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Are Women Poorer? Empirical Insights from Rural Odisha

Surya Narayan Biswal, Santosh Kumar Mishra*, Minaketan Sarangi

Department of Humanities and Social Sciences, ITER, Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar, Odisha, India-751030. *Corresponding Author's Email: skmtite@gmail.com

Abstract

The present study assesses the status and determinants of multidimensional poverty in eight blocks of Jagatsinghpur district. Five socio-economic dimensions comprising fifteen indicators have been considered to construct the Multidimensional Poverty Index, using the Alkire-Foster Method at the individual level. Assessment of multidimensional poverty at the block level and for women for the first time in Odisha justifies the study's novelty. The study revealed the skewed distribution of multidimensional poverty towards women. Women are more deprived in comparison to men in education, employment, asset ownership, possession of agricultural land, and organization of community-level activities. Variation in multidimensional poverty is also observed across eight blocks under study. Binomial logistic regression analysis indicates the significant negative effect of age, education, and occupation on multidimensional poverty. The findings of the study suggest not only the reorientation of government policies in increasing women's educational level, employability skills, and appropriate self-employment opportunities through women's self-help groups but also their strict implementation to empower women and reduce multidimensional poverty.

Keywords: Alkire-Foster Approach, Binomial Logistic Regression, Gender Poverty, Multidimensional Poverty, Odisha.

Introduction

Leaving no one behind (LNOB), the transformative promise of the 2030 agenda for sustainable development goals (SDGs) represents the unequivocal commitment of all UN Member States to eradicate poverty in all its forms, end discrimination - including gender discrimination and exclusion, and reduce the inequalities and vulnerabilities that leave individuals, families, and whole communities marginalized and excluded. LNOB not only entails reaching the poorest of the poor but also combats discrimination and rising inequalities within and amongst countries and their root causes. Gender refers to socially constructed roles and responsibilities of women, men, girls, and boys, and the differences in these roles and responsibilities stem from families, societies, and cultures (1). Gender inequality is prevalent across diverse strata of society, but it is more pronounced among the poor (2). It demonstrates the dissimilarity in the status of women and men in fulfilling basic human rights (3). In recent years, gender inequality has not only been regarded as a source of women's poverty but also a hindrance in the path of development in general. It is reflected in the worsening living conditions of women caused by inadequate access to economic resources (4, 5), income differences between males and females (4, 5), social protection gaps, and asset ownership (4, 6). The inability of the laws and regulations to protect women's equal rights, the prevailing system of marriage, and customs in rural areas are also treated as common characteristics of women's poverty (6, 7). Albeit human resources are regarded as the best resource available in the world with equal contribution of women and men to society's well-being, still a continuous debate goes over the paradoxical situation of whether women are better off than men in terms of the poverty level (8). Thus, gender mainstreaming and LNOB have become strong policy instruments to reduce poverty and gender inequality in recent years (2). Poverty has been widely recognized as a socioeconomic malady that is caused by the lack of bare necessities of human life, such as education, health, food, clothing, and shelter. The traditional one-dimensional

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measurement of poverty, estimated through people's income or consumption expenditure, overlooks other aspects of human life such as nutrition, health, education, access to clean drinking water and basic sanitation facilities, access to electricity, and many more (9-11). Some non-monetary attributes such as life expectancy, liberty, public goods, and happiness also matter for people's miserable conditions that are not purchased from the market by paying money (12). NITI Aayog, GoI, in its 2023 annual report, also points out that individuals facing deprivations due to the lack of choices and opportunities tend to be left behind and unable to reap benefits from economic growth, innovation, and globalization (13). As poverty is influenced by several non-money-metric dimensions, such as health, education, living standards, and economic activities, it is globally recognized as a multidimensional phenomenon that affects individuals across genders, ages, geographic regions, and ethnic groups (14). The international community has put more emphasis on eradicating poverty across the entire globe (15). UNDP's SDG is a milestone in this direction that aims to fight against extreme poverty, which goes beyond the income dimension (15).

Multidimensional Poverty, a joint venture of the OPHI and the UNDP, published the multidimensional poverty index (MPI) score globally for the first time in the year 2010 by including three dimensions of well-being: education, health, and living standards with a range of indicators under each dimension (12). Education enhances people's knowledge and skills, allowing them to participate in different productive activities and enlarge their mindset to participate in socio-economic and political spheres (16). Good health is fundamental for maintaining an adequate life as it enhances the individual's work efficiency (6). Deprived individuals in health aspects reduce their work efficiency and productivity and thereby fail to achieve development in attaining higher levels of education, availing better job opportunities, and maintaining improved living standards, which subsequently push them to the ambit of multidimensional poverty. The standard of living resembles the individual's quality of life and resource bases such as access to housing, basic services, and asset holding. According to prof. Amartya Sen, living standards can be seen as the freedom of individuals related to material capabilities (17). The economic dimension signifies an individual's engagement in productive activities to enhance their well-being. Economically better-off individuals can achieve other areas of well-being, such as improved healthcare facilities, better education facilities, and improved living conditions. In contrast, economically deprived individuals suffer from psychological stress, loss of motivation and self-confidence that upsurge ailments and morbidity, disruption of family relationships, social exclusion, and gender unevenness (7, 12, 16). Distinct researchers in their multidimensional poverty study accounts for different indicators under the education dimension, such as completing five years of schooling (18, 19), completing six years of schooling (4, 16, 20, 21), and completing eight years of schooling (12), BMI (7, 10, 12, 16, 20, 22), health/medical insurance (11, 12, 16, 22), immunization/vaccination (16, 20), self-reporting health status, chronic disease, and hospitalization (10), incident of morbidity and illness (23) under health dimension, housing conditions (4, 6, 11), access to safe and clean drinking water (4, 11, 12, 15, 16, 21, 22), access to improved sanitation facilities (4, 9, 11, 21, 22), access to electricity (6, 9, 11, 22), access to clean cooking fuel (4, 9, 11, 12, 16, 21, 22, 24), and ownership of assets (4, 9, 11, 12, 18) under the standard of living dimension; employment status (7, 12, 15, 16), possession of agricultural land (16, 18), possession of savings bank account (11, 16) under economic dimension; organization and participation in community-level activities under social connectedness dimension (16). Feminist scholars have paid more attention to the gender experiences of poverty since the 1990s (25). The differences in the opportunities and income among female family members, which are responsible for differences in relative poverty among households, form the background of the feminization of poverty (5). The empirical study on gender-based multidimensional poverty in China reveals that women are more disadvantaged in terms of access to primary education, nutritional status, and income level (10). The same study observed the highest women-men gap of about 14 percent in education, followed by about 10 percent in health conditions and about 5 percent in nutritional status. In the research study relating to

