

## RELATIONSHIP BETWEEN WORK POSTURE AND CORE MUSCLE WEAKNESS WITH LOWER BACK DISABILITY AMONG BANKERS. CROSS SECTIONAL STUDY

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### ABSTRACT

#### **Background:**

Banking workers are subjected to prolonged sitting and non-ergonomic working postures, which can lead to musculoskeletal issues, reducing core muscle endurance and resulting in low back discomfort. Core muscular weakness reduces spinal stability, which contribute to functional impairment. Understanding the association between work posture and core muscle strength is critical for addressing lower back pain among bankers.

#### **Objective:**

To determine the relationship between work posture and core muscle weakness with lower back disability among bankers.

#### **Methodology:**

A **cross-sectional** study of 109 bankers aged 20 to 50 years was undertaken using a purposive sampling technique. Participants who worked more than 6 hours each day and experienced low back discomfort were included. Data were collected including the Rapid Entire Body Assessment (REBA) for posture evaluation and the Modified Oswestry Disability Index (MODI) for disability assessment. The data were analyzed with SPSS version 27.

#### **Results:**

The findings showed the average age of participants was  $35.73 \pm 8.58$  years, with both males (54.1%) and females (45.9%). Postural assessments revealed that a large majority of participants had suboptimal working postures, such as bent trunks, twisted stances, and unstable leg posture. The MODI results revealed moderate to severe disability among participants, primarily affecting daily tasks such as sitting, standing, and traveling. Work posture has a significant positive correlation with lower back impairment ( $r = 0.735, p < 0.01$ ).

**Conclusion:**

*The study concludes that poor work posture is significantly associated with lower back impairment among bankers. Core muscular weakness and prolonged sitting both contribute to increasing impairment. Improving posture and workplace ergonomics may assist to reduce lower back pain in this population.*

**Keywords:**

*Bank managers, Employees, REBA, Core weakness, Lower Back Disability, Cross-sectional study.*

## INTRODUCTION

Bank personnel labor long hours working in a single position, which contributes to basic weaknesses. Core weakness refers to weakness in the abdominal and back muscles caused by inactivity and poor posture during lengthy work hours. Muscular imbalances significantly enhance the incidence of musculoskeletal problems linked to low back pain. Inadequate muscle endurance, muscular imbalance, and illnesses of the lower limbs can arise from excessive tension on the back and lumbar spine. Both local/deep muscles (such as the transversus abdominis and lumbar multifidus) and global/superficial muscles (such as the rectus abdominis and erector spinae) that support torque/trunk movement and stability during physically demanding tasks are included in core stability.<sup>1</sup>

According to research, over 80% of people throughout the world have experienced LBP. It causes discomfort, substantial medical costs, and a considerable influence on the social economy. Loss of working hours is very costly for society. From 1990 to 2015, LBP accounted for 54% of global disability years, making it the major cause of disability. In March 2018, Lancet issued three publications urging immediate action to address the global LBP crisis.<sup>2</sup>

Sedentary lifestyles can lead to poor posture and an increased risk of musculoskeletal disorders (MSDs). These illnesses result from a weakening of the "core" muscle network. Excessive stress on the lumbar spine can cause muscle fatigue, hip extensor imbalance, back injury, and lower extremity instability, leading to paraspinal muscle atrophy. Long work hours can lead to muscular imbalances and raise the risk of musculoskeletal disorders, which are primarily brought on by weakness of the body's "core" or central muscles. Excessive strain on the back and lumbar spine can

result in lower-extremity problems, muscle fatigue, and imbalance. The "core" or central muscle weakening of the body is the primary cause of many disorders. Lower-extremity problems, muscle weariness, and imbalance can result from excessive tension on the back and lumbar spine.<sup>3</sup> The term "musculoskeletal diseases" (MSDs) refers to pain and inflammation brought on by soft tissue injuries and disorders, which include muscles, tendons, ligaments, joints, and cartilage. MSDs can affect almost any tissue, including nerves and tendons in the neck, shoulders, back, arms, and legs. MSD symptoms are associated with WMSDs. Almost any tissue, including tendons and nerves in the neck, shoulders, back, arms, and legs, can be impacted by MSDs. WMSDs are associated with MSD symptoms brought on by workers' prolonged sitting while performing their jobs. WMSDs not only have an impact on people's health and cause disability, but they also have major financial ramifications for those affected in terms of sick time and medical bills. WMSDs limit the work capacity of many employees, causing them to retire early.<sup>4</sup>

The current study is the first study to examine the impact of supported dynamic lumbar extension with an abdominal drawing-in maneuver (ADIM) approach on stature recovery in CLBP individuals. Fryer et al. (2010) developed a supported dynamic lumbar extension exercise that involved extending the lumbar spine with upper limb support for 5 seconds, then returning to a neutral position for 3 seconds, and repeating for four cycles. Fryer et al. (2010) found that this exercise can restore disc height in prolonged sitting individuals, as shown by magnetic resonance imaging. Activating deep trunk muscles with the ADIM approach reduces lumbar spinal load and improves stature recovery from compressive stresses in CLBP patients (Saiklang et al., 2020). Supported dynamic lumbar

extension using the ADIM approach may help enhance stature recovery in individuals with CLBP.<sup>5</sup>

The significance of this research is that it aims to expand knowledge from past research and act as a reference for new expertise in the health industry. The community becomes a source of information about the relationship between work posture, core muscle weakness, and the prevalence of low back disability among bank employees.

