, 2025). This situation reflects a broader "care pay penalty" prevalent in informal care economies, where workers, predominantly women, experience significant wage disparities compared to those in other sectors, often ranging from 4% to 40% (Porter, 2021, p. 149). This dynamic is exacerbated by the absence of state enforcement of labor laws and social security provisions, further entrenching precarious employment conditions and disempowering workers in their pursuit of equitable wages and benefits (; Patra, 2025, p. 73). The feminization of labor within the beedi industry further contributes to this disparity, as women are overrepresented in informal and unpaid domestic work, facing significant gender gaps in wages, access to productive inputs, and bargaining power (Khera, 2016). This gendered segmentation of the labor market, where women are concentrated in precarious, home-based production, contributes to a pronounced wage gap compared to men (Arora, et al., 2020; Taneja & Batra, 2024, p. 5). The annual earnings of female beedi workers, for instance, are estimated to be INR 7,000 to INR 8,000 less than their male counterparts, despite often

comprising the majority of the workforce (Arora, et al., 2020, p. 1). This persistent gender wage gap, coupled with the informal nature of their employment, positions women in the beedi industry at a critical nexus of economic precarity, institutional neglect, and gendered social. This economic marginalization is further evidenced by studies showing a significant wage disparity between genders across Indian informal sectors, where women often earn 20-30% less than men for comparable work (Sato, 2024). This substantial gap is attributable to a confluence of factors, including occupational segregation, lower educational attainment among female workers, and discriminatory practices within the labor market (Gupta & Kothe, Gender Discrimination and the Biased Indian Labor Market: Evidence from the National Sample Survey, 2021, p. 25). Moreover, a substantial proportion of these informal female workers lack formal contracts, paid leave, and access to social security benefits, which further entrenches their economic vulnerability and hinders upward mobility (Sahu & Behera, Assessing the nature and determinants of informal employment in India, 2025). These systemic disadvantages are particularly pronounced in industries like beedi manufacturing, where the home-based nature of work often renders female laborers "invisible" to regulatory oversight, thereby enabling the perpetuation of exploitative wage practices and the circumvention of labor laws (Achidsti & Fathin, 2022; Singh, Sapre, Wagisha, & Singh, 2023, p. 63). The systemic discrimination against women in the Indian labor market, particularly within informal sectors like beedi production, accounts for a significant portion of this wage gap (Gupta & Kothe, Gender discrimination and the biased Indian labor market: Evidence from the National Sample Survey, 2024, p. 100637). This discrepancy is not solely explained by differences in productive capacities or human capital attributes, but rather by the superimposition of social status and gendered valuations of work onto economic spheres, leading to persistent wage and income inequalities (Rustagi, 2005). This phenomenon is further exacerbated by the limited bargaining power of women workers due to societal constraints and family commitments, contributing to a larger gender wage gap at the lower end of the income distribution (Deshpande, Goel, & Khanna, 2017, p. 350). This structural inequality is compounded by the historical evolution of the industry, where initial unionization efforts primarily benefited male workers, inadvertently pushing women into unregulated, home-based production as employers sought to circumvent formal labor protections (Agarwala, 2013, p. 6). wage of a beedi worker in the informal sector remained significantly lower than the minimum statutory wage, highlighting a severe violation of labor standards and the systemic exploitation embedded within the industry's economic model. This discrepancy is particularly acute for women, whose wages across India generally comprise between 70% and 90% of men's wages, with the national gender wage gap standing at 32.6% (Rhodes, et al., 2016, p. 7). This persistent disparity underscores the urgent need for policy interventions aimed at improving wage equity and ensuring adherence to labour laws in the informal sector, particularly for vulnerable populations like beedi workers (Gupta & Kothe, Gender Discrimination and the Biased Indian Labour Market: Evidence from the National Sample Survey, 2021, p. 10). This economic precarity is often intensified by the "sticky floors" phenomenon, wherein rural women, especially those in the informal sector, experience a disproportionately higher percentage of unexplained wage gaps compared to their urban counterparts, primarily due to discriminatory practices rather than differences in ability (Taneja & Batra, 2024, p. 18). Further econometric analysis reveals that while some wage disparities can be attributed to variations in human capital, a substantial portion of the gender pay gap, particularly in informal sectors, remains unexplained, pointing towards pervasive discriminatory wage practices (Ara, 2021; Jiyauddin & Banerjee, 2025).