multidimensional poverty among rural women in China, Peng observed that the relative poverty of women in rural households is extensive and broader, especially in the economic, humanities, and rights dimensions, women were more deprived than men (7). The same study also revealed that Gender differences in education affect women's income level and their participation in the labor market, and gender differences in income level affect women's production level, decision-making, and the possession of household assets and resources, which increases the possibilities of women's poverty. In a similar type of study conducted in Antalya, Turkey, it was observed that about half of the women don't have a formal employment contract with their employer, while most of them work for more than eight hours per day (26). The same study also revealed that physical abuse and insecurity in jobs are the major reasons for women's poverty. Another multidimensional poverty study in Nigeria found that low income and limited access to resources and opportunities reduce women's bargaining power and aggravate their poverty levels (4). Soni and Bakhru, in their study relating to gendered poverty in the South Asia region, observed that women are economically, socially, and physically more deprived than men, and they are primarily regarded as unpaid laborers engaged in household activities and even receive no regard from the male household member and are often victims of abuse (27). Petesch and Badstue, in their study relating to gender norms and poverty dynamics in 32 villages of South Asia, observed that diverse gender norms constrain women's productive roles, strongly discourage their presence in the public sphere, and restrict their movement to marketplaces without accompanied by a male relative (28). Munawar *et al*., in their feminization of poverty study in rural Pakistan, observed that women were primarily running with financial difficulties that led them to consume fewer calories and suffer under bad health conditions, which in turn led the school-going household members to lack of education (29). Zulfikar and Malik, in their study relating to the feminization of poverty in urban slums of Pakistan, observed that poverty is the consequence of intra-household gender disparities arising from the prevailing patriarchal structure that compels women to obey all the major decisions of their lives and the lives of their children (30). In the study relating to gender poverty in Bangladesh, Kabir observed that women live more in poverty due to their non-participation in income-earning activities because of different social barriers they face than men (31). Dash *et al*., in their study relating to women and poverty in India, observed that women are poorer than men in several indicators of poverty, such as educational attainment, political representation, health, and equality in the workplace (32). The same study also revealed that because of women's low participation in the labor force, their income levels are also lower, which leads to women being inferior to men in all aspects. Sahoo *et al*., in their study relating to multidimensional deprivation among social groups in rural India, observed that multidimensional deprivation is much higher among rural households in the ST and SC categories than among other social groups (33). The same study also observed that SC households in the central and northeastern parts of the country experience severe multidimensional deprivations, whereas ST households in central and eastern Indian states experience acute deprivation, with Odisha experiencing the highest level of deprivation of 0.663 Multidimensional Deprivation Index (MDI) value. Considering all the social groups, the above study also revealed that the central and the eastern regions are comparatively more deprived than the other regions of the country due to households' poor performance in most of the indicators of MDI relating to housing, basic amenities, and social and economic dimensions. An empirical study on women's empowerment and multidimensional poverty in rural Odisha revealed that more than two-thirds of women are deprived of employment and asset ownership, and half of the women are deprived of nutrition, sanitation, and in using clean cooking fuel in the study area (20). Biswal *et al*., in their study relating to the feminization of multidimensional poverty in Odisha, observed that females are more deprived in different dimensions of poverty, such as education, health, living standard, empowerment, environment, autonomy, and social relationships than males due to the lower level of educational background of females and their economic deprivation (16). From the above discussion, it can be inferred that multidimensional poverty is skewed towards women and stems from their limited access to

higher education, improved health and nutrition, sanitation, employment, and asset ownership.

Odisha, an eastern Indian state, occupied the 8th topmost position among 28 Indian states in poverty and was recognized as a state with the steepest decline in the number of multidimensionally poor people by 13.65 percent, from 29.34 percent in NFHS 4 (2015-16) to 15.68 percent in NFHS 5 (2019-21) (13). NFHS-5 information also reveals that the overall MPI score for the state was estimated at 0.070, whereas for the rural and urban regions of the state, it was 0.079 and 0.023, respectively. For the same period, Odisha occupied 3rd topmost position among 28 Indian states according to deprivation in improved sanitation facility, 4th top most position in using clean cooking fuel, 7th topmost position simultaneously in three indicators of multidimensional poverty, i.e., access to clean drinking water, access to electricity, and in completed six years of schooling. Despite the implementation of various development programs in the state, about two-thirds of the total population is deprived of using clean cooking fuel, about 40 percent are deprived of access to improved sanitation and better housing facilities, and about one-third of the population is deprived of in nutritional status (13). Against this backdrop, the present study examines the status and determinants of multidimensional poverty among women and men in rural Odisha. Specifically, the objectives of this study are twofold: (i) to assess the status of multidimensional poverty and (ii) to examine the impact of various socioeconomic and demographic variables on multidimensional poverty across gender in rural Odisha. The novelty of this study lies in the block-level analysis of multidimensional poverty for women in rural Odisha. The remaining article is structured as follows: Section 2 discusses the materials and methods, section 3 discusses the results, and section 4 concludes.

Methodology

A multi-stage random sampling technique is used in this study to collect information from individuals aged 18 years and older between January 2021 and March 2021. In the first stage, Jagatsinghpur district is purposefully taken as the sample district, considering the peculiar characteristics of multidimensional poverty. The position of the sample blocks and district is presented in Figure 1 (34).

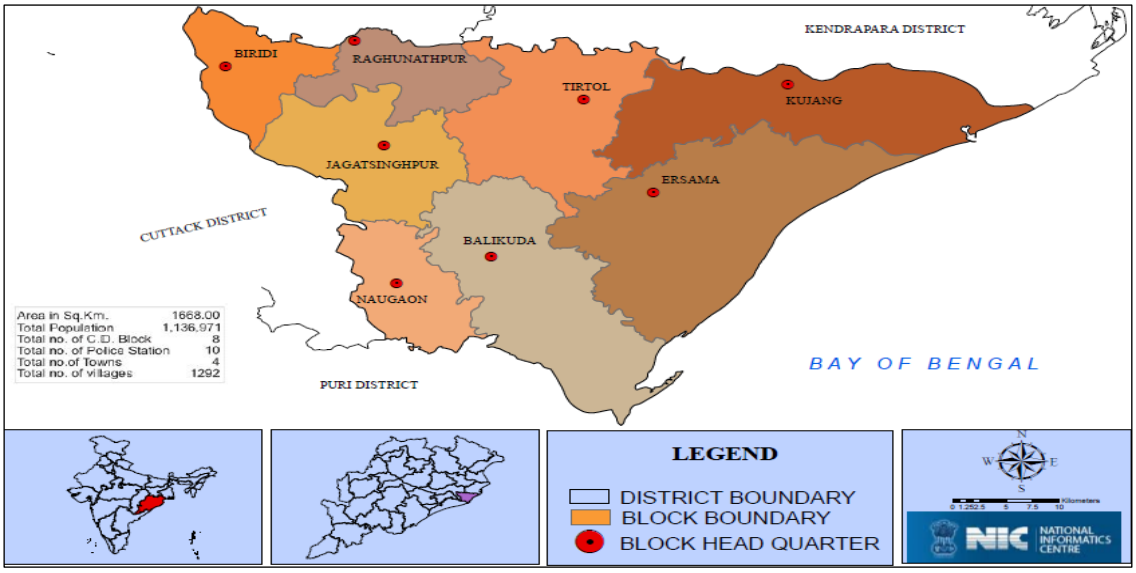


Figure 1: Block Map of Jagatsinghpur District of Odisha

The indicator-wise deprivation status of the sample district vis-a-vis Odisha, as reported by the NITI Aayog, Govt. of India in its "India: National Multidimensional Poverty Index Baseline Report, 2021", is presented in Figure 2 (35). Although Jagatsinghpur is recognized as the 2nd topmost non-poor district in the state, with only 11.83 per cent of people constituting multidimensionally poor still in the district, more than 90 per cent of the people are deprived of using clean cooking fuel, more than two-thirds of people are deprived in access to improved sanitation facilities, about 40 per cent of the people are deprived in better

housing facilities, and about one-fourth people are nutritional deficiency (35).