### LITERATURE REVIEW

A study by Anggreni et al., 2024 describe the relationship between work posture and core muscle endurance with low back disability among farmers. The rapid entire body assessment (REBA) was used to measure posture, the prone bridge test was used to measure core muscular endurance, and the modified Oswestry disability index (MODI) was used to measure lower back disability. This study used an analytical observational design with a cross-sectional investigation. The sample method used was basic random sampling, and the study's total sample size was 106. Basic random sampling was used as the sample technique. There were 106 participants in the study. Posture was evaluated using the rapid entire body assessment (REBA), core muscle endurance was measured using the prone bridge test, and lower back disability was measured using the modified Oswestry disability index (MODI). Conclusion of this research paper is that there is a considerable and high link between work posture and core muscle endurance with the incidence of lower back impairment.<sup>6</sup>

Putsa et al., 2022 studied this cross-sectional study who examined the reduce risk of musculoskeletal disorders among office workers. Participants aged 20-59 who used computers at work at least 4 days per week. The prevalence of MSDs was 37.9% (n = 207/545), with neck, shoulders, and back being the most common areas of complaint. There was no significant relationship between physical fitness and MSDs among office workers. After controlling for age, sex, body mass index, and comorbidities, moderate-to-vigorous intensity physical activity (MVPA)  $\geq 150$  min/week and sitting at work  $\geq 4$  h/day were identified as risk

factors for MSDs (OR = 1.57, 95%CI = 1.04–2.37). Changing positions from sitting to standing or walking every hour at work could cut MSD chances by more than 30%. Office workers who commuted under high stress and slept for less than 6 hours per day (1.6 to 2.4 times) were more likely to develop MSDs.<sup>7</sup>

Determine by Aytutuldu et al., 2022 the relation of musculoskeletal pain and work-related factors among Turkish office worker using computer. The study involved 150 office workers and collected data using an online survey that included the Nordic musculoskeletal questionnaire, the Oswestry disability index (ODI), the neck disability index (NDI), and the Disability of the Back, Arm, Shoulder, and Hand Questionnaire Short-form. The participants were divided into four subgroups: no pain (n = 26), lower back discomfort (n = 37), neck pain (n = 49), and upper extremity pain (n = 38). The Nordic musculoskeletal questionnaire, the Oswestry disability index (ODI), the neck disability index (NDI), and the Disability of the Back, Arm, Shoulder, and Hand Questionnaire Short-form were among the online surveys used to gather data. Four subgroups of participants were identified: those with no pain (n = 26), those with lower back discomfort (n = 37), those with neck pain (n = 49), and those with upper extremity pain (n = 38). Numerous risk variables, such as physical inactivity, body mass index, working hours, working years, and workplace ergonomics, have been associated with pain-related impairment in office workers.<sup>8</sup>

Studied by Jia et al., 2022 determine the prevalence and risk factors of low back pain among industries worker of China. With the acceleration of industrialization and population aging, low back pain (LBP) has emerged as the primary cause of disability-related life loss. A modified epidemiological cross-sectional survey approach, and a stratified cluster sampling technique. The annual incidence of lower back pain among workers in China's important sectors is 16.4%. The multivariate regression model identified risk factors for LBP, including frequent repetitive movements with the trunk, working in the same positions at a high pace, trunk position, frequently

turning around with your trunk, working overtime, lifting heavy loads (more than 20 kg), education level, staff shortage, working age (years), cigarette smoking, use of vibration tools at work, body mass index, lifting heavy loads (more than 5 kg), and age. In order to reduce the detrimental effects of LBP on workers' health, it is essential to apply suitable solutions based on the individual, occupational, and psychological features of LBP. This is because LBP is highly prevalent among important industries and workers in China. Therefore, in order to reduce the detrimental effects of LBP on workers' health, it is essential to apply suitable measures based on the individual, occupational, and psychological features of LBP.<sup>2</sup> Negash et al.'s 2022 study examines the prevalence of low back pain and its contributing factors among medical staff at the University of Gondar Comprehensive and Specialized Hospital in Northwest Ethiopia. A cross-sectional study of 423 healthcare professionals was conducted at the institutional level. Following proportional allocation to each occupation, a sample was drawn from each using systematic random sampling. More over half of the individuals suffered from low back pain. In this study, being female, frequent bending, extended sitting, standing, and the type of profession were all statistically significant predictors of lower back discomfort. It is preferable to provide the hospital with proper assistive gadgets to reduce frequent bending and twisting by healthcare professionals.<sup>9</sup> In previous studies, has not been conducted to assess the core muscle weakness among bank employees with poor work posture and maximal

physical inactivity. As it is said precaution is better than cure, it is important to find out the relationship between poor work posture and core muscle weakness in bank employees, so as to help the bank employees from losing the working hours, taking leaves and avoiding other Musculoskeletal disorders caused due to core muscle weakness.

## **2.1: OBJECTIVE**

The objective of this study is to determine the relationship between work posture and core muscle weakness with lower back disability among Bankers.

## **2.2: Hypothesis**

### **2.2.1: Alternate Hypothesis**

There was significant relationship between work posture and core muscle weakness with lower back disability among Bankers.

### **2.2.2: Null Hypothesis**

There was no significant relationship between work posture and core muscle weakness with lower back disability among Bankers.

## **MATERIALS & METHODS**

### **3.1: Study Design:**

The study design was Cross sectional.

### **3.2: Study Setting:**

The study setting was held at Layyah Punjab, Pakistan.

### **3.3: Duration of Study:**

The study duration was 6 months after approval of synopsis.

### 3.4: Sample Size:

Raosoft®		Sample size calculator
What margin of error can you accept? <small>5% is a common choice</small>	<input type="text" value="5"/> %	The margin of error is the amount of error that you can tolerate. If 90% of respondents answer <i>yes</i> , while 10% answer <i>no</i> , you may be able to tolerate a larger amount of error than if the respondents are split 50-50 or 45-55. Lower margin of error requires a larger sample size.
What confidence level do you need? <small>Typical choices are 90%, 95%, or 99%</small>	<input type="text" value="95"/> %	The confidence level is the amount of uncertainty you can tolerate. Suppose that you have 20 yes-no questions in your survey. With a confidence level of 95%, you would expect that for one of the questions (1 in 20), the percentage of people who answer <i>yes</i> would be more than the margin of error away from the true answer. The true answer is the percentage you would get if you exhaustively interviewed everyone. Higher confidence level requires a larger sample size.
What is the population size? <small>If you don't know, use 20000</small>	<input type="text" value="150"/>	How many people are there to choose your random sample from? The sample size doesn't change much for populations larger than 20,000.
What is the response distribution? <small>Leave this as 50%</small>	<input type="text" value="50"/> %	For each question, what do you expect the results will be? If the sample is skewed highly one way or the other, the population probably is, too. If you don't know, use 50%, which gives the largest sample size. See below under <b>More information</b> if this is confusing.
Your recommended sample size is	<b>109</b>	This is the minimum recommended size of your survey. If you create a sample of this many people and get responses from everyone, you're more likely to get a correct answer than you would from a large sample where only a small percentage of the sample responds to your survey.

