



Exploring Health Risks of Working Women in Rural Bangladesh: Dual Burden of Communicable and Non-Communicable Diseases

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ABSTRACT: Background: Occupational risk factors, including prolonged working hours, physical labor, and environmental exposure, significantly impact workers' health. Understanding these associations is crucial to developing effective workplace health interventions. **Objective:** To assess the association between occupational risk factors and health conditions among participants in a cross-sectional study. **Methods:** This cross-sectional study was conducted in three upazilas of Khulna District Koyra, Paikgacha, and Tala between January and June 2023. A total of 300 working women from diverse occupations were selected using stratified random sampling. Data were collected through structured questionnaires and clinical assessments. Key occupational risk factors examined included prolonged working hours, physical labor, and environmental exposure. Health conditions analyzed included musculoskeletal problems, mental health issues, hypertension, respiratory problems, and skin conditions. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated to evaluate associations, with a significance threshold of $p < 0.05$. **Results:** Prolonged working hours (>8 hours/day) were significantly associated with musculoskeletal problems (OR: 2.45, 95% CI: 1.68–3.57, $p < 0.001$) and mental health issues (OR: 1.87, 95% CI: 1.24–2.82, $p = 0.003$). Physical labor was strongly linked to back pain (OR: 3.12, 95% CI: 2.15–4.52, $p < 0.001$) and joint problems (OR: 2.78, 95% CI: 1.89–4.09, $p < 0.001$). Environmental exposure significantly increased the likelihood of respiratory problems (OR: 2.34, 95% CI: 1.67–3.28, $p < 0.001$) and skin conditions (OR: 1.98, 95% CI: 1.34–2.92, $p = 0.002$). Hypertension was also associated with long working hours (OR: 1.56, 95% CI: 1.12–2.17, $p = 0.008$). **Conclusion:** Occupational risk factors are significantly associated with various health conditions, emphasizing the need for targeted workplace interventions, such as ergonomic adjustments, mental health support, and protective measures. Addressing these factors can improve workers' health and productivity.

Keywords: Occupational Health, Risk Factors, Musculoskeletal Problems, Workplace Interventions.

INTRODUCTION

Occupational health is an integral aspect of public health, addressing the myriad health challenges faced by individuals in their work environments. Rural working women represent a significant demographic whose health needs often remain underexplored, especially in low- and

middle-income countries. These women face a dual burden of communicable and non-communicable diseases due to occupational exposures, socioeconomic constraints, and limited access to healthcare services [1]. Rural women often engage in labor-intensive occupations such as agriculture, small-scale trading, and domestic work, which

expose them to physical, chemical, and biological hazards. Prolonged physical labor and suboptimal working conditions are associated with musculoskeletal disorders, respiratory problems, and skin conditions [3, 4]. In addition, exposure to environmental pollutants and lack of proper protective equipment exacerbate their vulnerability to various health risks. The intersection of occupational stress, long working hours, and inadequate rest also contributes to mental health challenges, including anxiety and depression³. Communicable diseases remain prevalent among this population, driven by factors such as poor sanitation, limited access to clean water, and inadequate health education. Waterborne diseases, respiratory infections, and vector-borne illnesses are common among rural working women [4]. Simultaneously, the rise in non-communicable diseases, including hypertension, diabetes, and cardiovascular conditions, adds another layer of complexity to their health profile. The coexistence of these disease burdens underscores the need for targeted interventions [5]. Globally, studies have highlighted similar health challenges faced by rural working women. For instance, research in sub-Saharan Africa reported a high prevalence of musculoskeletal problems among female agricultural workers, attributed to repetitive motions and heavy lifting [6]. Similarly, studies from Southeast Asia emphasize the impact of long working hours on mental health and the rising prevalence of lifestyle-related conditions among rural women [7]. These findings resonate with the health issues observed in rural Bangladesh, where cultural, environmental, and economic factors further shape the health outcomes of working women [8]. In Bangladesh, rural working women often lack access to quality healthcare services. Geographic isolation, financial barriers, and cultural norms restrict their ability to seek timely medical care. Government healthcare facilities are often under-resourced, and reliance on traditional healers or self-medication is common. This gap in healthcare access not only delays treatment but also perpetuates preventable morbidity and mortality [9]. The occupational health challenges faced by rural working women are compounded by socioeconomic determinants¹⁰. Education plays a pivotal role in shaping health outcomes; women with lower educational attainment are less likely to adopt preventive health behaviors or seek medical

advice. Economic constraints limit their ability to afford nutritious food, leading to malnutrition and associated health issues such as anemia. Moreover, family responsibilities often take precedence over personal health, further exacerbating their vulnerability [10, 11]. Existing policy frameworks in Bangladesh and other developing countries have largely overlooked the specific needs of rural working women [12, 13]. Although national health programs address maternal and child health, occupational health remains an underprioritized area. There is an urgent need for integrated strategies that address both communicable and non-communicable diseases among this demographic. These strategies should include workplace interventions, community-based health education programs, and improved access to healthcare services [14, 15]. This study aims to bridge the knowledge gap by exploring the dual burden of communicable and non-communicable diseases among rural working women in Bangladesh. By examining the socio-demographic, occupational, and health characteristics of these women, the research seeks to identify risk factors and inform the development of targeted interventions. The findings will contribute to the broader discourse on occupational health and underscore the importance of addressing gender-specific health disparities in rural settings.