The second stage constitutes all eight blocks viz., Balikuda, Biridi, Ersama, Jagatsinghpur, Kujang, Naugaon, Raghunathpur, and Tirtol. In the third stage, 16 villages, two villages from each block, were randomly selected for the study. In the fourth stage, 384 sample households out of 2,33,626 households of the district are determined using the Rao-soft online sample size calculator. 16 sample villages, randomly selected, possess 6,092 households, of which sample households for each village are randomly selected. From each sample village, 6.30 [(384/6092) *100] percent of the total households are selected using a simple random sampling technique. Details of the village-wise estimated number of sample households for each of the eight blocks are given in Table 1.To gauge whether one individual or a group is multidimensionally poor or non-poor, the MPI is constructed using the Alkire-Foster (2011) approach with apposite modification (36). Five dimensions and fifteen indicators with equal weighting structures were used to construct MPI. Details of the dimensions, indicators, and weights taken in the study to estimate the multidimensional poverty index are summarised in Table 2.

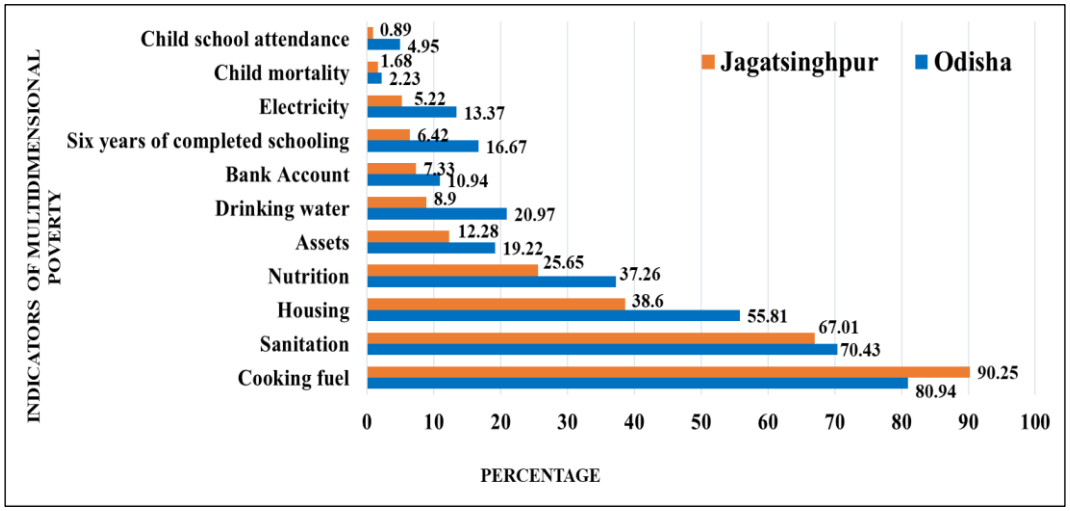


Figure 2: Indicator-Wise Deprivation Status of Odisha and Jagatsinghpur (In %)

Table 1: Sampling Frame

District (State)	Total No of Household	Margin of error	Sample Household Size (in No) at 95% confidence level	Block	Village	Total number of households	Sample Household size (in No)
Jagatsinghpur (Odisha)	2,33,626	5%	384	Balikuda	Nagapur	526	33
					Kalio	346	22
				Biridi	Alando	329	21
					Ranipada	98	6
				Ersama	Kothi	200	13
					Siha	240	15
				Jagatsinghpur	Punanga	537	34
					Raibarei	229	14
				Kujang	Hasina	509	32
					Samagol	464	29
				Naugaon	Gangada	529	33
					Tentoi	472	30
				Raghunathpur	Jaisol	227	14
					Radhanga	320	20
				Tirtol	Bisunpur	573	36
					Kolata	493	31
				Total		6092	384

Note: Census 2011 (Govt. of India) information is used to obtain the total number of households in each sample village, block, and district.

Table 2: MPI (Dimensions, Indicators, and Weights with Deprivation Conditions)

Dimension	Weight	Indicator	Abbreviation	Weight	Deprived if s(he) ...
Education	0.2	Completed eight years of schooling	EDN	0.200	Has not completed at least eight years of schooling.
Health	0.2	Nutritional Status	NUT	0.067	is underweight or overweight or obese as measured by age-specific BMI
		Immunization	IMUN	0.067	Has not taken an age-specific vaccine to prevent infectious diseases, including the COVID-19 vaccine.
		Health Insurance	HINS	0.067	has not enrolled under any (private / government) health / medical insurance scheme
Standard of living	0.2	Housing condition	HOU	0.033	Is living in a house where the housing conditions are inadequate in any of the three components, i.e., floor, roof, or walls.
		Access to electricity	ELEC	0.033	Is living in a house that has no access to electricity.
		Access to clean cooking fuel	FUEL	0.033	Is living in a house that uses dirty cooking fuel such as firewood, coal, and cow dung.
		Access to safe drinking water	WAT	0.033	Is living in a house without access to safe and clean drinking water.
		Access to improved sanitation	SAN	0.033	has practiced open defecation
Economic	0.2	Asset ownership	ASET	0.033	Has not owned the following assets - TV, Mobile phone, electric fan, refrigerator, and motorcycle with gear or without gear.
		Employment	EMP	0.067	Has not engaged in any income-earning activities.
		Possession of Agricultural Land	LAND	0.067	Has not possessed any hectare of agricultural land.
		Possession of savings bank A/C	BANK	0.067	Has not possessed a savings bank A/C either in the bank or in the post office.
Social Inclusion	0.2	Organizing community-level activities	OCOM	0.100	Has not organized any community-level activities.
		Participation in community-level activities	PCOM	0.100	Has not participated in any community-level activities.

Each individual is assigned a deprivation score (**Di**), based on deprivation in the component indicator (**ci**) and the weight assigned to the i^{th} indicator (**wi**). For individual deprivation in the i^{th} indicator, 'ci' was assigned '1', and for non-deprivation, '0'. The composite index for each individual is estimated by using the following equation

$$\mathbf{Di} = \sum_{i=1}^{15} wici = w_1c_1 + w_2c_2 + \ldots\ldots + w_{15}c_{15} \quad \ldots\ldots.[1]$$

Individual deprivation score (**Di**) lies between '0' and '1', where '0' indicates that the individual is non-deprived in all the multidimensional poverty indicators, and '1' indicates that the individual is deprived in all the multidimensional poverty indicators.