The sample size was 109 calculated by Raosoft.<sup>8</sup>

### 3.5: Sampling Technique:

The sampling technique was purposive sampling.

### 3.6: Sample Selection:

#### 3.6.1: Inclusion Criteria:

- Males and females.<sup>10</sup>
- Age between 20-50 years.<sup>1</sup>
- Working for more than 6 hours.<sup>11</sup>
- Disabling LBP in the previous month.<sup>12</sup>
- Voluntary participation.<sup>13</sup>
- Prone Bridge test.

#### 3.6.2: Exclusion Criteria:

- People with a history of spine fracture.<sup>14</sup>
- Post-operative complications.<sup>15</sup>
- Individuals who consistently exercise for 2-4 hours daily.<sup>1</sup>

### 3.7: Data Collection Tools:

- Rapid Entire Body Assessment (REBA)
- Modified Oswestry Disability Index (MODI)

#### 3.7.1: REBA:

Data was collected using the Rapid Entire Body Assessment (REBA) proposed by Drs. Sue Hignett and Lynn McAtamney. REBA is a 1-15 points screening tool for assessing level of musculoskeletal risk. REBA estimates the most prevalent, extended, or loaded postures.<sup>16</sup>

#### Scoring:

- 1 = Negligible risk
- 2-3 = Low risk
- 4-7 = Medium risk

8-10 = High risk

11-15 = Very High risk

#### 3.7.2: MODI:

Modified Oswestry Disability Index (MODI) is a tool used to measure the functional disability level in patients with low back pain. The questionnaire consisted of 10 sections, each with 6 statements, rated from 0 to 5. The total score is calculated by summing the values of each section and converting them into percentage.<sup>6</sup>

#### Scoring:

- 0-20% (Minimal)
- 21-40% (Moderate)
- 41-60% (Severe)
- 61-80% (Crippled)
- 81-100% (Bedbound)

### 3.8: Data Collection Procedure:

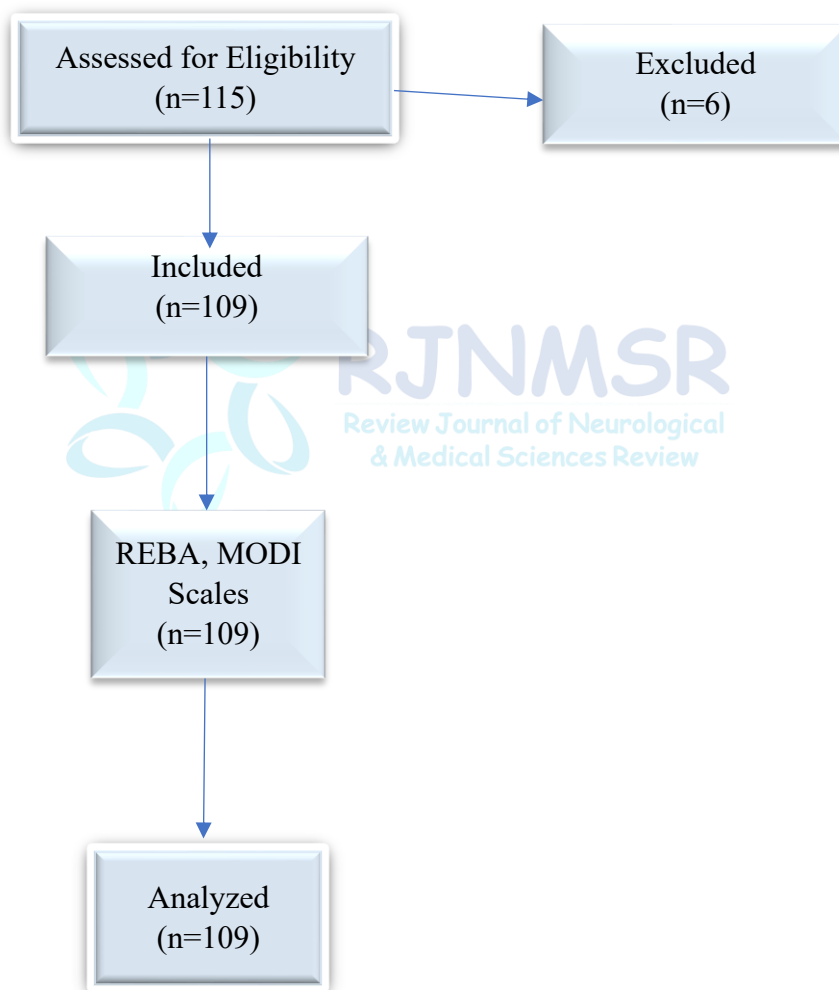
The subject who meets the inclusion criteria was included in this study. The nature and purpose of study along with questionnaires was explained to each and every subject. Consent was taken and MODI questionnaire was performed to confirmed the levels of disability, as it is clinically validated approach that specifically addresses the functional disability in patients with low back pain. The REBA was used for posture assessment, Prone Bridge test use to measure core muscle endurance, strong reliability and solid validity, after this data was filled, analyzed and interpreted accordingly.

**3.9: Ethical Considerations:**

1. The rights of the research participants were protected, and the ethical guidelines established by the GCUF Layyah ethical committee was adhered to.
2. All participants were required to sign written informed consent forms, which are attached.