METHODOLOGY

This cross-sectional study was conducted in three upazilas of Khulna District, namely Koyra, Paikgacha, and Tala, between January and June 2023. The study aimed to explore the dual burden of communicable and non-communicable diseases among working women in rural areas. A total of 300 women engaged in various occupations, such as teaching, agriculture, small businesses, and domestic work, were selected for the study using a stratified random sampling technique to ensure diverse representation. Data collection was performed using a structured, interviewer-administered questionnaire. The questionnaire comprised sections on sociodemographic information, occupational details, lifestyle factors, disease history, and current health conditions. The questionnaire was developed in both English and Bengali, with pretesting conducted on a small group of participants to ensure clarity and cultural appropriateness. Trained field researchers collected

data through face-to-face interviews conducted at participants' homes or workplaces, maintaining confidentiality throughout the process. Written informed consent was obtained from all participants before their inclusion in the study. The consent form, along with a detailed explanation of the study objectives and procedures, was provided in the local language to ensure comprehension. Participants were assured of their voluntary participation and the confidentiality of their data.

Anthropometric measurements such as height, weight, and blood pressure were recorded using standardized tools. Additionally, clinical history was gathered through self-reported symptoms and diagnoses confirmed by healthcare professionals. Data on communicable diseases, such as tuberculosis and hepatitis, were collected alongside information on non-communicable conditions like diabetes and hypertension.

RESULTS

Table 1: Socio-Demographic Characteristics of Participants (N=300)

Characteristics	Categories	Frequency	Percentage
Age (years)	20-29	84	28.0
	30-39	134	44.7
	≥40	82	27.3
Education	No formal education	36	12.0
	Primary	90	30.0
	Secondary	88	29.3
	Higher secondary & above	86	28.7
Marital Status	Married	216	72.0
	Unmarried	58	19.3
	Divorced/Widowed	26	8.7
Family Type	Nuclear	190	63.3
	Joint	110	36.7
Monthly Family Income	<20,000 BDT	105	35.0
	20,000-30,000 BDT	120	40.0
	>30,000 BDT	75	25.0

Table 1 presents the socio-demographic characteristics of the participants. The mean age was 34.7 ± 8.2 years, with 44.7% of participants belonging to the 30-39 age group. Education levels varied, with 29.3% having secondary education.

The majority (72.0%) were married, and 63.3% lived in nuclear families. Monthly family income indicated that 40.0% were in the middle-income group (20,000-30,000 BDT).

Table 2: Occupational Characteristics of Participants (N=300)

Characteristics	Categories	Frequency	Percentage	p-value
Occupation Type	Service	123	41.0	0.045
	Business	78	26.0	
	Agriculture	54	18.0	
	Others	45	15.0	
Daily Working Hours	<6 hours	42	14.0	<0.001
	6-8 hours	189	63.0	
	>8 hours	69	23.0	
Work Experience	<5 years	102	34.0	0.023
	5-10 years	138	46.0	
	>10 years	60	20.0	

Table 2 highlights the occupational characteristics of the participants. Most participants (41.0%) were employed in service-related fields.

Regarding work hours, 63.0% worked between 6-8 hours daily. Significant differences were observed in work experience across occupations ($p=0.023$).

Table 3: Disease Prevalence Among Participants (N=300)

Disease Category	Type	Frequency	Percentage	p-value
Communicable Diseases	Respiratory infections	87	29.0	<0.001
	Waterborne diseases	75	25.0	
	Skin infections	63	21.0	
Non-communicable Diseases	Musculoskeletal problems	116	38.7	<0.001
	Hypertension	92	30.7	
	Diabetes	72	24.0	

Table 3 outlines the prevalence of common diseases. Musculoskeletal issues (38.7%) were the most common non-communicable disease, while

respiratory infections (29.0%) were the leading communicable disease.

Table 4: BMI Distribution (N=300)

BMI Category	Frequency	Percentage	Mean±SD	p-value
Underweight (<18.5)	36	12.0	17.8±0.6	<0.001
Normal (18.5-24.9)	141	47.0	22.4±1.9	
Overweight (25-29.9)	123	41.0	27.6±1.4	

Table 4 provides data on BMI distribution, with 41.0% of participants classified as overweight. The mean BMI was 25.4±3.6 kg/m².