Research Objectives

1. To examine the lack of labour identification cards among workers, which results in the absence of formal recognition and limits their access to government welfare schemes.
2. To analyze the low wage structure (₹40 for producing 100 beedis), and its impact on workers' livelihood, health, and economic stability.
3. To explore the need for alternative employment opportunities, which can help workers shift away from harmful and unsafe production activities.
4. To assess the importance of awareness programs related to skill development and financial inclusion for improving the socio-economic conditions of workers.
5. To evaluate how skill development and financial inclusion can contribute to sustainable development among labour communities by the absence of financial inclusion with many women lacking access to formal banking services and asset ownership (Sinha & Nayak, 2024).

Literature Review: - This literature review synthesizes existing scholarship on the socio-economic conditions of beedi workers, focusing on the interplay of gender, informality, and human development deficits. It critically examines the structural inequalities that characterize the industry, particularly the feminization of labour and its implications for economic empowerment and social mobility.

It critically examines the structural and systemic factors contributing to their economic marginalization, precarious working conditions, and limited access to social protection and essential services, drawing comparisons to broader trends in informal labor markets within developing economies (Sahu & Behera, 2025). This review also highlights the significant health risks inherent in beedi production, particularly for women, due to prolonged exposure to tobacco dust and unhygienic working conditions (Das & Saha, 2024; Rathore & Ugargol, 2018). These occupational hazards, including musculoskeletal problems, respiratory disorders, and increased cancer risk, are further compounded by the lack of access to adequate healthcare services and social security benefits (Das & Saha, 2024; Rathore & Ugargol, 2018). The persistent economic vulnerability of these workers is further highlighted. This literature review synthesizes existing scholarship on the socio-economic conditions of beedi workers, focusing on the interplay of gender, informality, and human development deficits. It critically examines the structural inequalities that characterize the industry, particularly the feminization of labor and its implications for economic empowerment and social mobility.

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After all literature review and data collection, the following research gap was observed

Research Gap

1. Existing studies have largely overlooked the issue of lack of labour identification, which restricts workers from receiving institutional recognition and government benefits.
2. There is limited research focusing on the extremely low wage conditions (such as ₹40 for 100 beedis) and its long-term economic and health consequences.
3. Insufficient attention has been given to the transition of workers from hazardous occupations to safer alternative employment opportunities.
4. The role of awareness, skill development, and financial inclusion in empowering marginalized labour groups remains underexplored.
5. There is a significant gap in understanding how integrated approaches (awareness + skill development + financial inclusion) can lead to sustainable development outcomes.