3. All data collecting information was kept private.
4. All study participants will remain anonymous.
5. The participants were made aware that there was no danger or drawbacks to the study's methodology.
6. Participants was made aware that they are free to leave the study at any time.

**3.10: Consort Flow Diagram:**



**3.11: Data Analysis Procedure:**

Data was analyzed by using The Statistical Package for Social Science Software (SPSS) version 27.0 for window Microsoft, also Microsoft word and excel was used to generate graphs, tables etc. The

quantitative data was presented in the form of mean and standard deviation. The categorical data was presented in the form of frequency and percentage.

**RESULTS**

**4.1. Sociodemographic**

Demographics	Mean	Std. Deviation
What is your age?	35.7339	8.58686
What is your gender?	1.4587	.50059
What is your marital status?	2.6789	.94164
What is your profession?	2.0092	.82210

Table 4.1 shows the mean and standard deviation of sociodemographic including age, gender, marital status and profession. The mean age in the study was 35.7339 and standard deviation was 8.58686. Gender statistics shows mean of 1.4587

and standard deviation was .50059. Marital status shows mean of 2.6789 and standard deviation was .94164. Profession statistics shows mean of 2.0092 and standard deviation was .82210.



**Fig. 4.1: Histogram of age statistics**

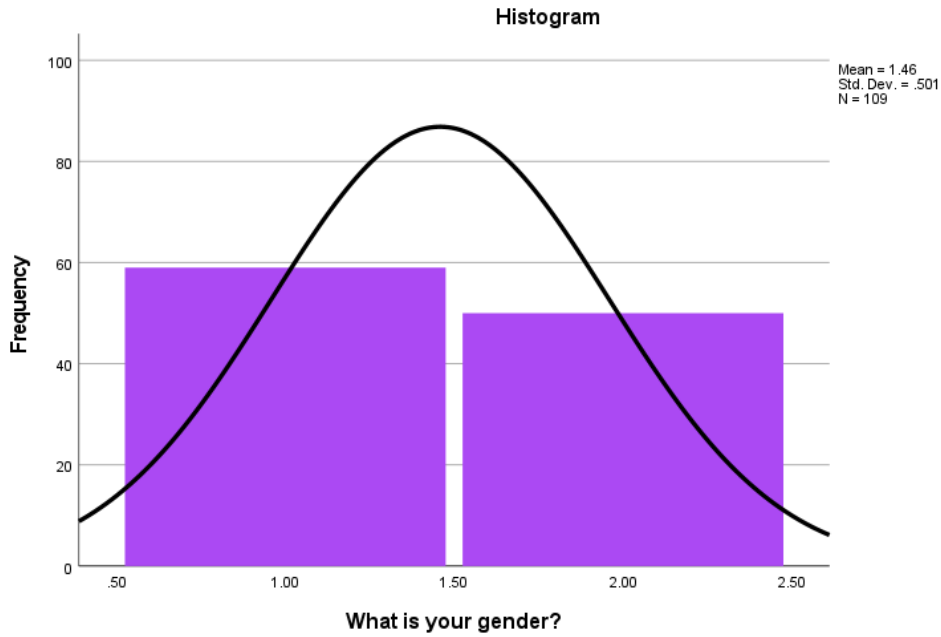


Fig. 4.2: Histogram of gender statistics

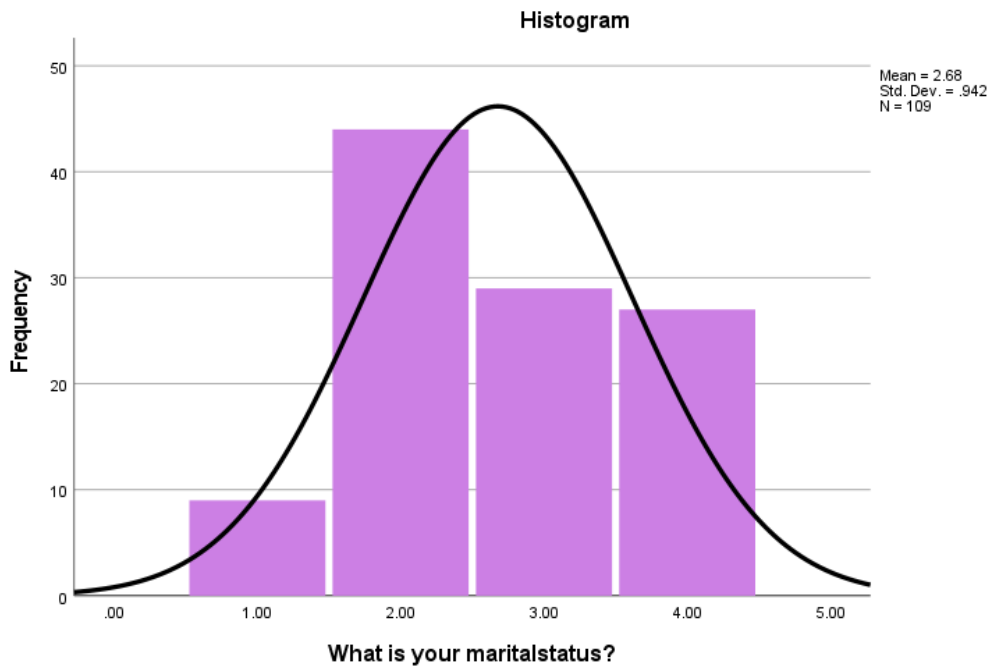


Fig. 4.3: Histogram of Marital Status

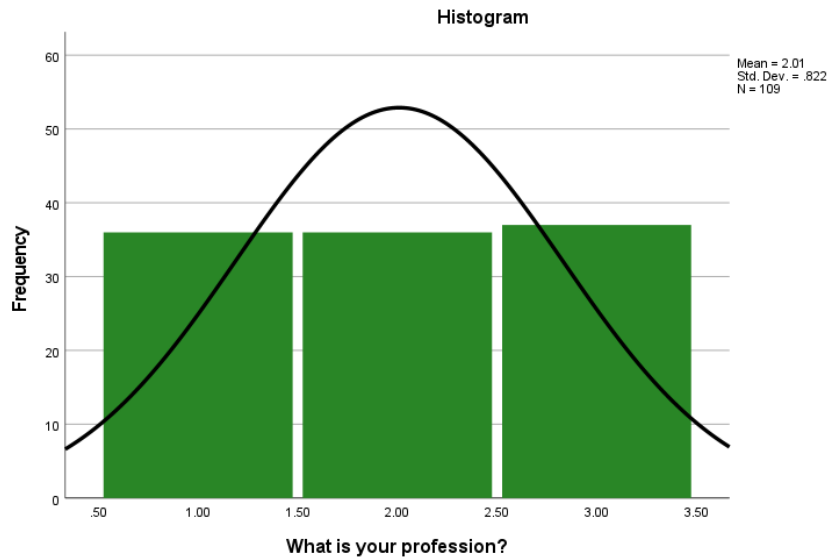


