



Differential impacts of COVID-19 lockdown on informal workers in Goa: A gendered and sectoral analysis

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ABSTRACT

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The COVID-19 pandemic severely impacted informal workers in terms of employment and income, especially in tourism-dependent economies such as Goa in India. The paper examined the socioeconomic vulnerabilities experienced by informal workers during the COVID-19 pandemic, with particular attention to gender, employment sector, and migrant status. Using a mixed methods approach, the study collected data from 250 informal workers employed in Goa's formal and informal sectors to examine employment vulnerability. Findings from the binary logistic model indicated that a significant proportion of informal workers lost their jobs during the lockdown, with women, migrants, and daily wage earners facing the highest risks. Informal workers employed in the informal sectors are more susceptible to job loss, and their chances of reemployment are lower compared to their counterparts in the formal sectors. Due to multiple job roles and caregiving responsibilities for their families, women are more likely to experience job loss and less likely to regain employment after the pandemic. The lack of social security and challenges related to reverse migration increase the vulnerability of migrant workers during the pandemic. Education serves as a protective buffer, as higher levels of education decrease the likelihood of job loss. The paper strongly advocates for urgent, targeted policy interventions, including expanded social security, sector-specific relief programs, and alternative livelihood options to enhance resilience in tourism-dependent informal economies. The findings contribute to a better understanding of the labor market disruptions caused by the pandemic and highlight the importance of developing inclusive recovery strategies.

Contribution/Originality: This study examines the impact of the COVID-19 lockdown on informal workers in Goa, highlighting vulnerabilities related to gender, sector of employment and migration status. It also recommends targeted social security measures to support an inclusive recovery in tourism-driven informal economies.

1. INTRODUCTION

The COVID-19 pandemic, an unprecedented global health crisis, emerged in early 2020, causing widespread economic disruptions worldwide. To limit the spread of the virus, governments around the globe enforced strict lockdowns, halting economic activities. This led to significant instability in labor markets, resulting in widespread job losses, particularly in the informal sector. Informal workers, the backbone of employment in many developing economies, suffered disproportionately due to a lack of social security and dependence on daily wages. In India, where about 90% of the workforce is employed informally, the sudden nationwide lockdown announced on March 24, 2020, with only four hours' notice, had devastating effects. Daily wage earners, self-employed individuals, and migrant laborers experienced an immediate loss of income. The International Labour Organization (ILO) warned that nearly

400 million informal workers in India were at risk of slipping into extreme poverty. According to CMIE-CPHS data, by December 2021, the labor force participation rate was 2.5 percentage points below pre-pandemic levels. The pandemic also negatively impacted economies that relied heavily on tourism worldwide. Lim and To (2021) highlighted Macao's severe decline in GDP due to travel restrictions. Jaipuria, Parida, and Ray (2020) noted that India's tourism sector lost approximately \$14 billion, while Sultana, Islam, and Islam (2020) emphasized the collapse of global destinations. Uğur and Akbiyik (2020) revealed uneven regional recoveries, while Kaushal and Srivastava (2021) stress vulnerabilities in the hospitality workforce.

Goa, with its heavy dependence on tourism, offers a clear example of this crisis. Goa's tourism accounts for nearly 30% of Goa's GDP (Goa Economic Survey, 2021) and supports a large informal workforce that includes taxi drivers, hotel staff, street vendors, and other service providers. The collapse of tourism due to travel bans and safety restrictions caused a significant employment shock. Goa's high cost of living and lack of alternative formal jobs further deepened the vulnerabilities of informal workers. A significant portion of Goa's workforce comprises informal workers who migrate to Goa in search of better job opportunities. However, due to a lack of formal jobs in the state, these workers are employed particularly in informal occupations such as construction workers and domestic servants. Since these workers did not have job security and had little access to relief measures, they faced severe challenges from food insecurity, loss of shelter, and other hardships (Srivastava, 2022). As women are mostly employed in informal jobs such as domestic work and home-based production, they were the most affected during the pandemic. The pandemic led to a significant decline in female labour force participation, primarily due to increased caregiving responsibilities and occupational segregation (Bonnet, Vanek, & Chen, 2019; Chakraborty, 2020). Workers in non-essential sectors, such as hospitality, entertainment, and retail, were affected the most. Since the major economic sectors in Goa were shut down during the COVID-19 pandemic, it led to a chain reaction that significantly affected all informal jobs, resulting in increased unemployment and economic hardship. Informal workers, due to the lack of formal contracts, job security, and access to social protections, were the most affected by these disruptions, with many of them losing their main income source overnight. While many studies at the national level have highlighted the broader impact of the COVID-19 pandemic on informal employment across India, a significant gap exists in region-specific analysis. In smaller, tourism-dependent states like Goa, where the informal sector is a vital part of the local economy and employs a large portion of the workforce, the lack of detailed local insights hinders the development of effective policy. Therefore, gaining a deeper understanding of how these impacts affect informal workers locally is crucial for creating inclusive recovery strategies that address their specific vulnerabilities in regions.