MPI across different groups is estimated by computing the incidence of poverty (**H**) and intensity of poverty (**A**). Incidence of poverty (**H**) is estimated by the formula '**q/n**', where 'q' is the total

number of individuals whose overall deprivation score (**Di**) is ≥ 0.3333, and 'n' is the total sample size. The intensity of poverty **(A)** is estimated by the formula '∑Di/q,' i.e., the average deprivation score of multidimensionally poor individuals in a specific group. The product of the incidence of poverty **(H)** and intensity of poverty **(A)** gives the MPI.

Thus, **MPI = H x A**

Different poverty threshold levels, both at individual and group levels, such as (i) less than 0.20, (ii) between 0.20 and 0.3333, (iii) between 0.3333 and 0.50, and (iv) 0.50 or above, are used to identify whether one individual or one group is coming under the category of multidimensionally non-poor (MDNP), vulnerable to multidimensionally poor (VMDP), multidimensionally poor (MDP), or severely multidimensionally poor (SMDP) respectively.

Further, the study adopted a binomial logistic regression model (37) to assess the impact of socioeconomic and demographic variables on multidimensional poverty across genders. Multidimensional poverty, the dependent variable taken in this study, assigned a value of '1' if the person is poor and '0' if the person is non-poor, with a poverty threshold level of 33.33 percent, i.e., 0.3333. Independent variables taken in this study constitute both continuous, viz., completed years of education, and categorical, viz., age and occupation. Logistic regression analysis was performed separately for women and men. The logit model adopted in this study is as follows.

$Logit(P) = In(\frac{Pi}{1-Pi})$= λ_1 + λ_2 Edn + λ_3 DPWAG + λ_4 DMWAG + λ_5 DEAG + λ_6 DWageEar + λ_7 DCropFar + λ_8 DLivestockFar+ λ_9 DBus+ λ_{10} DPvtSer + λ_{11} DGovtSer + ui [2]

Where,

$Logit(P) = In\left(\frac{Pi}{1-Pi}\right)$ is the dependent variable, {Pi = E[Yi = 1(MPI ≥ 0.3333)|X_i]};

Edn - Educational Qualification of the person, i.e., completed years of education;

DPWAG – Dummy variable for the person belonging to the prime working age group ('1' if a person belongs to PWAG, '0' otherwise);

DMWAG – Dummy variable for the person belonging to the mature working age group ('1' if a person belongs to MWAG, '0' otherwise);

DEAG – Dummy variable for the person belonging to the elderly working age group ('1' if a person belongs to EAG, '0' otherwise); (reference category EWAG – early working age group).

DWageEar – Dummy variable for the person working as a daily wage earner (1 if a person working as a daily wage earner, 0 otherwise);

DCropFar – Dummy variable for the person engaged in crop farming (1 if a person engaged in crop farming, 0 otherwise);

DLivestockFar – Dummy variable for the person engaged in livestock farming (1 if a person engaged in livestock farming, 0 otherwise);

DBus – Dummy variable for the person engaged in business (1 if a person engaged in business, 0 otherwise);

DPvtSer – Dummy variable for the person engaged in private service (1 if a person engaged in private service, 0 otherwise);

DGovtSer – Dummy variable for the person engaged in government service (1 if a person engaged in government service, 0 otherwise); (reference category no work).

The coefficients of the logistic regression model have been estimated using SPSS 23 and are presented in their logit and odd values. The positive logit coefficient and, alternatively, the odd value greater than one indicates an increase in the predictive probability of the dependent variable with an increase in the independent variable, and vice-versa.

Results and Discussion

Analysis of the sample characteristics of the study, which involves examining the participants' demographics and other relevant attributes to understand the context of the results, is presented in Table 3.

Table 3: Sample Characteristics

Category		*Total Person	%	Women Person	%	Men Person	%
Age Group	Early Working Age Group (EWAG) (18-24 years)	140	13.17	57	11.40	83	14.74
	Prime Working Age Group (PWAG) (25-54 years)	666	62.65	327	65.40	339	60.21
	Mature Working Age Group (MWAG) (55-64 years)	158	14.86	64	12.80	94	16.70
	Elderly Age Group (EAG) (65 years and above)	99	9.31	52	10.40	47	8.35
Social Category	SC	251	23.61	124	24.80	127	22.56
	SEBC	449	42.24	207	41.40	242	42.98
	OBC	190	17.87	87	17.40	103	18.29
	General	173	16.27	82	16.40	91	16.16
Educational Status	Illiterate (no education)	52	4.89	40	8.00	12	2.13
	Lower Primary (Class 1 to 5)	174	16.37	107	21.40	67	11.90
	Upper Primary (Class 6 to 8)	170	15.99	95	19.00	75	13.32
	Secondary (class 9 and 10)	313	29.44	146	29.20	167	29.66
	Higher Secondary (class 11 and 12 or +2)	158	14.86	55	11.00	103	18.29
	Graduation	173	16.27	49	9.80	124	22.02
	Post-Graduation and above	23	2.16	8	1.60	15	2.66
Occupational Status	Daily wage earner	177	16.65	42	8.40	135	23.98
	Crop Farming	96	9.03	6	1.20	90	15.99
	Livestock Farming	70	6.59	70	14.00	0	0.00
	Business	101	9.5	9	1.80	92	16.34
	Private Service	94	8.84	3	0.60	91	16.16
	Govt. Service	20	1.88	3	0.60	17	3.02
	No work	505	47.51	367	73.40	138	24.52

NB: *Out of 1063 Persons, 500 were Women, and 563 were Men

The gender distribution shows a slightly higher proportion of females, i.e., 52.96 percent. The age distribution reflects that more than 60 percent of the respondents, irrespective of gender, belong to the prime working age group (PWAG), i.e., 25-54 years, and around 10 percent of respondents belong to the elderly age group (EAG), i.e., above 65 years. Analysis across social categories reveals a higher concentration of respondents in the SEBC group (around 42 percent). The educational status of respondents indicates the skewed distribution of literate toward males. Nonworkers in the study constitute housewives, students, old-age persons, handicapped persons, and retired persons. About 75 percent of females are nonworkers, as against 25 percent of males. This is primarily because of women's participation in non-economic activities (unpaid household duties). Only women are engaged in livestock farming. The highest percentage of respondents belongs to daily wage earners.

Table 4 discusses the gender-wise deprivation status across 15 indicators. No respondents, whether women or men, were observed to have poor access to electricity and safe drinking water. This might be due to the successful implementation of government policies relating to rural electrification and drinking water supply. Women are more deprived in all indicators of multidimensional poverty except three, viz., access to clean cooking fuel, access to improved sanitation, and possession of savings bank accounts. The highest deprivation (>97 percent), irrespective of gender, is observed in organizing community-level activities. More than 75 percent of respondents, women, and men, are deprived of using clean cooking fuel. Although almost all the respondents have access to clean cooking fuel, they

use dirty, mainly wood and cow dung. Families in rural areas get firewood from trees growing on their own land and cow-dung cake from the excreta of cattle they rear. The availability of dirty cooking fuel freely or at a very low cost induces rural families to use these in place of clean cooking fuel. Similarly, it is observed that although the households are availing the benefit of government schemes in the construction of latrines, most of the members, particularly men, are practicing open defecation. More than 40 percent of women are deprived in nine indicators, whereas for men, this is five. Respondents, women as well as men, are least deprived of immunization.