Table 5: Healthcare Access and Utilization (N=300)

Healthcare Type	Categories	Frequency	Percentage	p-value
Primary Facility	Government facilities	211	70.3	<0.001
	Private clinics	63	21.0	
	Traditional healers	26	8.7	
Self-Medication	Yes	117	39.0	0.032
	No	183	61.0	

Table 5 summarizes healthcare access. A large proportion (70.3%) relied on government facilities, while 39.0% reported self-medication.

Table 6: Association between occupational factors and health conditions (N=300)

Risk Factor	Health Condition	Odds Ratio	95% CI	p-value
Working Hours (>8 hrs)	Musculoskeletal problems	2.45	1.68-3.57	<0.001
	Mental health issues	1.87	1.24-2.82	0.003
	Hypertension	1.56	1.12-2.17	0.008
Physical Labor	Back pain	3.12	2.15-4.52	<0.001
	Joint problems	2.78	1.89-4.09	<0.001
Environmental Exposure	Respiratory problems	2.34	1.67-3.28	<0.001
	Skin conditions	1.98	1.34-2.92	0.002

Table 6 presents the analysis of risk factors associated with health conditions. Participants working more than 8 hours daily showed a

significant association with musculoskeletal problems (OR: 2.45, 95% CI: 1.68-3.57, $p<0.001$) and mental health issues (OR: 1.87, 95% CI: 1.24-2.82,

$p=0.003$). Additionally, physical labor was strongly linked to back pain (OR: 3.12, 95% CI: 2.15-4.52, $p<0.001$) and joint problems (OR: 2.78, 95% CI: 1.89-4.09, $p<0.001$). Environmental exposure significantly increased the odds of respiratory problems (OR: 2.34, 95% CI: 1.67-3.28, $p<0.001$) and skin conditions (OR: 1.98, 95% CI: 1.34-2.92, $p=0.002$).

DISCUSSION

This study provides a comprehensive analysis of occupational risk factors and their association with health conditions among participants. The findings align with existing literature, underscoring the significant health burden associated with prolonged working hours, physical labor, and environmental exposure. Prolonged working hours (>8 hours/day) were significantly associated with musculoskeletal problems (OR: 2.45, 95% CI: 1.68-3.57, $p<0.001$) and mental health issues (OR: 1.87, 95% CI: 1.24-2.82, $p=0.003$). This finding corroborates studies by Antonopoulou MD *et al.*, which found a 2.3 times increased risk of musculoskeletal disorders among individuals working extended hours in industrial settings [16]. Similarly, a meta-analysis by Sabri TAT *et al.* demonstrated a 1.9-fold higher risk of depression among workers with extended work schedules. The strain of long hours likely exacerbates physical and mental stress, contributing to these adverse outcomes [17]. Participants engaged in physical labor had significantly higher odds of back pain (OR: 3.12, 95% CI: 2.15-4.52, $p<0.001$) and joint problems (OR: 2.78, 95% CI: 1.89-4.09, $p<0.001$). This aligns with the findings of Latza U *et al.*, who reported a threefold increased risk of back pain in manual laborers, particularly those involved in repetitive tasks [18]. Joint problems are similarly linked to repetitive strain and improper ergonomics, as highlighted by a study in construction workers by Tao *et al.* [19]. Environmental exposure was strongly associated with respiratory problems (OR: 2.34, 95% CI: 1.67-3.28, $p<0.001$) and skin conditions (OR: 1.98, 95% CI: 1.34-2.92, $p=0.002$). These results are consistent with findings from WHO (2020), which highlighted that occupational exposure to dust and chemicals increased the risk of respiratory diseases by 2.5 times [20-31]. Skin conditions, such as contact dermatitis, have also been reported in studies involving agricultural workers exposed to

pesticides, as described by Irby *et al.* [33]. Working long hours was also associated with hypertension (OR: 1.56, 95% CI: 1.12-2.17, $p=0.008$). This observation mirrors the conclusions of a cohort study by Liu *et al.*, which identified a 1.6-fold increased risk of hypertension among individuals with high occupational stress [34]. Prolonged stress likely triggers sympathetic nervous system activation, contributing to elevated blood pressure.

Limitations and Recommendations

While this study provides valuable insights, it is limited by its cross-sectional design, which precludes establishing causality. Future longitudinal studies are recommended to explore the temporal relationships between occupational factors and health outcomes. Additionally, interventions such as ergonomic training, mental health support, and protective equipment should be prioritized to mitigate these risks.

CONCLUSION

This study highlights the significant associations between occupational risk factors and various health conditions, emphasizing the need for targeted workplace interventions. By addressing prolonged working hours, physical labor, and environmental exposure, policymakers and employers can improve occupational health and reduce the burden of work-related diseases.

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