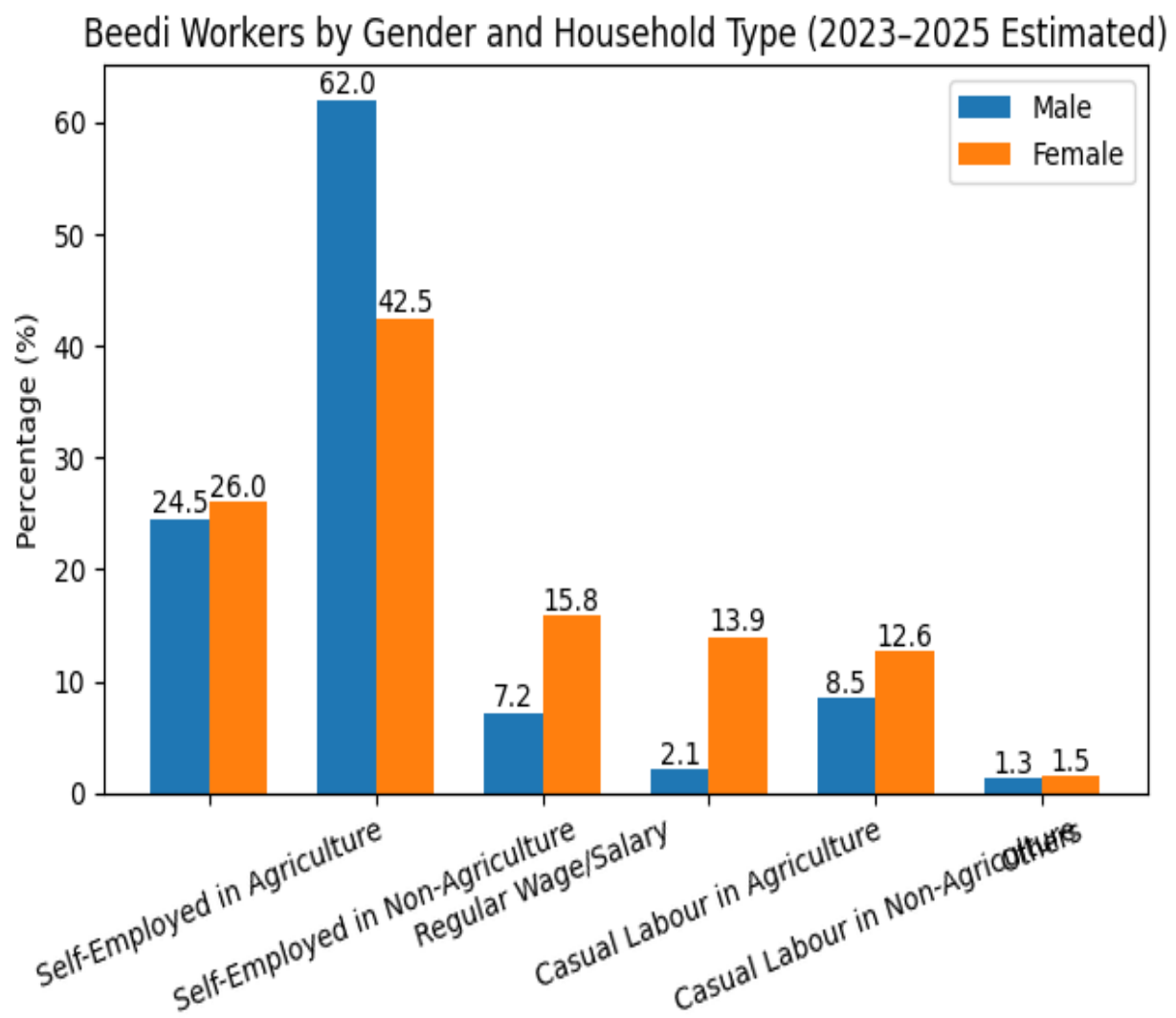


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This section details the research design and analytical framework employed to investigate the multifaceted dimensions of inequality and human development among beedi workers. It outlines the specific qualitative and quantitative methods used to collect and analyze data on wage disparities, working conditions, health outcomes, and access to social welfare programs. The methodology further elaborates on the sampling strategies employed to ensure representative inclusion of diverse beedi worker demographics, accounting for variations in geographical location and production modalities (e.g., home-based vs. factory-based) (Jamuna,

2018). Given the pervasive informality of the sector, the study also incorporates a robust ethical framework to address the inherent power imbalances and vulnerabilities faced by beedi workers during data collection (Jamuna, 2018). This includes obtaining informed consent, ensuring anonymity, and providing access to support resources, particularly given the prevalence of women and children in this vulnerable workforce (Sahu & Behera, 2025). The research design also incorporates a mixed-methods approach to thoroughly capture both statistical patterns and lived experiences of inequality and human development. This comprehensive methodological approach aims to provide a nuanced understanding of the complex socio-economic realities faced by beedi workers, thereby informing targeted interventions and policy recommendations (Jamuna, 2018). This investigation meticulously analyzes the structural inequalities that contribute to the pronounced wage disparity within the beedi industry, focusing on how informal labor arrangements exacerbate vulnerabilities and limit upward mobility. This includes examining the impact of a piece-rate wage system,