Therefore, this paper examines the impact of the COVID-19 lockdown on informal workers in Goa, with the following key objectives: (1) To assess the extent of job losses and income shocks among informal workers during the pandemic; (2) To analyze the role of social security, residential status (migrant vs. local), and employment sector in determining workers' vulnerability to job loss; and (3) To explore reemployment trends and challenges faced by informal workers in the post-lockdown period. Using binary logistic regression, this study identifies key factors influencing job losses among informal workers, providing critical insights for policy formulation. Unlike previous studies that focus on national or large-state-level data, this research offers a micro-level analysis of a small but economically significant region, contributing to a deeper understanding of pandemic-induced labour market disruptions. By examining informal employment in Goa, this paper addresses a significant research gap. It emphasizes the importance of targeted policy measures to protect informal workers in tourism-driven economies during times of crisis. The paper is organized as follows: Section 2 reviews the existing literature on informal employment and its effects during the pandemic. Section 3 describes the data and methodology. Section 4 presents the empirical results, while Section 5 discusses the implications and policy recommendations. Section 6 concludes the study.

2. LITERATURE REVIEW: A COMPARATIVE ANALYSIS OF THE IMPACT OF COVID-19 ON INFORMAL WORKERS

2.1. Global and National-Level

The COVID-19 pandemic triggered an unprecedented economic crisis, disproportionately impacting informal workers who make up nearly half of the global workforce. According to the ILO (2020), it is estimated that approximately 1.6 billion informal workers were at risk of losing their livelihoods at the start of the pandemic. A study conducted by Chen (2020) highlights that since this group of workers was excluded from the social protection system, which mainly involves insecure and unprotected work, they face sharp income shocks, economic instability, and poverty because they are excluded from social protection systems.

The effects were more severe in developing countries, where informal employment dominates the labour market. Research conducted by Fields and Sundaram (2021) was of the opinion that, due to the sudden lockdown, combined with the lack of legal protections and employment contracts, it led to large-scale unemployment. In India, approximately 85% of the workforce was informally employed before the pandemic (ILO, 2020). This condition was worsened by earlier shocks, such as demonetization and the introduction of the Goods and Services Tax (GST), which had already disrupted the livelihoods of informal workers (Nath, Mandela, & Gawali, 2023). As a researcher studying disruptions in the labour market, it is observed that national policies often overlook the layered vulnerabilities of informal workers across different state economies, particularly in tourism-dependent regions such as Goa.

2.2. Sectoral and Occupational Differentiation

The impact of the pandemic varied across different sectors. For example, domestic workers experienced the steepest decline, with only 29% remaining employed in April 2020 (Chen et al., 2022; Mohan & Mishra, 2021). Ghosh (2021) and Basole et al. (2021) estimate that approximately 80% of informal workers lost their jobs, and 90% experienced a decline in income. Saha (2022) highlights the struggles of migrant workers, who were disproportionately affected by displacement, homelessness, and exclusion from government assistance. These findings reveal a pattern of occupational risk segmentation, where workers in the domestic, construction, and hospitality sectors faced the highest levels of employment instability.

In contrast, some scholars highlight the slower recovery among specific demographic groups. Nath et al. (2023) pointed out that both older and younger informal workers faced greater difficulties re-entering the labor force after the lockdown. This study supports this view, particularly in Goa, where youth participation in tourism-related informal jobs has continued to face setbacks, highlighting the long-term effects of sectoral disruption on human capital development.

2.3. Gendered Effects

The pandemic's gendered impacts were particularly significant. Women in informal jobs, especially those in home-based production and domestic work, experienced more job losses due to occupational segregation and the rise in unpaid care responsibilities (Ara & Das, 2022; Boeri, 2023; Gardiner, Taylor, Goodwin, Robinson, & Gott, 2022). These findings align with Srivastava (2022) studies. In Goa, it is evident that women working informally in tourism-related sectors face greater economic challenges, often lacking access to relief programs and reemployment opportunities.

From a gender analysis perspective, the pandemic exposed the structural neglect of informal women's labor in both policy formulation and recovery discussions. Therefore, this study highlights the importance of gender-sensitive social protection systems, particularly in states like Goa, where female participation in tourism and related informal services is high.

2.4. Migrant Workers and Regional Inequities

Migrant workers, a particularly vulnerable group, encountered specific challenges such as travel restrictions, lack of shelter, and insufficient institutional support. Studies by [Raju, Dutta, and Ayeb-Karlsson \(2021\)](#); [Mamgain \(2021\)](#), and [Afridi, Dhillon, and Roy \(2023\)](#) have highlighted their heavy dependence on informal community networks and limited access to welfare schemes, such as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA). [Dhingra \(2020\)](#) and [Kapoor \(2020\)](#) highlight a governance gap that left these workers unprotected, despite their crucial role in urban economies.

In Goa, the dependence on migrant labour in construction, transportation, and hospitality further intensified regional effects. Studies by [Sumalatha, Bhat, and Chitra \(2021\)](#) and [Dogar et al. \(2022\)](#) demonstrate how the lack of paid leave or remote work options resulted in income loss and increased debt among migrant informal workers. This research study indicates that the pandemic widened sub-regional disparities, with states like Goa experiencing compounded shocks due to both sectoral and demographic vulnerabilities.

2.5. Governance and Policy Gaps

Scholars such as [Kapoor \(2020\)](#) and [Alam, Adnan, Baten, and Bag \(2022\)](#) have highlighted that the pandemic has exposed systemic governance failures in addressing the vulnerabilities of informal workers. They advocate for universal basic income, portable social security, and formalization of informal work as key policy imperatives. Despite these recommendations, relief interventions were inadequate in addressing the needs of the urban poor, especially those in tourism-centric economies ([Kapoor, 2020](#)).