Table 4: Indicator-Wise Deprivation Status Across Gender

Indicators of Multidimensional Poverty	Women Person	%	Men Person	%
Completed eight years of schooling	215	43.00	130	23.09
Nutritional Status	29	5.80	23	4.09
Immunization	5	1.00	4	0.71
Health Insurance	211	42.20	223	39.61
Housing condition	92	18.40	91	16.16
Access to electricity	0	0.00	0	0.00
Access to clean cooking fuel	390	78.00	447	79.40
Access to safe drinking water	0	0.00	0	0.00
Access to improved sanitation	206	41.20	319	56.66
Asset ownership	480	96.00	426	75.67
Employment	317	63.40	70	12.43
Possession of Agricultural Land	483	96.60	356	63.23
Possession of savings bank a/c	18	3.60	51	9.06
Organizing community-level activities	494	98.80	547	97.16
Participation in community-level activities	310	62.00	196	34.81

About half of the women in the study are housewives. Consequently, the highest deprivation gap between women and men is observed in the employment indicator. Remarkable deprivation gaps observed in the indicators "possession of agricultural land," "asset ownership," and "participation in community-level activities" may be attributed to the patriarchal family culture practiced in the district. The study also observed a significant educational deprivation gap, a concern for planners. Women's deprivation in education is observed to be significantly higher, i.e., about 90 percent in the older age group of 54 years and above, in comparison to about 29 percent deprivation in the age group between 18 and 54 years. The non-availability of educational institutions in the village, coupled with the prevailing societal stigma against female education before 1980, might be attributed to a higher educational deprivation gap. Women are observed to be less deprived than men in terms of access to improved sanitation, possession of savings bank accounts, and access to clean cooking fuel. For the other 12 indicators, women are more deprived than men. The deprivation gaps between women and men across all the fifteen indicators are depicted in Figure 3.

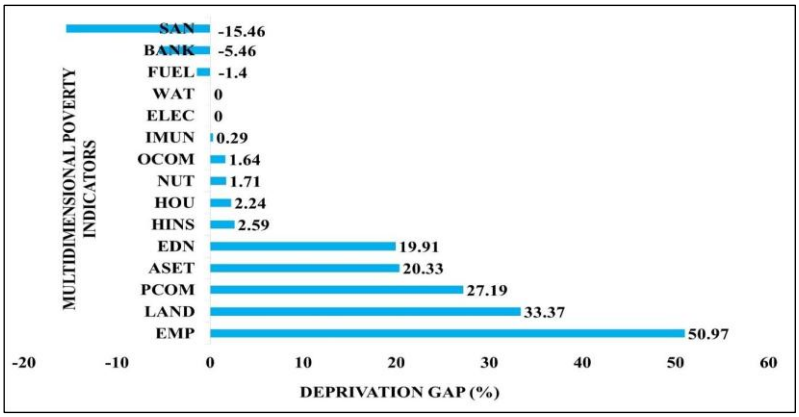
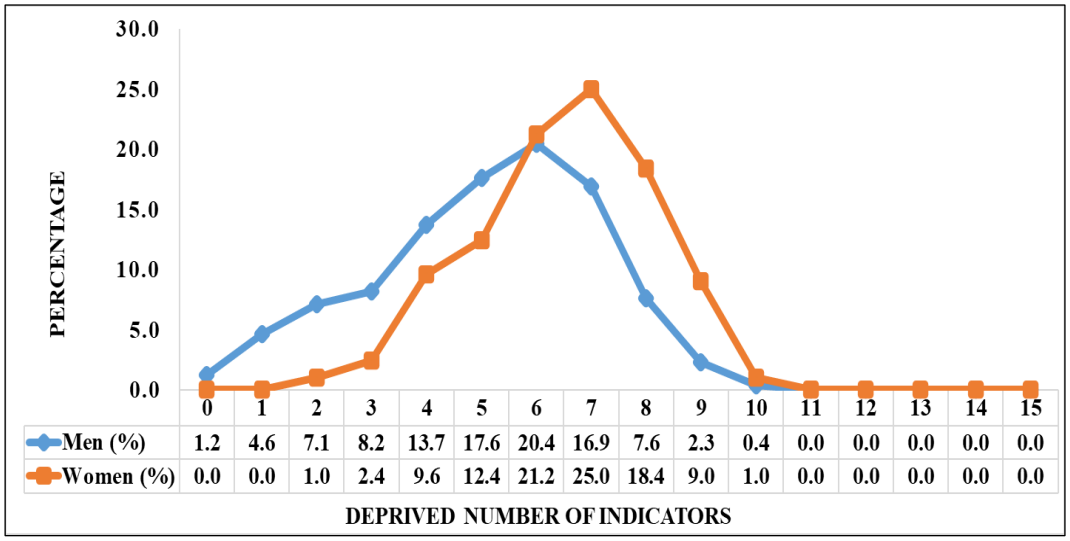


Figure 3: Indicator Wise Women-Men Deprivation Gap (In %)

Figure 4 explains the number of indicators in which deprivation of women and men (in percentage) exists. As observed, neither women nor men are deprived of more than 10 indicators. Men are more deprived of up to six indicators, and women are from seven to ten indicators. Only 27.2 percent of men are deprived in seven indicators or more, whereas the same for women is 53.4 percent, indicating the concentration of deprivation among women.



	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Men (%)	1.2	4.6	7.1	8.2	13.7	17.6	20.4	16.9	7.6	2.3	0.4	0.0	0.0	0.0	0.0	0.0
Women (%)	0.0	0.0	1.0	2.4	9.6	12.4	21.2	25.0	18.4	9.0	1.0	0.0	0.0	0.0	0.0	0.0

Figure 4: Gender-Wise Deprived Number of Indicators (In %)

The status of multidimensional poverty across genders is presented in Table 5, which reveals a higher concentration of women (about 80 percent) in the multidimensionally poor group as against 52.74 percent for men. The percentage of men in the MDNP group is roughly 13 times that of women, whereas the percentage of women in the SMDP group is about three times that of men. A notable observation is that about 19 percent of women and 34 percent of men, although multidimensionally non-poor, still are vulnerable to becoming poor. This must be considered while formulating policies for the poor, particularly for women in the district.

Table 5: Status Of Multidimensional Poverty Across Gender

*Multidimensional Poverty Status	Women		Men		Total	
	Person	%	Person	%	Person	%
MDNP	7	1.40	105	18.65	112	10.54
VMDP	94	18.80	192	34.10	286	26.90
MDP	174	34.80	186	33.04	360	33.87
SMDP	225	45.00	80	14.21	305	28.69
Multidimensionally non-poor (MDNP and VMDP taken together with a poverty threshold level less than 33.33%)	101	20.20	297	52.75	398	37.44
Multidimensionally poor (MDP and SMDP, taken together with a poverty threshold level greater than or equal to 33.33%)	399	79.80	266	47.25	665	62.56

NB: *Multidimensional poverty status is determined considering the individual deprivation score

The complementary cumulative distribution function across genders is presented in Figure 5, which provides valuable insights into tail probabilities and allows decision-makers to assess and mitigate risks associated with extreme events in various domains. This also reflects the robustness of a higher concentration of multidimensional poverty among women at any poverty threshold level.