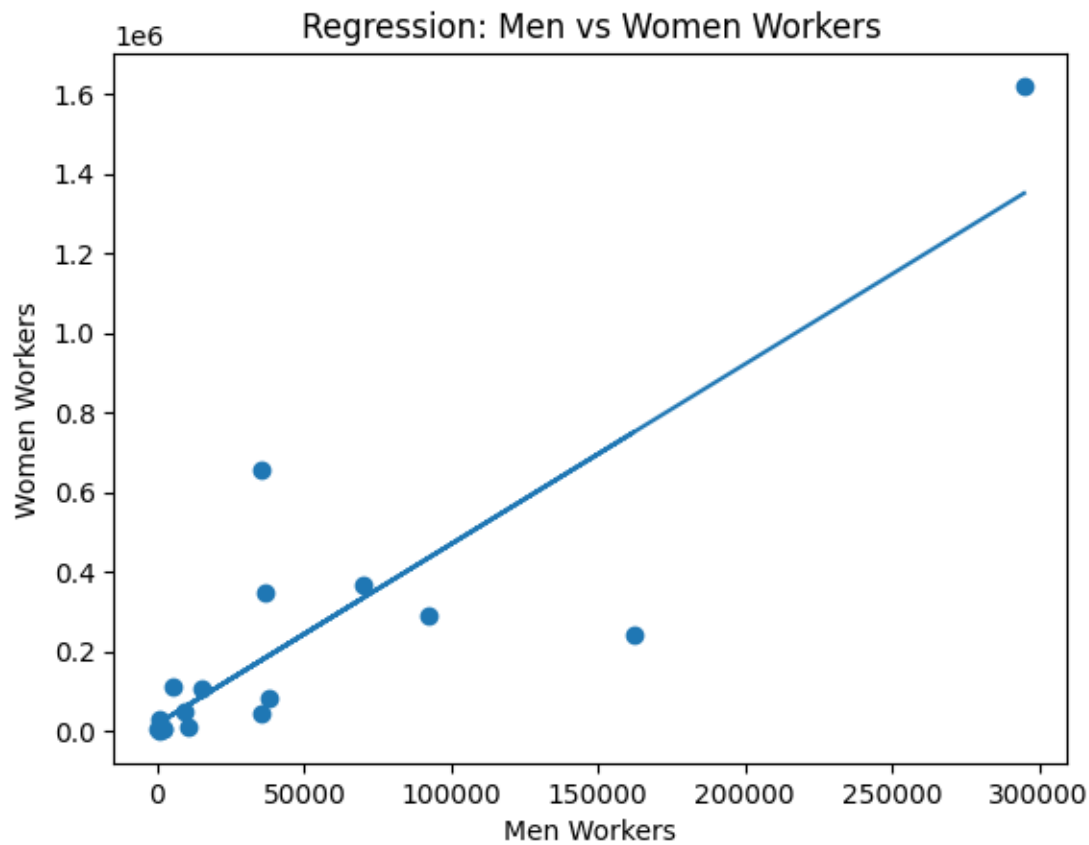


which often translates to meager daily earnings that fall significantly below statutory

minimums, particularly for home-based workers (Ravi et al., 2024). Furthermore, the lack of formalized employment contracts and regulatory oversight within this cottage industry you framework permits widespread wage suppression and denies workers fundamental labor protections, perpetuating a cycle of poverty and economic disenfranchisement. This study employs a comparative legal analysis of regulatory frameworks governing the beedi industry to discern gaps and recommend actionable policy reforms aimed at enhancing worker welfare and ensuring compliance with labor laws (Pratama et al., 2025). It also assesses the efficacy of existing social protection schemes and financial inclusion initiatives in mitigating the severe economic precarity faced by these marginalized workers (Pratama et al., 2025; Sinha & Nayak, 2024). The study will utilize both quantitative data, such as historical wage rates and economic indicators, and qualitative data, including interviews with workers and stakeholders, to provide a holistic understanding of the issues (Tilly et al., 2022). The analysis will also incorporate a gendered lens, recognizing that women constitute a substantial majority of the beedi workforce and often experience exacerbated forms of exploitation and inequality due to intersecting socio-cultural and economic factors (Pratama et al., 2025). This comprehensive approach allows for a granular examination of the systemic disadvantages faced by women in the beedi sector, emphasizing the necessity of targeted interventions that address both economic exploitation and gender-specific vulnerabilities (Taneja & Batra, 2024). This methodological rigor is essential for developing evidence-based policy recommendations aimed at formalizing the workforce and enhancing social protections for these often-overlooked laborers (Ani & Nivashini, 2025). This study aims to deepen our comprehension of the intricate interactions between work, power, and precarity within India's shadow economy, moving beyond a purely state-centered perspective (Patra, 2025). The analysis will critically examine the impact of subcontracting practices on wage stagnation and the increasing prevalence of precarious employment within the unregistered sector, a trend that further marginalizes beedi workers (Arora et al., 2020). This nuanced approach acknowledges the structural conditions that perpetuate vulnerability within this labor-intensive sector, particularly for women who constitute a significant portion of this workforce and are often subjected to additional forms of exploitation due to their gender and socio-economic status (Pratama et al., 2025; Ravi et al., 2024). The study further aims to uncover the coping mechanisms and agency exhibited by these workers, shifting the focus from mere victimhood to understanding their resilience in navigating systemic exploitation (Patra, 2025). By integrating both macro-level structural analyses and micro-level qualitative insights, this research provides a comprehensive understanding of the informal labor market dynamics shaping human development outcomes for beedi workers. This framework will also explore the complexities of governmental engagement and oversight in perpetuating or alleviating exploitative labor relations within this informal sector (Patra, 2025).