Fig. 4.4: Histogram of Profession

#### 4.2. Descriptive statistics of Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	59	54.1	54.1	54.1
Female	50	45.9	45.9	100.0
Total	109	100.0	100.0	

Table 4.2 shows the statistics of frequency and percentage of gender distribution. A total number 109 bank managers, employees and office workers

participated of which 59 (54.1%) were male and 50 (45.9%) were female.

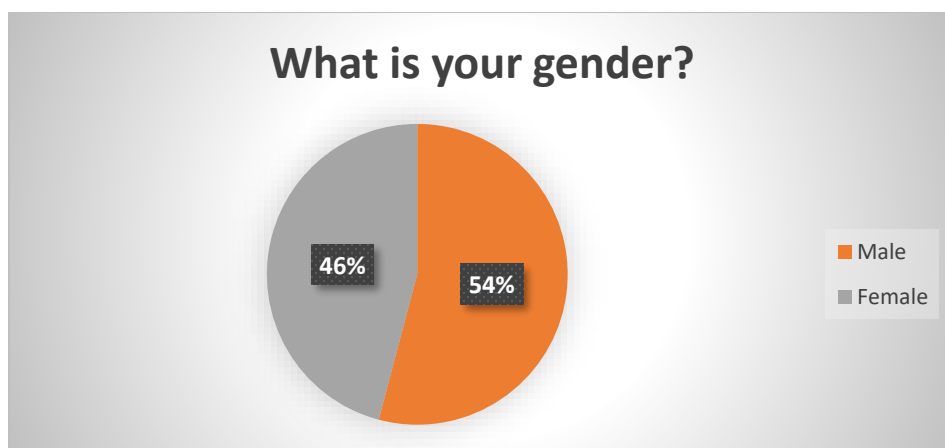


Fig. 4.5: Descriptive statistics of Gender

#### 4.3. Descriptive statistics of Marital status

	Frequency	Percent	Valid Percent	Cumulative Percent
Unmarried	9	8.3	8.3	8.3
Married	44	40.4	40.4	48.6
Widowed	29	26.6	26.6	75.2
Divorced	27	24.8	24.8	100.0
Total	109	100.0	100.0	

Table 4.3 demonstrates that the major portion of the sample which is 8.3% of respondents is unmarried, 40.4% of respondents are married, while widowed and divorced respondents stand

for proportion at 26.6% and 24.8% respectively. Comprehensively, the data indicates that most of the participants are in a marital relationship.

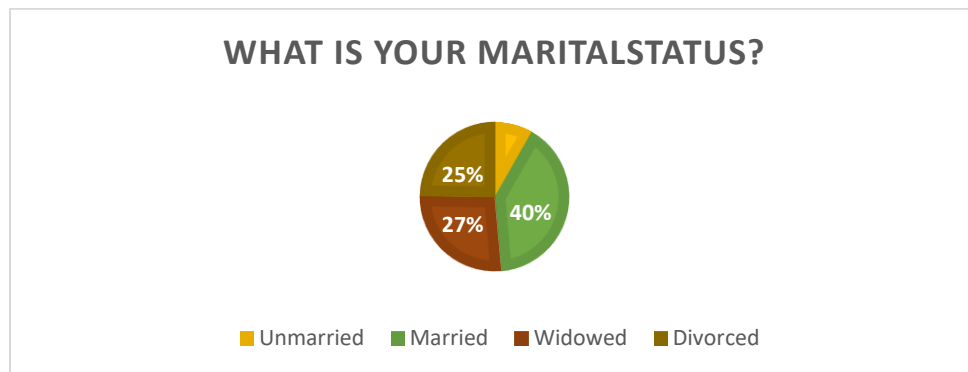


Fig. 4.6: Descriptive statistics of marital status

#### 4.4. Descriptive statistics of profession

	Frequency	Percent	Valid Percent	Cumulative Percent
Bank Manager	36	33.0	33.0	33.0
Employees	36	33.0	33.0	66.1
Office Worker	37	33.9	33.9	100.0
Total	109	100.0	100.0	

Table 4.4 demonstrates the descriptive statistics regarding professions, along with bank managers, employees and office workers. Bank managers

forming group (33.0%), followed by employees (33.0%) and office workers (33.9%) with a total of 109 participants.