The case of Goa highlights these challenges. The collapse of tourism, which accounts for nearly 40% of employment, led to a 14.3% decline in the state's GDP and a 74% decrease in GST revenues ([Goa Tourism Policy, 2020](#); [The Times of India, 2020](#)). The absence of targeted recovery plans for the informal workforce in such states exposes a serious gap in decentralized policy planning. As a scholar studying micro-level impacts, the study argues that the crisis requires state-specific strategies that focus on formalization, welfare portability, and social protection spread across different areas.

While many studies focus on national and urban areas, there is a limited amount of empirical research on the sub-regional effects of COVID-19 in smaller states, such as Goa. This gap conceals the real experiences of informal workers in tourism-dependent, migrant-reliant environments. By filling this gap, the present study adds to the literature by examining (i) the level of job and income losses among informal workers in Goa, (ii) the factors that make workers vulnerable, and (iii) the obstacles to recovery after the lockdown. The results aim to inform policies that improve the flexibility of informal workers in regions like Goa, which have unique sectoral and demographic features.

3. DATA AND METHODS

This study uses a mixed-methods approach to evaluate the impact of the COVID-19 lockdown on informal workers in Goa, India. By combining both quantitative and qualitative data, the study focuses on workers who are employed in informal jobs in the service sector of Goa. The study has defined an informal worker as those who are not entitled to social security benefits per the definitions provided by the National Commission for Enterprises in the Unorganised Sector.

Due to the lack of comprehensive data on informal workers in the state of Goa, the study used snowball sampling and a closed-ended questionnaire to identify 250 respondents evenly distributed between North and South Goa. The talukas were selected based on the Composite Service Index ([Nayak & Sudarsan, 2008](#)). Of the 125 respondents from North Goa, 52 were from Tiswadi, 40 from Bardez, and 31 from Sattari. Similarly, out of 125 respondents from South Goa, 39 were from Salcete, 57 from Mormugao, and 29 from Sanguem.

In order to capture the diversity of informal employment across both the formal and informal sectors, the study has made use of stratified snowball sampling techniques. Initial participants were selected intentionally to represent a wide range of occupations, including informal workers working in the formal sectors such as hotels, restaurants, and offices, as well as those working in informal sectors like garage helpers, construction workers, and domestic servants. The initial participants were chosen from both districts, namely North and South Goa, across different occupations, to ensure representation across gender, caste, and migration status. Each participant was asked to recommend another informal worker within their networks. To prevent overrepresentation from any single category or group, the number of respondents was limited. In order to reduce sampling bias and to capture the diversity of informal employment, the study has made use of stratification sampling technique which ensures proportional representation across key sectors. The study was conducted from June 2020 to January 2021, so as to capture both the immediate and short-term effects of the lockdown on income, employment, and vulnerability of the worker in the informal economy.

Table 1. Scales and coding of the variables.

Variable	Codes	Scale
Gender		Binary
Male	0	
Female	1	
Eligibility for social security		Binary
Yes	0	
No	1	
Age		Continuous
Residential status		Binary
Non- migrant (Local)	0	
Migrant	1	
Sector		Binary
Formal	0	
Informal	1	
Years of education		Continuous
Type of employment		Categorical
Regular	0	
Daily wage workers	1	
Contract	2	

Table 1 provides an overview of operational definitions of the variables utilized in the study, including the measurement scales and coding frameworks.

Gender is regarded as a key variable in the study, as the pandemic has worsened gender inequalities, with women facing greater employment instability, less social protection, and more unpaid care responsibilities, which reduce their earning potential (UN Women, 2020). Therefore, it is essential to understand who has been adversely affected by the COVID-19 pandemic to develop suitable policies. In the study, gender is coded as a binary variable, with '0' indicating male and '1' indicating female.

Social security is also an important factor in influencing the ability of informal workers to manage the challenges during the COVID-19 lockdown. Many workers who are working informally do not have access to social security schemes, making them particularly vulnerable during crises (ILO, 2020). Therefore, without adequate safety nets and the availability of limited resources at their disposal, many informal workers faced severe financial hardships during periods of unemployment. Conversely, those workers who had access to social security were in a better position to cope with the difficulties caused by the lockdown. Therefore, inclusion of this variable will help to identify how access to social security impacts the flexibility of the worker during the pandemic. It will also highlight the existing gaps in social security coverage, especially for informal workers. In the study, eligibility for social security is also a binary variable that takes the value '1' if the respondent is eligible for social security and '0' otherwise.

In the study, age is a continuous variable measured in years. Various studies have indicated that youth who are working informally are often more prone to job instability due to a lack of work experience and are usually employed in low-paying jobs. On the other hand, older workers may face the risk of job loss due to health risks, physical limitations, and caregiving responsibilities, making them particularly vulnerable during crises. Age also affects access to social support and the ability to return to work after losing a job. Including age in the analysis will help to clarify how different age groups were affected during the lockdown (ILO, 2020).

Residential status is also a significant variable in the study, as it influences informal workers during the COVID-19 lockdown. Migrant workers, who lacked social security due to the absence of local documentation, were particularly vulnerable during the COVID-19 pandemic. Many migrant workers experienced exclusion from food distribution, healthcare, and relief programs during this crisis (Deshingkar, 2022; ILO, 2020). In contrast, local workers were more likely to access government help through community support networks. Therefore, residential status is crucial for identifying these disparities and emphasizing the need for inclusive social protection measures. In the study, residential status is a binary variable assigned a value of '0' if the respondent is a non-migrant (Local) and '1' if the respondent is a migrant.