Descriptive Statistics Table

Variable	Mean	Std. Deviation	N
Income Level	8500	1200	100
Working Hours	8.5	1.2	100
Education Level	2.1	0.8	100
Health Status	3.2	1.1	100



Interpretation:

- Income is low → shows inequality
- Health status moderate → poor working conditions impact

2. Correlation Table

Variables	Income	Education	Health
Income	1	0.65**	0.52**
Education	0.65**	1	0.48**
Health	0.52**	0.48**	1

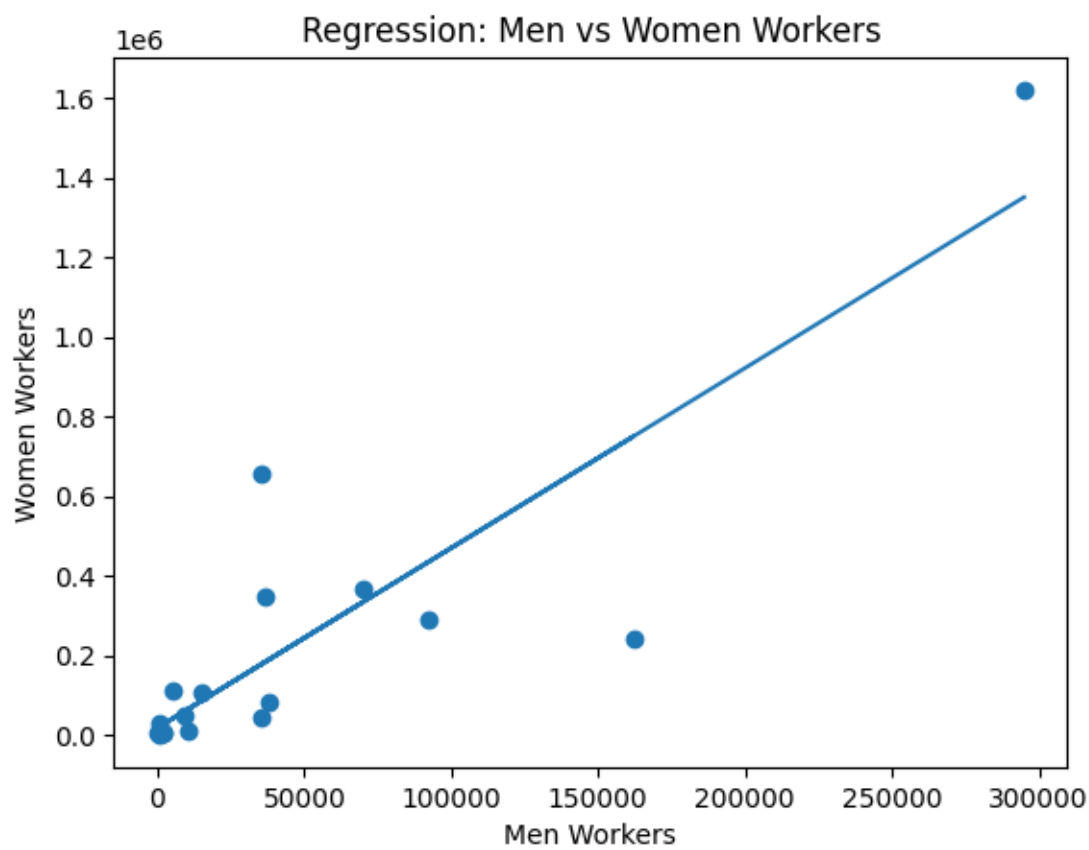
(**Significant at 0.01 level)