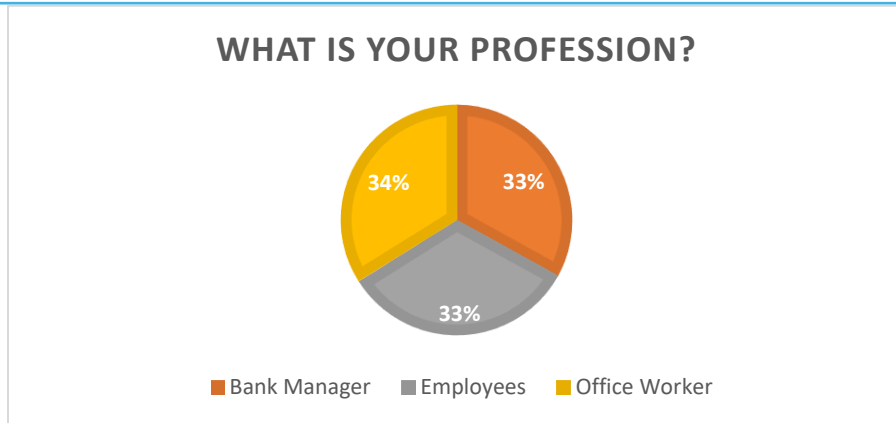


Fig. 4.7: Descriptive statistics of profession

#### 4.5. Descriptive statistics of REBA

Variables	Mean	Std. Deviation
What is the position of the trunk during the task?	2.7706	1.08554
What is the position of the neck?	2.2294	.78920
What is the position of legs?	2.8349	1.08452
What is the position of the upper arm?	2.2936	.80855
What is the position of the lower arm?	1.5413	.50059
What is the position of the wrist?	2.2385	.75644
What is the load/force handled?	1.7339	.89899
How is the coupling(grip quality)?	1.1468	.74319
What is the activity pattern?	1.7615	1.02649

The mean scores of the REBA items range from 1.1468 to 2.8349, showing an average level of REBA assessment among interview. The standard

deviations (.50059 to 1.08554) put forward moderate variability in respondent's experiences of REBA.

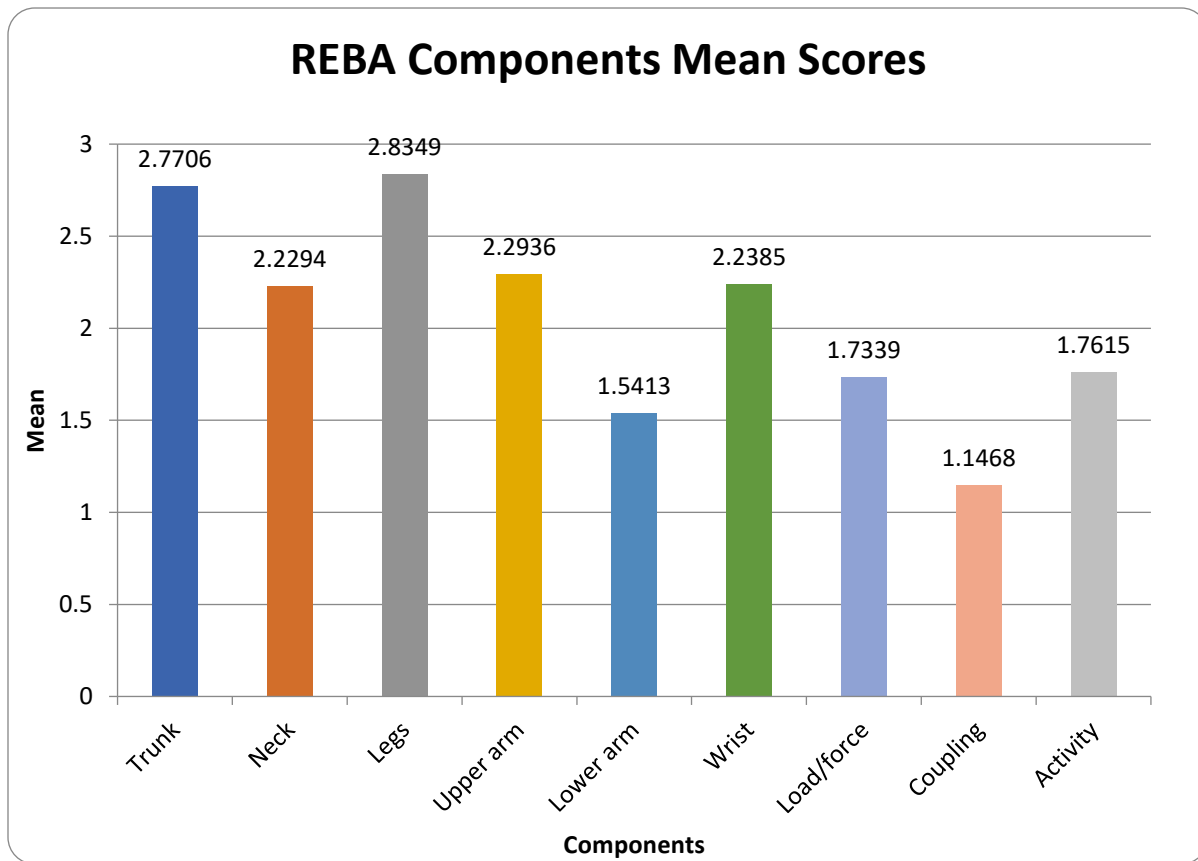


Fig. 4.8: Descriptive statistics of REBA

#### 4.6. Descriptive statistics of MODI

Variables	Mean	Std. Deviation
What is your pain intensity?	2.9725	1.32259
What is your personal care?	2.9083	1.35087
What is your lifting pattern?	3.0183	1.38765
What is your walking pattern?	3.0183	1.36070
What is your setting position?	3.1284	1.34096
What is your standing pattern?	3.0734	1.32432
What is your sleeping position?	3.1284	1.32708
What is your social life?	3.1284	1.29887
What is your traveling pattern?	3.3119	1.34507
What is your employment /homemaking?	3.2294	1.18347

The mean scores of the MODI items range from 2.9083 to 3.3119, showing an average level of disability among respondents. Higher mean values were noticed for traveling pattern (M = 3.3119).

The standard deviation (1.18347-1.38765) put forward moderate variability in participants of MODI.