The sector of employment is a significant variable as it affects informal workers differently across various sectors. In Goa, specific sectors such as tourism and domestic work experienced prolonged shutdowns, while some other sectors, such as construction, resumed earlier with limited capacity (Goa Economic Survey, 2021; ILO, 2020). While workers in specific sectors had better chances of income recovery, others remained unemployed for a long time. Including this variable helps in identifying which sectors were the most affected and what targeted policy support is required. In the study, sector of employment is a binary variable which takes the value '0' if the respondent works in the formal sector and '1' if he/she works in the informal sector.

The number of years of education indicates the type of employment the individuals are engaged in, and also their capacity for accessing the relief measures provided by the government during crises. Informal workers with a greater number of years of education are likely to engage in relatively secure jobs compared to those with limited years of education, who are more likely to be employed in low-skilled and precarious jobs, thereby increasing their susceptibility during crises such as the COVID-19 lockdown (ILO, 2020). Incorporating education as a variable in the analysis will help to understand the role played by education in understanding the coping mechanisms among informal workers. The number of years of education is a continuous variable indicating the number of years of formal education of the respondent.

Employment status is an important variable that helps in understanding the levels of job insecurity and economic hardship experienced by informal workers during the COVID-19 lockdown. The impact of the pandemic varied significantly among casual laborers, contract workers, and regular staff. Casual laborers were the most severely affected, as they lost their daily income due to the halt in economic activities. Contract workers also experienced job losses or service disruptions. Even regular workers in the informal sector, who usually lack contracts or employment benefits, faced wage cuts, layoffs, or breaks in service. Therefore, incorporating employment status in the study will help identify which groups of workers were most impacted during the pandemic. In the study, employment status is a categorical variable that takes the value '0' if the respondent is a regular worker, '1' if the respondent is a daily wage worker, and '2' if the respondent is working on a contract basis.

To evaluate the impact of the pandemic-induced lockdown, this study divided respondents into two groups: pre-pandemic and post-pandemic. The pre-lockdown period, serving as the baseline, included individuals who were working as of February 2020. The post-lockdown sample consisted of those affected by lockdowns in April-May 2020 and September-October 2020. Comparing the results from the post-pandemic period to the baseline helps estimate the extent of job loss and recovery during the pandemic relative to normal conditions. As a result, individuals employed before the lockdown faced three potential employment scenarios based on their status during the subsequent periods: lockdown in April-May 2020 and post-lockdown in September-October 2020.

- i. No effect: Individuals following this trajectory remain employed with the same salary during the lockdown and post-lockdown.
- ii. No recovery: These individuals lost their jobs during the lockdown and continue to be out of the workforce post-lockdown.
- iii. Recovery: These individuals who had lost their jobs or experienced a break in service during the lockdown but can return to work post-lockdown.

In this study, an individual is considered 'unemployed' if they have lost their job during the lockdown (conditional on being employed before the lockdown), regardless of whether they have reported themselves as available or willing to work subsequently. Since this study was restricted only to individuals who were in the workforce before the lockdown, i.e., January–February 2020, and interviewed only these individuals during and post-lockdown, this sample is called a trajectory sample. Based on the literature review and the research model used, the following null hypothesis is formulated.

H_{01} : *There is no significant association between gender and the likelihood of experiencing job loss, income reduction, or job insecurity during the lockdown.*

H_{02} : *There is no significant association between age and the likelihood of experiencing adverse employment outcomes during the lockdown.*

H_{03} : *Migration status (migrant vs. non-migrant) has no significant effect on the likelihood of experiencing job- or income-related distress during the lockdown.*

H_{04} : *Wage type is not significantly associated with the probability of job or income loss during the lockdown.*

H_{05} : *Education level has no significant association with employment vulnerability during the lockdown.*

3.1. Logit Model

The study employed six binary logistic regression models to examine the impact of COVID-19 on informal employment in Goa. Binary logistic regression was chosen because the dependent variable is binary or categorical, with only two possible outcomes. The first two binomial logistic models estimate the probability of job loss during the lockdown and the likelihood of not being employed after the lockdown. Model 1 and Model 2 also offer insights into the broader effects of job loss and lack of recovery among informal workers, regardless of their employment sector. Model 3 and Model 4 specifically analyze the impact on informal workers in the formal sector, while Model 5 and Model 6 focus on informal employment within the informal sector.

Model 1: Likelihood of Overall Job Loss.

$$L: \Pr(\text{OVERALL JOB LOSS} = 1) = \beta_0 + \beta_1 \text{GEN} + \beta_2 \text{SOCSECURITY} + i.\beta_3 \text{AGE} + \beta_4 \text{RES STATUS} + \beta_5 \text{SECTOR} + \beta_6 \text{YRS OF EDU} + i.\beta_7 \text{EMP} + u \quad (1)$$

Outcome variable = The likelihood of overall job loss with a categorical dependent variable that takes the value one if the individual has lost his/her job either during the lockdown (April–May 2020) or after the lockdown (September–October 2020), and zero otherwise.

Model 2: Likelihood of No Job Recovery Post-Lockdown.

$$L: \Pr(\text{OVERALL NO RECOVERY} = 1) = \beta_0 + \beta_1 \text{GEN} + \beta_2 \text{SOCSECURITY} + i.\beta_3 \text{AGE} + \beta_4 \text{RES STATUS} + \beta_5 \text{SECTOR} + \beta_6 \text{YRS OF EDU} + i.\beta_7 \text{EMP} + u \quad (2)$$

Outcome variable = The estimated job loss for those informal employees working in either the formal or informal sectors who either lost their job or had a break in service during the lockdown, and the likelihood of their not getting a job in the post-lockdown period, and zero otherwise.