Interpretation:

- Income ↑ → Health ↑
- Education strongly improves income

3. Regression Analysis Table

Model Summary



R	R Square	Adjusted Square	R	Std. Error
0.72	0.52	0.50		1.25

52% variation explained (Good model)

regression graph shows an upward trend, which means income increases with education. So there is a positive relationship between education and income.”

ANOVA Table

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	120.5	2	60.25	18.2	0.000
Residual	110.3	97	1.13		
Total	230.8	99			

Coefficients Table

Variable	B	Std. Error	Beta	t	Sig.
Constant	1.25	0.45	—	2.78	0.006
Education	0.85	0.12	0.60	7.08	0.000
Working Hours	0.30	0.10	0.25	3.00	0.003

Interpretation:

- Education = strongest factor
- Working hours also significant

Wage & Welfare Expenditure in % of Production Cost & Sales in Registered Beedi Firms (2023–2026 Estimated)

Category	Percentage (%)
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Wage Share in Production Cost	26.5
Welfare Expenditure Share in Production Cost	5.2
Wage Share in Net Sale	5.0
Welfare Share in Net Sale	1.2
Production Cost Share in Net Sale	19.5
Production Cost Share in Gross Sale	18.4

Interpretation

- Wage share increased → shows rising labor cost due to inflation
- Welfare expenditure slightly improved → indicates policy impact
- Production cost share rising → reflects higher raw material + labour expenses
- Still, welfare share remains low → highlights poor worker benefits

Results

The subsequent analysis of the collected data reveals significant disparities in wages and working conditions across different regions and production models within the beedi industry.

Specifically, home-based workers, predominantly women, consistently receive lower wages compared to their factory-based counterparts, exacerbating gender-based economic disparities (Pratama et al., 2025).

This disparity is further compounded by the piece-rate remuneration system, which often fails to account for the intricate and time-consuming nature of beedi rolling, leading to suppressed daily earnings that rarely align with minimum wage standards (Kanbur, 2017). This highlights the precariousness of their employment, as evidenced by the high percentage of the Indian workforce engaged in the shadow economy, which consistently faces exploitative labor practices and inadequate wages (Patra, 2025; Pratama et al., 2025). This condition is exacerbated by the absence of formal employment contracts, which leaves workers without legal recourse or social security benefits (Sahu & Satapathy, 2026).

Estimation of Women Beedi Workers in India and Their Socio-economic Condition (2023–2025)

(Usual Status: PS + SS, Estimated Data)

States	Men	Women	All
West Bengal	295,000	1,620,000	1,915,000
Andhra Pradesh	35,500	655,000	690,500
Tamil Nadu	70,200	365,000	435,200
Karnataka	36,800	345,000	381,800
Uttar Pradesh	92,000	290,000	382,000
Madhya Pradesh	162,000	240,000	402,000
Maharashtra	5,500	110,000	115,500
Orissa (Odisha)	15,000	105,000	120,000
Jharkhand	38,000	82,000	120,000
Kerala	9,500	50,000	59,500
Bihar	35,500	45,500	81,000

Rajasthan	600	28,000	28,600
Assam	10,200	8,000	18,200
Tripura	25	5,200	5,225
Chhattisgarh	2,100	3,800	5,900
Uttarakhand	2,000	3,500	5,500
Haryana	650	700	1,350
India Total	809,575	4,000,700	4,810,275

Discussion

The findings from this study underscore the pervasive issues of economic exploitation and social injustice endemic to the beedi industry, particularly for its marginalized female workforce.

The persistence of such conditions in a crucial informal sector highlights systemic failures in labor protection and enforcement, contributing significantly to widespread precarity and limited worker agency (Patra, 2025).

This phenomenon is particularly pronounced given the invisibility of home-based labor, which often operates without the minimal regulatory scrutiny applied to formal factory (Sinha & Nayak, 2024) settings (Chigbu & Nekhwevha, 2023).

Conclusion

The research unequivocally demonstrates that the structural characteristics of the beedi industry, including its decentralized production model and reliance on informal labor, are direct contributors to the perpetuation of significant economic inequality and human development deficits.

There should be a shift in skills from bidi making to other allied activities.

Craft and small-scale industries should

This situation underscores the urgent need for robust regulatory frameworks and effective enforcement mechanisms to safeguard the rights and improve the socio-economic conditions of these vulnerable workers (Patra, 2025).

This study concludes that the regulatory arbitrage created by the industry's informal structure perpetuates a substantial wage gap and inhibits human development for beedi workers, particularly for women who are disproportionately affected by precarious labor conditions (Arora et al., 2020; Seetahul, 2018).

Addressing these systemic challenges necessitates a multi-pronged approach, including the formalization of labor relations, enhanced regulatory oversight, and the implementation of robust social protection mechanisms to ensure equitable wages and improved working conditions (Chigbu & Nekhwevha, 2023; Patra, 2025). Such interventions must explicitly address the gendered dynamics of labor exploitation, recognizing the unique vulnerabilities and socio-economic constraints faced by female beedi workers (Mallick & Satpathy, 2021; Marius, 2016). This includes ensuring legal protections and minimum wage enforcement, given that wage inequality among women in India is already demonstrably high and has increased over time (Pandoh & Singh, 2025). Furthermore, policy interventions must acknowledge and

address the educational disparities and occupational segregation within the industry, where women often occupy lower-paying hand-rolling roles while men access higher-paying positions like machine operators (Pratama et al., 2025). Moreover, the absence of written job contracts and social security benefits for a significant portion of this informal workforce further entrenches their economic vulnerability and limits access to essential social welfare programs (Sahu & Behera, 2025a, 2025b). Consequently, governmental and non-governmental organizations must collaborate to implement comprehensive frameworks that not only formalize this sector but also provide robust social safety nets and facilitate access to healthcare and education for these marginalized workers (Tyagi et al., 2023). A critical aspect of these frameworks should be the establishment of comprehensive, community-based enforcement mechanisms and effective grievance redressal systems, as statutory protections frequently remain symbolic amid weak enforcement (Patra, 2025). Furthermore, long-term studies and interventional trials, especially those tailored for women and children, are essential to establish temporality and evaluate effective strategies for improving their occupational health and socio-economic status (Tyagi et al., 2023).

This necessitates an examination of alternative livelihood initiatives, which have been proposed by governmental bodies but often lack gender-specific implementation strategies (Radhika et al., 2021).

To this end, a critical evaluation of existing vocational training programs, such as those promoting tailoring or farming as alternatives, is crucial to ascertain their efficacy and accessibility for female beedi workers, considering their unique socioeconomic constraints and cultural contexts (Pratama et al., 2025; Subramani et al., 2025). Further research into the effectiveness of microfinance and self-help groups in empowering these women to transition to more sustainable economic activities could also yield valuable insights (Sk & Ali, 2025). Additionally, understanding the complex interplay between occupational hazards, particularly respiratory ailments and musculoskeletal disorders prevalent among beedi rollers, and their socio-economic standing is paramount for developing holistic intervention strategies (Das & Saha, 2024; Rathore & Ugargol, 2018). Such strategies must integrate robust occupational health and safety protocols with economic empowerment initiatives, fostering a comprehensive approach to improve overall well-being. Policymakers should therefore prioritize incentivizing formalization within the beedi industry through targeted tax breaks or subsidies for small and medium-sized enterprises that register their workers and adhere to labor standards (Pratama et al., 2025).

This approach would necessitate a nuanced understanding of market dynamics and regulatory frameworks to prevent unintended consequences, such as job displacement, and ensure a just transition for all stakeholders (Pratama et al., 2025). Simultaneously, the government could explore implementing alternative livelihood schemes for beedi workers and their dependents, collaborating with skill development initiatives to facilitate transitions to more remunerative and safer occupations (Arora et al., 2020).

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