#### 4.7. Frequency and Percentage distribution of REBA

	Option 1	Option 2	Option 3	Option 4
<b>Trunk Position</b>	Upright: 20 (18.3%)	Slightly bent: 19 (17.4%)	Severely bent: 36 (33.0%)	Twisted: 34 (31.2%)
<b>Neck Position</b>	Neutral: 24 (22.0%)	Slightly flexed/ext: 36 (33.0%)	Twisted/severe: 49 (45.0%)	–
<b>Leg Position</b>	Both supported: 18 (16.5%)	Uneven weight: 20 (18.3%)	One leg bent: 33 (30.3%)	Very unstable: 38 (34.9%)
<b>Upper Arm Position</b>	Below shoulder: 24 (22.0%)	At shoulder: 29 (26.6%)	Above shoulder: 56 (51.4%)	–
<b>Lower Arm Position</b>	60–100°: 50 (45.9%)	Outside range: 59 (54.1%)	–	–
<b>Wrist Position</b>	Neutral: 21 (19.3%)	Slightly bent: 41 (37.6%)	Severely bent: 47 (43.1%)	–
<b>Load / Force</b>	<5 kg: 8 (7.3%)	5–10 kg: 38 (34.9%)	10–20 kg: 38 (34.9%)	>20 kg: 25 (22.9%)
<b>Coupling (Grip)</b>	Good: 23 (21.1%)	Fair: 47 (43.1%)	Poor: 39 (35.8%)	–
<b>Activity Pattern</b>	<1 min: 14 (12.8%)	Static >1 min: 31 (28.4%)	Repetitive: 31 (28.4%)	Rapid change: 33 (30.3%)

This table shows the frequency and percentage distribution of REBA assessment scale. This scale shows mostly bank managers, employees and office workers who spend more time in their field have more REBA than youngsters in this field.

#### 4.8. Frequency and Percentage distribution of MODI

Variables	No problem / Normal	Mild issue	Moderate limitation	Moderate–severe	Severe	Very severe / dependent
<b>Pain Intensity</b>	7 (6.4%)	10 (9.2%)	15 (13.8%)	33 (30.3%)	35 (32.1%)	9 (8.3%)
<b>Personal Care</b>	7 (6.4%)	11 (10.1%)	19 (17.4%)	30 (27.5%)	32 (29.4%)	10 (9.2%)
<b>Lifting</b>	8 (7.3%)	9 (8.3%)	16 (14.7%)	28 (25.7%)	36 (33.0%)	12 (11.0%)
<b>Walking</b>	6 (5.5%)	11 (10.1%)	18 (16.5%)	26 (23.9%)	36 (33.0%)	12 (11.0%)
<b>Sitting</b>	6 (5.5%)	8 (7.3%)	15 (13.8%)	33 (30.3%)	31 (28.4%)	16 (14.7%)
<b>Standing</b>	6 (5.5%)	8 (7.3%)	19 (17.4%)	27 (24.8%)	37 (33.9%)	12 (11.0%)
<b>Sleeping</b>	4 (3.7%)	11 (10.1%)	17 (15.6%)	27 (24.8%)	35 (32.1%)	15 (13.8%)
<b>Social Life</b>	4 (3.7%)	10 (9.2%)	17 (15.6%)	29 (26.6%)	35 (32.1%)	14 (12.8%)
<b>Traveling</b>	6 (5.5%)	4 (3.7%)	19 (17.4%)	20 (18.3%)	41 (37.6%)	19 (17.4%)
<b>Employment</b>	1 (0.9%)	9 (8.3%)	19 (17.4%)	29 (26.6%)	37 (33.9%)	14 (12.8%)

The following table shows the frequency and percentage distribution of MODI among bank managers, employees and office workers. The majority of the respondents stated that they

experienced moderate limitations to severe during their work indicating a relatively high level of MODI.

#### 4.9. Normality of REBA and MODI

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
What is the position of the trunk during the task?	.226	109	.000	.844	109	.000
What is the position of the neck?	.285	109	.000	.776	109	.000
What is the position of legs?	.212	109	.000	.837	109	.000
What is the position of the upper arm?	.323	109	.000	.745	109	.000
What is the position of the lower arm?	.362	109	.000	.634	109	.000
What is the position of the wrist?	.274	109	.000	.784	109	.000
What is the load/force handled?	.215	109	.000	.868	109	.000
How is the coupling(grip quality)?	.232	109	.000	.801	109	.000
What is the activity pattern?	.189	109	.000	.861	109	.000
What is your pain intensity?	.215	109	.000	.900	109	.000
What is your personal care?	.188	109	.000	.916	109	.000
What is your lifting pattern?	.201	109	.000	.900	109	.000
What is your walking pattern?	.205	109	.000	.909	109	.000
What is your setting position?	.196	109	.000	.908	109	.000
What is your standing pattern?	.207	109	.000	.905	109	.000
What is your sleeping position?	.203	109	.000	.912	109	.000
What is your social life?	.198	109	.000	.912	109	.000
What is your traveling pattern?	.246	109	.000	.882	109	.000
What is your employment /homemaking?	.210	109	.000	.913	109	.000

The above-mentioned table showed the normality of data. After applying test of normality data was not normally distributed with significant p-value (<0.05).