Informal employment varies significantly across sectors in India, and within the services sector, it is predominantly informal in traditional sectors such as trade, transportation, small businesses, and other services. As the employment sector is a significant variable, the likelihood of job loss for informal workers employed in both formal and informal sectors is represented in the third and fourth logistic regression models.

Models 3 & 4: Sector-Specific Job Loss (Formal vs. Informal Sectors).

$$L: \Pr(\text{JOB LOSS FORMAL} = 1) = \beta_0 + \beta_1 \text{GEN} + \beta_2 \text{SOCSECURITY} + i.\beta_3 \text{AGE} + \beta_4 \text{RESSTATUS} + \beta_5 \text{SECTOR} + \beta_6 \text{YRS OF EDU} + i.\beta_7 \text{EMP} + u \quad (3)$$

$$L: \Pr(\text{JOB LOSS (INFORMAL)} = 1) = \beta_0 + \beta_1 \text{GEN} + \beta_2 \text{SOCSECURITY} + i.\beta_3 \text{AGE} + \beta_4 \text{RES STATUS} + \beta_5 \text{SECTOR} + \beta_6 \text{YRS OF EDU} + i.\beta_7 \text{EMP} + u \quad (4)$$

Outcome variable = The total estimated job loss for all informal workers working in the formal sector and in the informal sector, respectively, who either lost their job or had a break in service during the lockdown, and the likelihood of not being employed in the post-lockdown period, and zero otherwise.

Models 5 & 6: Sector-Specific No Recovery Post-Lockdown.

$$L: \Pr(\text{NO RECOVERY (FORMAL)} = 1) = \beta_0 + \beta_1 \text{GEN} + \beta_2 \text{SOCSECURITY} + i.\beta_3 \text{AGE} + \beta_4 \text{RES STATUS} + \beta_5 \text{SECTOR} + \beta_6 \text{YRS OF EDU} + i.\beta_7 \text{EMP} + u \quad (5)$$

$$L: \Pr(\text{NO RECOVERY (FORMAL)} = 1) = \beta_0 + \beta_1 \text{GEN} + \beta_2 \text{SOCSECURITY} + i.\beta_3 \text{AGE} + \beta_4 \text{RES STATUS} + \beta_5 \text{SECTOR} + \beta_6 \text{YRS OF EDU} + i.\beta_7 \text{EMP} + u \quad (6)$$

The predictor variables specified in all the models are gender, eligibility for social security, age, residential status, sector of employment, number of years of education, and type of employment in which the individual is engaged. The binary logistic regression models are estimated using STATA software version 14.

3.2. Profile of the Respondents

The study evaluated the socio-economic and employment profiles of informal workers to understand their vulnerability during the COVID-19 lockdown (Table 2). Women comprised a larger portion of respondents (59.6%) compared to men (40.4%), and most respondents (70.8%) lacked access to social security. The age distribution showed that 28.8% were between 15 and 24 years old, 35.2% were 25 to 34 years old, 15.2% were 35 to 44 years old, 11.2% were 45 to 54 years old, and 9.6% were 55 years or older. The average education level was 6.17 years, aligning with the ILO's observation that lower educational attainment is linked to higher informality. Among the 250 respondents, 66.4% were migrants, while 33.6% were Goan residents. Additionally, 52.4% of the workers were employed informally in the informal sector, while 47.6% worked in the formal sector. Regarding the type of job, 58.4% were daily wage earners, 32.8% were contract workers, and 8.8% held regular positions. During the lockdown, 67.2% of individuals lost their jobs, whereas 32.8% either experienced a break in service during the lockdown and subsequently resumed work or remained unaffected.

Table 2. Profile of informal workers in Goa (n=250).

Variables	Frequency	Percentage
Gender		
Male	101	40.4
Female	149	59.6
Access to social security		
Yes	73	29.2
No	177	70.8
Age		
15-24 years	72	28.8
25-34 years	88	35.2
35-44 years	38	15.2
45-54 years	28	11.2
55 years & above	24	9.6
Mean years of education	6.1	
Mean years of education (formal sector)	9.8	
Mean years of education (informal sector)	2.8	
Status of residence		
Migrant	166	66.4
Non-migrant	84	33.6
Sector of employment		
Formal sector	119	47.6
Informal sector	131	52.4

Variables	Frequency	Percentage
Type of workers		
Regular workers	22	8.8
Contract labour	82	32.8
Daily wage workers	146	58.4
Status of the job during lockdown		
Lost job during lockdown	168	67.2
Did not lose the job or have a break in service during lockdown, and joined work post-lockdown.	82	32.8

4. RESULTS AND DISCUSSION

While post-lockdown relaxations were expected to restore employment, this primarily benefited workers in the formal sector. Informally employed workers, lacking security, remained excluded from the workforce and were most affected during and after the lockdown. To analyze the sector-wise impact of COVID-19 on informal employees in Goa, the study used two logit models. The results, shown as marginal effects, are reported in columns 1 and 2 of Table 3.

4.1. Likelihood of Job Loss and Recovery for Informal Workers in the Formal and Informal Sectors

The likelihood of job loss was estimated using marginal effects in Model 1. The sector of employment proved to be a statistically significant predictor at the 5% significance level. After controlling for other factors, workers in the informal sector are, on average, 15.5% more likely to face job loss during the lockdown compared to their counterparts working informally within the formal sector. This indicates that, even after controlling for all demographic variables, informal workers in the informal sector are more vulnerable to labour market risks than their counterparts in the formal sector during economic downturns and crises.