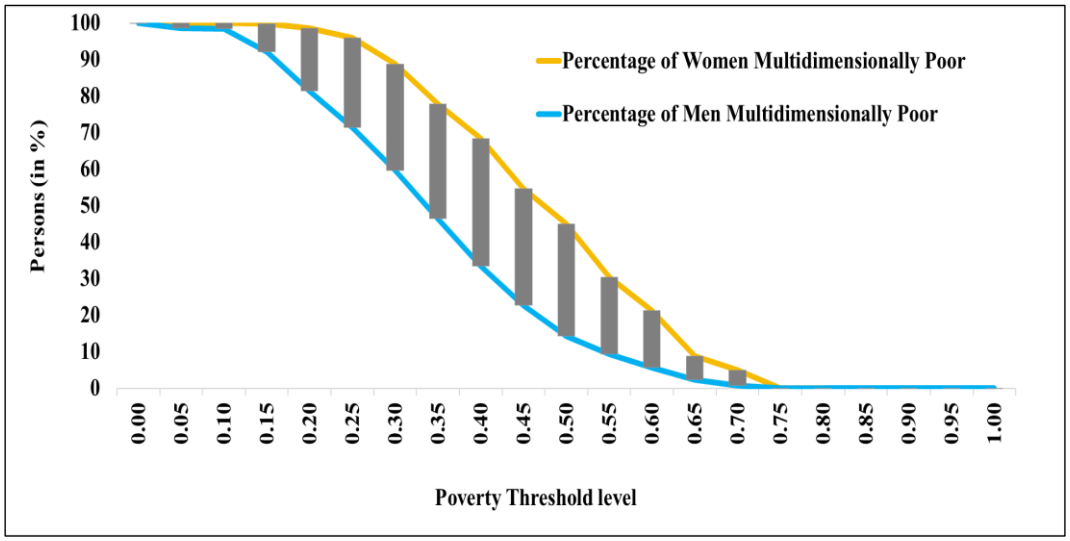


Figure 5: Gender-Wise Deprivation Status at Different Poverty Threshold Levels (In %)

Table 6 and Figure 6 portray the MPI for all eight blocks and the district, calculated using the incidence and intensity of poverty. As observed, the MPI for women is more than for men across all the blocks and the district. As derived from MPI (≥0.3333), poverty status reveals that women are multidimensionally poor in all blocks except Jagatsinghpur. In contrast, none of the blocks witnessed men as multidimensionally poor.

Table 7 displays the block-wise and gender-wise deprivation status across all the 15 indicators of multidimensional poverty under study. All the blocks and the district witnessed a positive women-men deprivation gap in five indicators, viz., completed eight years of schooling, asset ownership, employment, possession of agricultural land, and participation in community-level activities. One notable observation is the presence of a positive deprivation gap in the organization of community-level activities in four blocks of the district, viz., Biridi, Jagatsinghpur, Raghunathpur, and Tirtol. Although the Government of Odisha, through the organization of SHGs, opened the scope for women to organize community-level activities, women of these four blocks lag behind the other four blocks. Deprivation gap analysis across blocks and indicators reveals that deprivation gap exists in seven indicators for Kujanga and Naugaon, in eight indicators for Biridi, Erasama, Raghunathpur, and Tirtol, in nine indicators for Balikuda and 11 indicators for Jagatsinghpur.

Table 6: Gender-Wise MPI Score Across Different Blocks of Jagatsinghpur District

Components	Block under Jagatsinghpur District											
	Balikuda			Biridi			Erasama			Jagatsinghpur		
	W	M	O	W	M	O	W	M	O	W	M	O
q	63	36	99	26	18	44	28	32	60	41	29	70
n	76	80	156	36	39	75	33	51	84	63	67	130
H = q/n	0.829	0.45	0.635	0.722	0.462	0.587	0.848	0.627	0.714	0.651	0.433	0.538
A = Di/q	0.518	0.448	0.492	0.501	0.449	0.480	0.505	0.449	0.475	0.510	0.459	0.489
MPI = H x A	0.429	0.202	0.312	0.362	0.207	0.282	0.428	0.282	0.339	0.332	0.199	0.263
Poverty Status	MDP	MDNP	MDNP	MDP	MDNP	MDNP	MDP	MDNP	MDP	MDNP	MDNP	MDNP
Components	BLOCK											
	Kujanga			Naugaon			Raghunathpur			Tirtol		
	W	M	O	W	M	O	W	M	O	W	M	O
q	66	40	106	72	45	117	39	21	60	64	45	109
n	76	83	159	81	96	177	45	42	87	90	105	195
H = q/n	0.868	0.530	0.667	0.889	0.469	0.661	0.867	0.500	0.690	0.711	0.429	0.559
A = Di/q	0.519	0.474	0.502	0.526	0.472	0.505	0.532	0.503	0.522	0.495	0.464	0.482
MPI =H x A	0.450	0.251	0.334	0.468	0.221	0.334	0.461	0.252	0.360	0.352	0.199	0.269
Poverty Status	MDP	MDNP	MDP	MDP	MDNP	MDP	MDP	MDNP	MDP	MDP	MDNP	MDNP
Components	Jagatsinghpur District											

	W	M	O
q	399	266	665
n	500	563	1063
H = q/n	0.798	0.473	0.626
A = Di/q	0.514	0.465	0.492
MPI = H x A	0.410	0.220	0.308
Poverty Status	MDP	MDNP	MDNP

NB: W = Women, M = Men, O = Overall (Women and men taken together); MDNP - Multidimensionally non-poor and MDP - Multidimensionally poor with 33.33% poverty threshold level

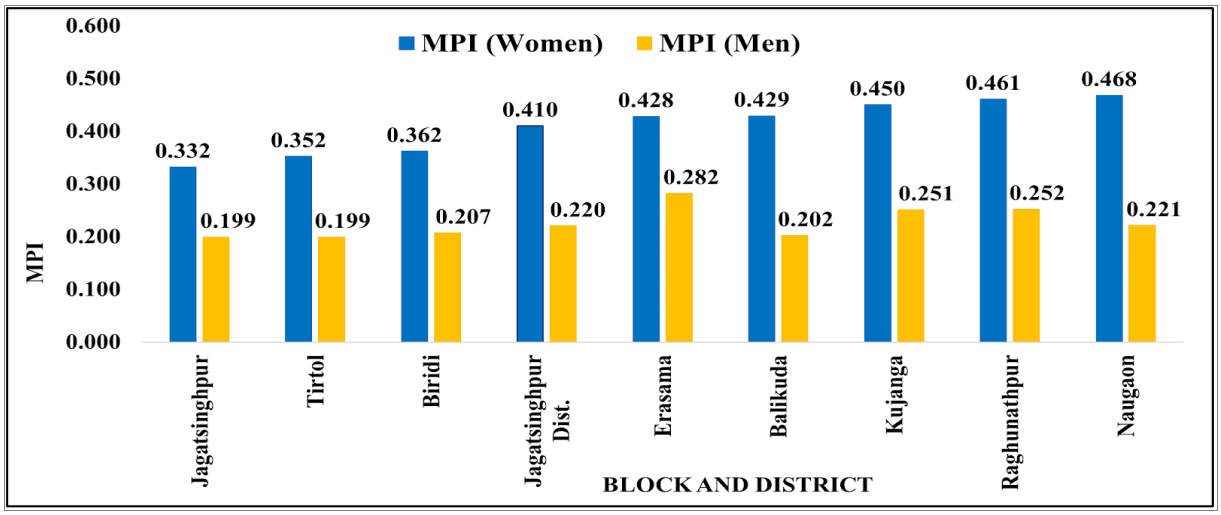


Figure 6: Gender-Wise Poverty Status Across Different Blocks of Jagatsinghpur District