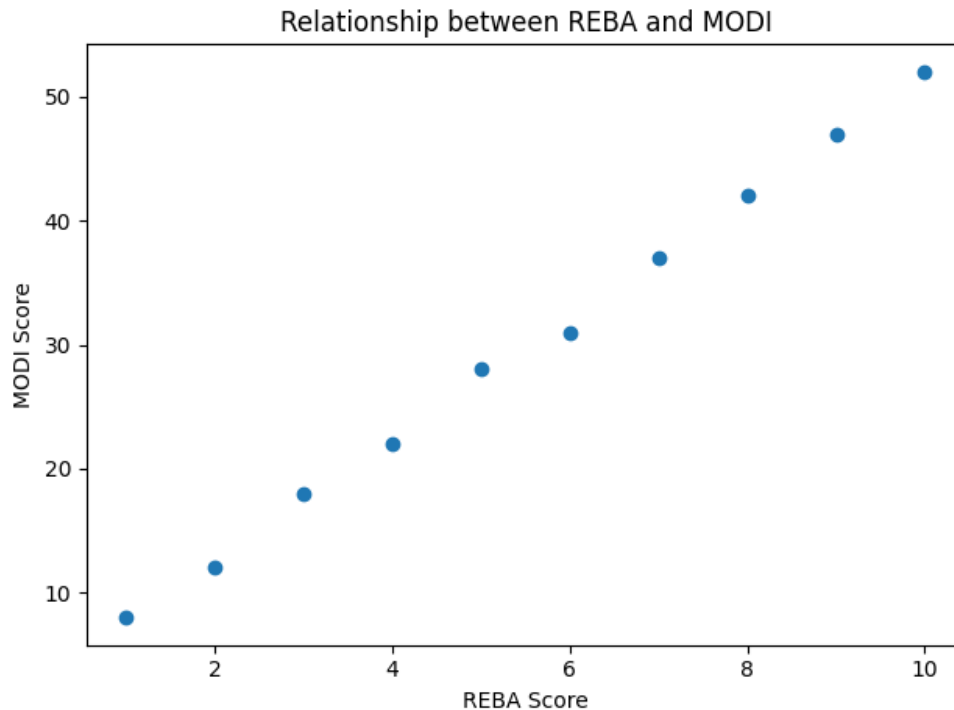
#### 4.10. Correlation of REBA and MODI

		REBA	MODI
REBA	Correlation Coefficient	1.000	.735**
	Sig. (2-tailed)	.	.000

	N	109	109
MODI	Correlation Coefficient	.735**	1.000
	Sig. (2-tailed)	.000	.
	N	109	109
**. Correlation is significant at the 0.01 level (2-tailed).			

This table indicates a correlation between the REBA and MODI among sample (N = 109). The correlation between REBA and MODI was found

to be statistically significant ( $p < 0.05$ ), which showed that the higher the level of REBA, the higher the level of MODI.



**Fig. 4.9:** Visual scatter graph showing the positive correlation between REBA and MODI

### DISCUSSION

This study was conducted to better understand a very practical and real-life issue confronting bankers: how their daily working position and weak core muscles affect their lower back and general functional capacity. Simply put, we wanted to know if sitting for lengthy periods of time in poor posture causes back problems and impairment.

From a pathophysiological perspective, prolonged sitting decreases the activation of deep core muscles like the transversus abdominis and multifidus, which reduces spinal stability and puts more strain on passive structures like ligaments and intervertebral discs. This imbalance leads to muscular fatigue, altered biomechanics, and

chronic low back discomfort; prolonged flexed or twisted postures increase intradiscal pressure and produce microtrauma, resulting in impairment (Jia et al., 2022; Saiklang et al., 2022). In addition to increasing the load on passive components like ligaments and intervertebral discs, this decreases the stability of the spine. Chronic low back pain, altered biomechanics, and muscular exhaustion are the results of this imbalance. Long-term twisted or flexed positions cause microtrauma and raise intradiscal pressure, which impairs function (Jia et al., 2022; Saiklang et al., 2022).

The average age of participants in the study was  $35.7 \pm 8.5$  years, indicating that middle-aged persons are more likely to work in banking and are hence more vulnerable. The gender distribution

showed that both genders are roughly equally affected, with a slightly higher number of males (54.1%) than females (45.9%).

According to REBA study, many individuals assumed poor posture while working. For instance, 31.2% had twisted postures, whereas 33% had noticeably bowed trunks. Similarly, 34.9% of the participants exhibited unstable leg postures, whereas 45% of the subjects showed significant neck deviation. These results clearly indicate that bankers have inadequate ergonomic practices. These results are in line with other studies (Putsa et al., 2022; Kaya Aytutuldu et al., 2022) that indicated poor posture and extended sitting to be significant contributors to musculoskeletal disorders.

The study found a significant positive association between REBA and MODI scores ( $r = 0.735$ ,  $p < 0.01$ ), suggesting that poor work posture significantly increases the level of disability. This finding supports the alternate theory and is consistent with previous research that has shown a substantial link between poor posture, core muscular weakness, and low back dysfunction (Anggreni et al., 2024). The majority of participants reported moderate to severe disability in a variety of areas (MODI ratings). For instance, significant limitations were noted in employment (33.9%) and travel (37.6%). These results highlight how low back pain affects daily activities in a practical way. REBA and MODI scores were shown to be significantly positively correlated ( $r = 0.735$ ,  $p < 0.01$ ). This implies that bad posture at work greatly raises the degree of incapacity. This result lends credence to the alternative explanation and is in line with other studies that have demonstrated a strong correlation between low back problems, weak core muscles, and bad posture (Anggreni et al., 2024).

Overall, the study's findings show that poor work posture and a lack of core muscular endurance are significant contributors to low back impairment among bankers. Early intervention with ergonomic correction, posture training, and core strengthening exercises is crucial for reducing the burden of musculoskeletal problems. Additionally, the presence of static activity patterns and repetitive motions, as seen in this

study, contributes to diminished muscular endurance and fatigue. Pain and suffering are made worse by inactivity, which lowers blood flow and builds up metabolic waste.

Overall, the results of the study show that low back impairment among bankers is largely caused by poor work posture and a lack of core muscle endurance. Reducing the burden of musculoskeletal issues requires early intervention with ergonomic correction, posture training, and core strengthening exercises.

### 5.1: Conclusion:

This study found a strong positive link between work posture and lower back impairment in bankers. Poor ergonomic posture and prolonged sitting (REBA: 1.1468-2.8349), promote core muscular weakening, which leads to greater functional impairment (MODI: 2.9083-3.3119). Improving job ergonomics and encouraging physical exercise can assist to lower the incidence of low back pain in this population.

### 5.2: Limitations:

- Moderate sample size ( $N = 109$ ) limits generalizability.
- Self-reported tools (REBA and MODI) may increase the risk of response bias.
- Core muscle endurance was not assessed using advanced tools (only functional tests were used).

### 5.3: Recommendations:

- Ergonomic training programs should be implemented in banks.
- Regular breaks and posture correction strategies should be encouraged.
- Core strengthening exercises should be included in daily routine.
- Awareness campaigns should be conducted to educate employees about posture-related risks.
- