PROCEEDING

2nd Banten International Conference on Health Advancement & Research
binar@poltekkesbanten.ac.id
https://binar.poltekkesbanten.ac.id/
Vol. 1 No. 2 (2026)

THE RELATIONSHIP BETWEEN WORK POSTURE AND MUSCULOSKELETAL DISORDERS (MSDs) COMPLAINTS AMONG HOUSEWIFE PLASTIC WOVEN BAG WORKERS IN BINTOYO VILLAGE

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ABSTRACT

Housewives working as plastic woven bag crafters in Bintoyo Village, Ngawi Regency are informal sector workers vulnerable to work-related health problems. Manual weaving activities involving repetitive movements and non-ergonomic static sitting positions (stooping and bending the neck) are primary risk factors for Musculoskeletal Disorders (MSDs). This study aims to analyze the relationship between work posture and MSDs complaints among this worker group. This study utilized a quantitative analytical design with a cross-sectional approach. The study population consisted of all 90 housewives working as plastic woven bag crafters in Bintoyo Village. A sample of 47 respondents was selected using a purposive sampling technique. Work posture was assessed using the Rapid Entire Body Assessment (REBA) method with the assistance of the Angulus software, while MSDs complaints were identified using the Nordic Body Map (NBM) questionnaire. Bivariate analysis was conducted using the Spearman Rank Correlation Test. Univariate analysis showed that the majority of respondents had a moderate risk work posture (55.3%, n=26) and experienced a high level of MSDs complaints (55.3%, n=26). Bivariate analysis revealed a statistically significant, strong, and positive correlation between work posture and MSDs complaints ($p = 0.000$; $r = 0.664$). There is a significant relationship between work posture and Musculoskeletal Disorders (MSDs) complaints among housewife plastic woven bag workers in Bintoyo Village; less ergonomic work postures directly correspond to higher MSDs complaints. It is recommended that local community enterprises (BUMDes) facilitate ergonomic workstations and promote Occupational Health and Safety (OHS) interventions in the informal sector.

Keywords: ***Work Posture, Musculoskeletal Disorders (MSDs), REBA, Nordic Body Map (NBM)***

INTRODUCTION

Workers in the informal sector represent a self-employed population operating largely outside formal regulatory frameworks, leading to limited access to healthcare services and Occupational Health and Safety (OHS) protections. The home industry of plastic woven bag manufacturing is a vital informal sector supporting the local grassroots economy. However, despite its economic contribution, the application of ergonomic principles in designing work environments within this sector remains largely neglected.

Weaving tasks are performed manually in static sitting positions (cross-legged on the floor or using low backless wooden stools), with prolonged neck flexion and forward trunk bending. Repetitive strain combined with continuous static muscular loading without adequate body support leads to strain and injury of the musculoskeletal system, commonly known as Musculoskeletal Disorders (MSDs). The International Labour Organization (ILO) estimates that approximately 30% of workers worldwide suffer from musculoskeletal complaints caused by non-ergonomic work practices.

Based on a preliminary study conducted among woven bag crafters in Bintoyo Village, the majority of workers reported persistent pain in the lower back, upper back, neck, and wrists. Therefore, this study focuses specifically on evaluating the relationship between work posture and Musculoskeletal Disorders (MSDs) complaints among housewife plastic woven bag workers in Bintoyo Village, Padas District, Ngawi Regency.

MATERIALS AND METHODS

This study employed a quantitative analytical survey design with a cross-sectional approach, conducted in Bintoyo Village, Padas District, Ngawi Regency. The target population consisted of all 90 housewives working as plastic woven bag crafters in the village. The sample size was determined using Slovin's formula, yielding a total of 47 respondents. The sampling technique applied in this study was purposive sampling, in which participants were selected based on predetermined inclusion criteria established by the researcher.

This study involved two main variables: the independent variable, work posture, and the dependent variable, Musculoskeletal Disorders (MSDs) complaints. Work posture was assessed directly using the Rapid Entire Body Assessment (REBA) observation sheet, supported by the Angulus application to obtain more accurate measurements of body joint angles, including the neck, trunk, upper arms, lower arms, wrists, and legs. Meanwhile, MSDs complaints were measured using the standardized Nordic Body Map (NBM) questionnaire, which assesses the severity of pain across 28 anatomical body regions.

Data analysis in this study was conducted in two stages. Univariate analysis was performed to present the frequency distribution of each variable under study. Subsequently, bivariate analysis was conducted to examine the relationship between work posture and MSDs complaints using the Spearman Rank Correlation Test. This test was selected based on the results of the normality test using the Shapiro-Wilk test, which indicated that the data were not normally distributed, thereby justifying the use of a non-parametric statistical test. Hypothesis testing was performed at a significance level of $\alpha = 0.05$.