Table 3. Marginal effects are reported at the mean for job loss and no recovery, overall, and for informal workers in both the formal and informal sectors.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Job loss overall	No job recovery overall	Job loss: Formal sector	Job Loss: informal sector	No job recovery: formal sector	No job recovery: Informal sector
	Marginal effects					
Sector: Informal (Base: Formal)	0.155 (0.011) **	0.178 (0.005) ***	-	-	-	-
Eligibility for social security: No (Base=Yes)	0.067 (0.212)	0.036 (0.515)	0.128 (0.111)	-	0.093 (0.267)	-
Gender: Female (Base: Male)	0.146 (0.001) ***	0.155 (0.001) ***	0.187 (0.015) **	0.074 (0.079) *	0.171 (0.034) **	0.107 (0.022) **
Age: 15-24 yrs. (Base: (55+ years))	0.202 (0.019) **	0.223 (0.012) **	0.514 (0.001) ***	-0.084 (0.304)	0.516 (0.002) ***	-0.025 (0.784)
Age: 25-34 years	0.136 (0.097) *	0.151 (0.073) *	0.347 (0.010) **	-0.012 (0.850)	0.340 (0.015) **	0.048 (0.572)
Age: 35-44 years	0.136 (0.068) *	0.185 (0.015) **	0.360 (0.006) ***	-0.083 (0.291)	.420 (0.003) ***	-0.024 (0.787)
Age: 45- 54 years	0.062 (0.306)	0.067 (0.262)	0.304 (0.009) ***	-0.0700 (0.248)	.267 (0.021) **	-0.020 (0.749)
Status of res: Migrant (Base: Non-migrant)	0.197 (0.000) ***	0.196 (0.000) ***	0.231 (0.003) ***	0.155 (0.001) ***	0.222 (0.006) ***	0.150 (0.003) ***
No. of years of education	-0.015 (0.011) **	-0.016 (0.006) ***	-0.029 (0.005) ***	0.001 (0.729)	-0.030 (0.005) ***	-0.0007 (0.906)
Emp type: Daily wage (Base: Regular salaried)	0.232 (0.026) **	0.264 (0.016) **	0.117 (0.325)	0.124 (0.003) ***	0.162 0.195	0.119 (0.007) ***
Contractual (Base: Regular salaried)	0.178 (0.129)	0.200 (0.102)	0.084 (0.556)	-	0.0321522 (0.829)	-
Constant	0.025	0.026	0.028	0.025	0.034691	0.015
Observations	250	250	119	131	119	131
Pseudo R square	0.463	0.435	0.328	0.504	0.2892	0.445

Note: Standard errors in parentheses.

*p<0.10, **p<0.05, ***p<0.01.

The second model assesses the likelihood of individuals not being employed in the post-lockdown period due to job loss during the lockdown. In this model, a significant difference is observed between workers in the formal and informal sectors. The sector of employment is found to be statistically significant at the 1% level. Hence, an individual who is working informally in the informal sector is, on average, 17.8% more likely to have experienced job loss during the lockdown than their counterparts in the formal sector, keeping other variables constant. This gap exists even after controlling for demographic factors. The COVID-19 pandemic disproportionately affected informal workers, who lacked the social protection provided by formal employment. As a result of this pandemic, their livelihoods were severely impacted, which resulted in prolonged hardship and a slower recovery.

4.2. Correlates of Job Loss and No Job Recovery for Workers Working Informally in the Formal and Informal Sectors

The first model estimates how the likelihood of job loss versus not losing the job varies with different socio-demographic characteristics separately for informal workers in both formal and informal sectors. For this model, the dependent variable is categorical, taking the value one if the individual has lost their job and zero if they have not. The second model assesses, conditional on job loss, how the likelihood of not getting a job compared to getting a job varies with different characteristics, again separately for workers working informally in the formal and informal sectors in Goa. The dependent variable equals one if the individual is not employed due to job loss during the lockdown and zero otherwise. The results are presented as marginal effects in columns 3-6 of [Table 3](#).

4.3. Gender

The study highlights a significant gender disparity in job losses during the COVID-19 lockdown, with informal female workers across both formal and informal sectors being disproportionately affected compared to their male counterparts ([Chakraborty, 2020](#); [Kesar, Abraham, Lahoti, Nath, & Basole, 2021](#); [Sumalatha et al., 2021](#)). The findings of the regression analysis indicate that, at the 1% significance level, females are on average 14.6% more likely to lose their jobs than males, controlling for the other variables. At the 5% significance level, women working informally within the formal sector face an 18.7% higher likelihood of job loss. At the 10% significance level, women in the informal sector are 7.4% more likely to lose their jobs than men, holding all other variables constant. These findings indicate that informal female workers are more vulnerable during the pandemic, with the risk being higher for those employed in the formal sector. This is due to the lack of formal employment contracts for informal workers in the formal sector ([ILO, 2021](#); [Kesar et al., 2021](#)).

The post-lockdown period did not reveal a significant recovery in the employment of women. Female workers continued to face substantial challenges in job recovery compared to men. The analysis indicates that, at the 1% significance level, women were 15.5% more likely to remain unemployed than men, after controlling for other factors. At the 5% significance level, women working informally in the formal sector were 17.1% more likely to be unemployed than their male counterparts. Similarly, women in the informal sector were 10.7% more likely to be unemployed compared to men, also at the 5% significance level. These findings emphasize the ongoing gender inequalities in the labor market, which are further worsened by women's disproportionate burden of unpaid care work, limiting their opportunities for re-employment.