Studying the factors influencing multidimensional poverty is necessary to develop comprehensive strategies for addressing the poverty of any region. Persons counted as multidimensional poor and non-poor are presented in Table 8. This study observed a higher percentage of people living in multidimensional poverty, regardless of gender and age. Persons with educational qualifications of secondary level, graduation, post-graduation, and above are less poor than other educational groups. Persons engaged in business and service sectors (both private and public) are less poor in comparison to other occupational groups. The chi-square test of independence is used to test whether multidimensional poverty is independent of the factors, viz., gender, age, education, and occupation. All these four variables are statistically significant at one percent level of significance, indicating significant evidence of an association between multidimensional poverty and these four factors.

Table 7: Block and Indicator-Wise Deprivation Status Across Gender (In %)

*Indicators	Balikuda	Biridi	Erasama	Jagatsinghpur	Kujanga	Naugaon	Raghunathpur	Tirtol	District
Women									
EDN	44.74	33.33	39.39	36.51	43.42	49.38	48.89	42.22	43.00
NUT	6.58	2.78	0.00	7.94	2.63	4.94	4.44	11.11	5.80
IMUN	6.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
HINS	43.42	41.67	36.36	38.10	59.21	48.15	37.78	28.89	42.20
HOU	19.74	50.00	18.18	23.81	18.42	4.94	26.67	8.89	18.40
ELEC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FUEL	84.21	69.44	78.79	69.84	90.79	65.43	91.11	75.56	78.00
WAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAN	35.53	52.78	39.39	44.44	61.84	38.27	51.11	20.00	41.20
ASET	98.68	97.22	100.00	88.89	100.00	92.59	100.00	94.44	96.00
EMP	60.53	50.00	60.61	66.67	65.79	74.07	53.33	63.33	63.40
LAND	100.00	100.00	93.94	96.83	94.74	93.83	97.78	96.67	96.60
BANK	1.32	2.78	0.00	0.00	1.32	16.05	2.22	1.11	3.60
OCOM	98.68	100.00	96.97	100.00	100.00	97.53	100.00	97.78	98.80

PCOM	63.16	52.78	93.94	42.86	61.84	76.54	77.78	45.56	62.00
Men									
EDN	25.00	12.82	17.65	28.36	19.28	28.13	30.95	20.00	23.09
NUT	5.00	0.00	0.00	2.99	3.61	5.21	2.38	7.62	4.09
IMUN	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71
HINS	33.75	56.41	27.45	32.84	55.42	45.83	38.10	30.48	39.61
HOU	20.00	38.46	15.69	22.39	15.66	3.13	28.57	8.57	16.16
ELEC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FUEL	82.50	76.92	76.47	65.67	93.98	68.75	88.10	82.86	79.40
WAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAN	61.25	61.54	70.59	41.79	81.93	41.67	61.90	45.71	56.66
ASET	85.00	76.92	84.31	67.16	84.34	62.50	80.95	72.38	75.67
EMP	13.75	12.82	13.73	13.43	8.43	12.50	9.52	14.29	12.43
LAND	61.25	71.79	66.67	70.15	63.86	46.88	64.29	69.52	63.23
BANK	5.00	10.26	1.96	2.99	6.02	27.08	11.90	3.81	9.06
OCOM	100.00	94.87	98.04	97.01	100.00	97.92	95.24	93.33	97.16
PCOM	21.25	23.08	92.16	16.42	38.55	32.29	33.33	33.33	34.81

NB: *For indicator-wise deprivation conditions, refer to Table 2

Binary logistic regression analysis, separately for women and men, has been carried out to examine the nature and magnitude of the impact of variables, viz., age, education, and occupation, on multidimensional poverty, and the results are shown in Table 9. EWAG and no work are taken as the reference categories for the variables age and occupation, respectively.

The Omnibus test evaluates the null hypothesis that all predictor variables in the model do not affect the outcome variable (i.e., the coefficients are all zero). The Omnibus test results from our regression output, both for women and men, show the p-value less than 0.001. Therefore, the overall model is statistically significant, suggesting that age, education, and occupation together provide a better prediction of multidimensional poverty status than expected by chance. Further, about 82.4 percent of cases for women and 78.9 percent for men have been correctly classified, which again justifies the goodness-of-fit of the estimated model. The Nagelkerke R-Square values indicate that the full model can explain around 40 percent and 47 percent of the variation in multidimensional poverty for women and men, suggesting that predictions are fairly reliable.

Table 8: Multidimensional Poverty Across Socio-Economic Variables

Socio-economic variables		**MDNP (in person)**	**MDP (in person)**	**Pearson Chi-square value**	**Sig. level**
Gender	Women	101	399	119.810*	0.000
	Men	297	266		
Age	EWAG	36	104	43.019*	0.000
	PWAG	294	372		
	MWAG	53	105		
	EAG	15	84		
Education	Illiterate	0	52	255.495*	0.000
	Lower Primary	3	171		
	Upper Primary	27	143		
	Secondary	185	128		
	Higher Secondary	77	81		
	Graduation	91	82		
	Post Graduation and above	15	8		
Occupation	No work	104	401	245.687*	0.000
	Daily wage earner	50	127		
	Crop Farming	60	36		
	Livestock Farming	18	52		
	Business	75	26		
	Private Service	72	22		
	Govt. Service	19	01		

The logistic coefficients for education, age, and occupation, as a whole, and the constant, both for women and men, are all statistically significant at a one percent level based on the statistical tests of Wald statistics. Therefore, the three variables individually predict the probabilities of multidimensional poverty. The sign of original logistic coefficients (λ) are all negative. Also, the magnitude of all the exponentiated coefficients (Exp λ) is less than one. These indicate that the predicted probability of multidimensional poverty is inversely related to the predictor variables: education, age, and occupation. The magnitude of coefficients in logistic regression indicates how much each predictor variable contributes to the probability of the outcome. The coefficients of education suggest that for every additional year of increase in the year of schooling, the log odds of being multidimensionally poor decrease by 0.448 for women and 0.423 for men, holding all else constant. Interpreting in terms of exponentiated coefficients, for each year of additional schooling, the odds of being poor decrease approximately 36 percent for women and 34 percent for men, assuming all other variables in the model are held constant.