RESULTS AND DISCUSSION

Univariate Analysis

Data collected from 47 respondents provided the frequency distributions for work posture risk levels and MSDs complaint severity, as presented in Tables 1 and 2. As shown in Table 1, the majority of workers fell into the medium-risk ergonomic category (55.3%, n = 26), followed by the low-risk category (27.7%, n = 13) and the high-risk category (17.0%, n = 8), with none of the respondents classified into the very high-risk category

Table 1 Frequency Distribution of Work Posture Risk Levels (REBA)

REBA Risk Category	Frequency (f)	Precentage (%)
Low Risk	13	27,7
Medium Risk	26	55,3
High Risk	8	17,0
Very High Risk	0	0,0
Total	**47**	**100,0**

Main data source, 2026

This predominance of medium- to high-risk postures is largely driven by prevailing work habits among the crafters, such as sitting floor-bound or on low stools without lumbar support, which force the body to adopt non-neutral positions throughout prolonged working hours. Crafters were consistently observed maintaining bent neck angles, stooped spines, and repetitive wrist movements during the weaving process—postural patterns that place persistent static strain on the muscular system, particularly given the extended duration over which such positions are sustained.

Table 2 presents the distribution of MSDs complaint severity among respondents. More than half of the respondents (55.3%, n = 26) suffered from high-severity MSDs complaints, while 36.2% (n = 17) reported moderate-severity complaints and only 8.5% (n = 4) reported low-severity complaints.

Table 2. Frequency Distribution of Musculoskeletal Disorders (MSDs) Complaints

MSDs Severity Level (NBM)	Frequency (f)	Precentage (%)
Low	4	8,5
Moderate	17	36,2
High	26	55,3
Very High	0	0,0
Total	**47**	**100,0**

Main data source, 2026

This high prevalence of severe MSDs complaints corresponds closely with the elevated postural risk identified in Table 1, and appears to stem from a combination of sustained static loading and repetitive muscular exertion, particularly in the upper extremities. Among the anatomical regions assessed, the neck,

upper back, lower back, and wrists were most frequently reported as experiencing discomfort, reflecting the specific body segments most heavily burdened during the weaving activity.

Bivariate Analysis

Prior to hypothesis testing, the Shapiro-Wilk normality test was conducted for both variables, yielding a p-value of 0.000 ($p < 0.05$) for each, confirming that the data were not normally distributed. Consequently, the non-parametric Spearman Rank Correlation test was applied to examine the relationship between work posture and MSDs complaints, with the results presented in Table 3.

Tabel 3. Correlation Analysis Between Work Posture and MSDs Complaints

Variabel Tested	p-value (Sig.)	Correlation Coefficient (r)	Interpretation
Work Posture vs. MSDs Complaints	0,000	0,664	Significant, Strong & Positive Correlation

Main data source, 2026

The Spearman Rank test yielded a significance value of $p = 0.000$ ($p < 0.05$), leading to the acceptance of the alternative hypothesis (Ha). The correlation coefficient ($r = 0.664$) establishes a strong, positive relationship between work posture and MSDs complaints, indicating that as ergonomic posture risk scores increase, the severity of MSDs symptoms also increases correspondingly—that is, crafters working in riskier postures are more likely to experience more severe musculoskeletal complaints.

From a biomechanical perspective, stooped and bent working postures force the spinal and cervical musculature to support the weight of the upper body under conditions of mechanical disadvantage. When such postures are sustained over extended periods, prolonged muscle contraction restricts local blood circulation and oxygen delivery to the affected tissues. This impaired circulation contributes to the accumulation of lactic acid, resulting in muscular fatigue and localized pain. These findings are consistent with the ergonomic theory proposed by Tarwaka (2015), which identifies awkward working postures as a primary determinant of musculoskeletal damage among manual workers.

Taken together, these findings indicate that the predominantly stooped, floor-bound working postures adopted by plastic woven bag crafters in Bintoyo Village are strongly associated with the high prevalence of severe MSDs complaints observed in this population, underscoring the need for ergonomic interventions—such as the provision of appropriate seating with lumbar support and periodic postural breaks—to reduce musculoskeletal risk among informal home-based craft workers.

CONCLUSION

The majority of housewife plastic woven bag crafters in Bintoyo Village exhibit medium-risk work postures (55.3%). A significant proportion of these workers experience high-level Musculoskeletal Disorders (MSDs) complaints (55.3%). There is a statistically significant, strong, and positive relationship ($p = 0.000$; $r = 0.664$) between work posture and Musculoskeletal Disorders (MSDs) complaints among housewife plastic woven bag workers in Bintoyo Village, Padas District, Ngawi Regency

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