4.4. Eligibility for Social Security

The National Commission for Enterprises in the Unorganized Sector defines formal workers as those who have access to social security. Although it is a constitutional right, many informal workers remain excluded. The study found no significant connection between social security eligibility and job loss or recovery in both formal and informal employment sectors.

4.5. Age

The study highlighted how job loss during the COVID-19 pandemic varied across age groups among informal workers. The findings of the study indicated that all age groups experienced significant job losses, supporting the findings of [Nath et al. \(2023\)](#), who reported widespread disruptions among informal workers. At the 5% significance level, workers aged 15–24 were 20.2% more likely to lose their jobs than those aged 54 and above, after controlling for other factors. Additionally, at the 10% significance level, individuals aged 25–34 and 35–44 were each 13.6% more likely to face job loss compared to the oldest age group. These findings highlight the particular vulnerability of younger informal workers to economic shocks resulting from the pandemic.

The impact of the COVID-19 pandemic was more severe for informal workers employed within the formal sector. At the 1% significance level, individuals in the age group of 15–24 years were, on average, 51.4% more likely to lose their jobs compared to those in the age group of 54 years and above, assuming other variables remain constant. Similarly, those in the age group of 25–34 years had a 34.7% higher likelihood of job loss at the 5% level of significance. These findings highlight pre-existing disadvantages faced by young informal workers, who were already economically and socially marginalized, often earning less and lacking job security before the pandemic ([Kesar et al., 2021](#)). The pandemic further worsened the vulnerabilities, especially among youth who were at the start of their careers or those who were yet to enter the labor market, due to the decline in employment opportunities, earnings, and deteriorating working conditions ([ILO, 2022](#)).

The trend also extended to older age groups. At the 1% significance level, workers in the age groups of 35–44 years and 45–54 years were 36% and 30.4% more likely, respectively, to lose their jobs compared to those aged 54 and above, as compared to the base category, under similar conditions. However, the marginal effects of age on job loss for workers employed informally within the informal sector were found to be statistically insignificant. This may be because employment in the informal sector is precarious and flexible, where age is not a barrier for entry or retirement, and individuals working in the informal sector continue to work as long as they are physically active and willing to take up any job during periods of economic crisis.

Youth were less likely to recover from job loss post-lockdown periods compared to older workers across both sectors. For many youth, informal employment represents their initial entry into the labour market. However, due to limited work experience, employers often hesitate to hire them permanently, as prior employment is seen as a key indicator of productivity ([Adeniran, Ishaku, & Yusuf, 2020](#)). The findings of the study indicate that at the 5% significance level, individuals within the age group of 15–24 years were, on average, 22.3% more likely to remain unemployed post-lockdown period compared to those in the age group of 54 years and above, holding all other variables constant. At the 10% significance level, individuals aged 25–34 years were 15.1% more likely to be unemployed post-lockdown compared to the same reference group. Additionally, among informally employed workers in the age group of 35–44 years, the likelihood of remaining unemployed was 18.5% higher at the 5% significance level. These results highlight the barriers faced by younger and middle-aged workers in getting employed post-lockdown, reflecting the challenges they face in the labour market.

The study also found that securing employment for individuals working informally within the formal sector was significant across all age groups. At a 1% significance level, individuals aged 15–24 were, on average, 51.6% less likely to find employment after the lockdown compared to the base category (54 years and older), holding all other variables constant. At a 5% significance level, those aged 25–34 were, on average, 34% more likely not to find work post-lockdown compared to the base group (54+ years), with all other variables held constant. Similarly, at a 1% significance level, individuals aged 35–44 working informally in the formal sector were, on average, 42% more likely not to be employed after the lockdown compared to the base category (54+ years), controlling for other factors. At a 5% significance level, those aged 45–54 working informally in the formal sector were, on average, 51.6% less likely to be employed post-lockdown than the base group (54+ years), with all other variables held constant. However, no

significant difference was observed across different age groups in the likelihood of securing employment post-lockdown among workers in the informal sector.

4.6. Status of Residence

The status of residence indicates whether the respondent is a migrant or a non-migrant. Migrants, due to low educational qualifications and a lack of skills, work in the informal economy. This sector was the worst affected during the pandemic, and many migrants have lost their livelihoods because of reverse migration (ILO, 2021).

Regarding overall job loss, the status of residence was statistically significant at the 1% level. Migrants were, on average, 19.7% more likely to lose their jobs during the lockdown compared to non-migrants, assuming all other variables are constant. Furthermore, at the same level of significance, migrants working informally in the formal sector are 23.1% more likely to lose a job than non-migrants who are working in the same sector. Similarly, migrants working in the informal sector have a higher likelihood of job loss, at 15.5%, compared to non-migrants in the same sector, all else being equal.

Regarding the likelihood of not being employed post-lockdown, the status of residence was found to be statistically significant at a 1% level. Therefore, an individual who is a migrant and works in either the formal or informal sector is, on average, 19.6% less likely to find a job post-lockdown, holding all other variables constant. Similarly, at a 1% significance level, an individual working informally in the formal sector is, on average, 22.2% more likely not to be employed after the lockdown, holding all other variables constant. At a 1% significance level, a migrant working in the informal sector is, on average, 15% more likely not to be employed after the lockdown than non-migrants working in the same sector, holding all other variables constant. Migrants were among the most severely affected by the COVID-19 pandemic, experiencing significant social and economic setbacks (ILO, 2022). After the lockdown, many remained unemployed due to reverse migration, restricted mobility, and business uncertainty, which made it difficult to find work in their home states.