Table 9: Socio-Economic Determinants of Multidimensional Poverty Across Gender

	Women				**Men**			
	λ	**Wald**	**p-value**	**Exp (λ)**	**λ**	**Wald**	**p-value**	**Exp (λ)**
Constant	7.511*	62.409	0.000	1828.447	6.728*	89.171	0.000	835.354
EDN	-0.448*	49.844	0.000	0.639	-0.423*	77.470	0.000	0.655
Age code	-	16.000	0.001	-	-	3.284	0.350	-
Age code (PWAG)	-1.769*	15.786	0.000	0.171	-0.557	1.713	0.191	0.573
Age code (MWAG)	-2.151*	8.179	0.004	0.116	-0.676	1.708	0.191	0.508
Age code (EAG)	-2.455	5.797	0.016	0.086	-1.073**	3.131	0.077	0.342
Occupation code	-	21.668	0.001	-	-	60.709	0.000	-
Occupation code (WageEar)	-0.056	0.005	0.944	0.946	-2.010*	19.479	0.000	0.134
Occupation code (CropFar)	-2.038	5.015	0.025	0.130	-3.246*	41.605	0.000	0.039
Occupation code (LivestockFar)	-1.193*	10.642	0.001	0.303	-	-	-	-
Occupation code (Bus)	-2.429*	9.388	0.002	0.088	-3.294*	45.619	0.000	0.037
Occupation code (PvtSer)	-19.919	0.000	0.999	0.000	-2.442*	28.043	0.000	0.087
Occupation code (GovtSer)	-21.203	0.000	0.999	0.000	-3.719*	10.058	0.002	0.024
OMNIBUS test of model coefficients	Chi-square (129.079*) Significance (0.000)				Chi-square (241.058*) Significance (0.000)			
COX and SNELL R^2	0.228				0.348			
NAGELKERKE R^2	0.359				0.465			
Cases correctly classified (%)	82.4				78.9			

NB: * and ** indicate 1 percent and 10 percent significance levels, respectively

Although age and occupation, as a whole, significantly influence the log odds of multidimensional poverty, all of their groups are not significant factors determining multidimensional poverty. Coming to age, PWAG and MWAG for women and EAG for men significantly reduce the probability of being poor. The study observed that the women in the age group PWAG and MWAG have 83 percent and 81 percent lower odds, respectively, of being poor than women in EWAG, ceteris paribus. Similarly, men moving to the age group EAG experience 64 percent lower odds of being poor compared to men in the EWAG. This might be due to the increased chance of being engaged in any economic activity with increased age and, hence, a lower chance of falling into poverty. Analysis of the coefficients across different occupation groups for men indicates that as a person engaged in any economic activity under study instead of being unemployed, the probability of being poor decreases, ceteris paribus. The decrease in the probability of

becoming poor is more for men engaged in government service, followed by business, crop farming, private service, and daily wage earners. Women who have been engaged in livestock farming and business have 70 percent and 91 percent lower odds of becoming poor compared to women who have no work. Women engaged in other economic activities also significantly affect multidimensional poverty.

Conclusion

This study is basically undertaken to compare the magnitude and determinants of multidimensional poverty between women and men in the rural Jagatsinghpur district of Odisha. This study is of its first kind in analyzing multidimensional poverty among women across all the blocks of Jagatsinghpur district, which justifies the study's novelty. The sample constitutes 1063 respondents randomly selected from 384 households of all eight blocks of the district. Fifteen indicators across five dimensions have been taken to assess the magnitude of multidimensional poverty using the methodology developed by Alkire and Foster (36). Binomial logistic regression analysis has been applied to investigate the factors influencing multidimensional poverty among women and men.The skewed distribution of multidimensional poverty towards women is the major finding of this study. Women are more deprived in comparison to men in education, employment, asset ownership, possession of agricultural land, and organization of community-level activities. Prevailing patriarchal culture and societal attitudes against women can be said to be the major reasons for the higher deprivation of women in asset ownership and possession of agricultural land. Although with the passage of time, the attitude towards women is changing a lot, still higher women deprivation is observed in education and employment. Another significant observation of the study is that although almost all the respondents have access to clean cooking fuel, they still use dirty fuels, particularly firewood, and cow dung, which pollute not only the inside household environment but also the outside and consequently suffer under different types of health hazards. This type of deprivation might be due to the high refueling price of clean cooking fuel, i.e., LPG. With economic empowerment, the respondents are expected to use clean cooking fuel. Further, the study observed that although the households are availing the benefit of government schemes in the construction of latrines, most of the members, particularly men, are practicing open defecation and also polluting the outside environment, which is also treated as an important factor for spreading different types of health hazards. In this regard, creating awareness among the respondents for using household latrines will reduce environmental pollution, different health hazards, and multidimensional poverty.

Using binomial logistic regression, analysis of the determinants of multidimensional poverty among women reveals that age, education, and occupation significantly negatively affect women's multidimensional poverty. The age structure cannot be changed with government policy interventions. Therefore, an increase in the educational level and a change in the occupation structure realized through appropriate government policies will be expected to reduce multidimensional poverty among women. Although both central and state governments have implemented various schemes to reduce the dropout of girls at the primary and secondary levels and increase the educational level of women in the state, viz., Beti Bachao Beti Padhao, CBSE Udaan Scholarship Program, National Scheme of Incentives to Girls for Secondary Education, and Kasturba Gandhi Balika Vidyalaya Scheme of Government of India and Right to Education Act, Early Childhood Care and Education (ECCE) programme and Learning Enhancement Programmes (Ujjwal, Utthan and Utkarsh) of Government of Odisha, still the state observed increased dropout rates both at the primary and upper primary level over the years. Therefore, reorientation and successful execution of the existing programs may help reduce dropouts and increase girls' education levels.

An increase in the educational level will no doubt increase the employability of women. But alone, it cannot fulfill the desired goals. Since most of the women are engaged in household activities, pursuing some economic activities along with their household duties will help them to gain economic empowerment. Implementing the Women's Self-Help Groups (WSHGs) programme under the aegis of the 'Mission Shakti' is worth mentioning in this regard. Steps need to be taken to implement this program effectively. Activities that have the desired market potential need to be undertaken through WSHGs. Further, necessary training relating to

communication, teamwork, problem-solving, time management, adaptability, and continuous learning may be imparted to women with higher educational levels to enhance their employability skills. Maintaining regional equity must also be considered while designing and implementing these policies.

Abbreviations

BMI: Body Mass Index, CBSE: Central Board of Secondary Education, EWAG: Early Working Age Group, EAG: Elderly Age Group, GOI: Govt. of India, LNOB: Leaving no one behind, MWAG: Mature Working Age Group, MPI: Multidimensional Poverty Index, MDNP: Multidimensionally non-poor, MDP: Multidimensionally poor , NFHS: National Family Health Survey, OPHI: Oxford Poverty and Human Development Initiative, PWAG: Prime Working Age Group, SMDP: Severely multidimensionally poor, SDG: Sustainable Development Goals , UN: United Nations, UNDP: United Nations Development Programme, VMDP: Vulnerable to multidimensionally poor, WSHGs: Women's Self-Help Groups.

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Author Contributions

Surya Narayan Biswal: literature review, methodology, data analysis, interpretation, conclusion, and references, Santosh Kumar Mishra: literature review, problem formulation, discussion, conclusion, Minaketan Sarangi: literature review, discussion, conclusion.

Conflict of Interest

There is no conflict of interest.

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