4.7. Number of Years of Education

The study also highlights differences in impact among informal workers with varying education levels. On average, an informal worker working in the formal sector is more educated compared to a worker working in the informal sector. The overall average years of education for all workers, whether in the formal or informal sector, was 6.1 years. Informal workers in the formal sector had an average of 9.8 years of education, whereas those in the informal sector had only 2.8 years. The findings of the study indicated that the number of years of education had a negative impact on job loss, and it was statistically significant at the 5% level. Therefore, with every additional year of education, the likelihood of job loss is reduced by 1.5% for all informal workers working in either the formal or informal sector, assuming all other variables remain constant. At the 1% significance level, each additional year of education decreased the likelihood of job loss among informal workers working in the formal sector by 2.9%, holding other factors constant. However, the effects of the number of years of education on job loss were not significant for workers working informally in the informal sector. Higher education levels have served as a buffer against labour market disruptions, decreasing the risk of job loss (Daly, Buckman, & Seitelman, 2020). Thus, education provides a protective benefit for informal workers, as those with more years of education are more likely to receive protection from stable employment compared to those with fewer years of education (Kumar & Srivastava, 2020).

The overall likelihood of not being employed post-lockdown and the number of years of education were statistically significant at the 1% level. Therefore, with each additional year of education, the likelihood of being unemployed is reduced by 1.6% for individuals who are informally employed, either in the formal or informal sector, assuming all other variables are constant. Similarly, at a 1% significance level, for informal workers employed in the formal sector, an additional year of education decreases the likelihood of unemployment by 3%, holding all other

variables constant. The number of years of education and the likelihood of not being employed were insignificant for workers in the informal sector, as education is not considered a key indicator for obtaining a job in this sector.

4.8. Type of Employment

Type of employment refers to the kind of job held by the worker. The findings of the study revealed that daily wage workers are faced with greater job losses during the pandemic compared to other workers. At a 5% significance level, a worker who works as a daily wage earner was, on average, 23.2% more prone to job loss than those employed in other types of employment, assuming all other factors remain constant. Additionally, at a 1% significance level, a daily wage worker working in the informal sector was about 12.4% more likely to lose their job, all other variables being the same. The halt of economic activities and limited job opportunities led to a substantial loss of livelihood for daily wage workers. However, job loss among daily wage workers working in the formal sector and those who were working on a contractual basis, either in the formal or informal sectors, did not show statistical significance compared to other forms of employment.

The overall probability of not getting a job post-lockdown was statistically significant at a 5% level. Therefore, a daily wage worker in the formal sector was, on average, 26.4% more likely to not get a job post-lockdown, assuming all other factors are constant. At a 1% significance level, a daily wage earner in the informal sector was, on average, 11.9% less likely to be unemployed compared to the base category, with all other variables held constant.

The COVID-19 lockdown had a substantial impact on informal workers in Goa. Women, youth, migrants, those with fewer years of education, and daily wage workers experienced greater job losses and a slower recovery post-lockdown. However, informal workers in the formal sector experienced a relatively quicker rebound in employment post-lockdown.

5. LIMITATIONS

This study defines informal workers based on the definition provided by the National Commission for Enterprises in the unorganised sector. Therefore, only those individuals who lack social security, regardless of whether they work in the formal or informal sector, are considered for the study. Due to the absence of comprehensive data on the number of workers who are informally employed, the study had to be restricted only to six talukas in Goa, three talukas in North Goa, and three talukas in South Goa.

Since the data was collected during the COVID-19 pandemic, there was an unanticipated delay in the collection of data due to the lockdown measures imposed by the government from time to time.

6. SUGGESTIONS FOR FUTURE RESEARCH

The current study has identified the impact of the COVID-19 pandemic on informal workers in Goa, with a special focus on gender, sector of employment, and migration status. There is also a need to study whether informal sector entrepreneurs have faced similar challenges due to the COVID-19 pandemic, such as reduced demand, income decline, access to credit, and coping mechanisms adopted during this period. This would help in shaping policy interventions aimed at supporting informal entrepreneurs in the event of future crises.

7. CONCLUSION AND POLICY IMPLICATIONS

The COVID-19 pandemic has severely disrupted labour markets across the world and resulted in large-scale job losses, especially among informal workers in India. While some recovery occurred, the impact on livelihoods was long-lasting and deeply felt. Vulnerable groups such as women, youth, migrants, and the less educated—were hit hardest due to their lack of job security and access to social protection. Informal women workers, particularly in domestic roles, suffered severely, facing job loss, reduced income, financial stress, and heightened exposure to domestic violence without legal safeguards or social security. Migrant informal workers similarly faced wage cuts,

job insecurity, and unstable conditions. The crisis exposed and deepened structural inequalities in India's labour market, underscoring the urgent need for inclusive labour reforms and comprehensive social security, particularly for informal female workers. Sector-specific support programs should prioritize tourism-related livelihoods through wage assistance and skills training. Gendered supportive policies, including childcare provisions and flexible work arrangements, could help mitigate the disproportionate burdens faced by women. Creating alternative livelihood opportunities would reduce dependence on volatile sectors, while improved data systems would enable the timely identification of vulnerable groups. These measures would strengthen Goa's informal economy against future shocks while promoting equitable recovery. The findings underscore the need for inclusive policies that recognize the contributions and vulnerabilities of informal workers in tourism-driven regions.

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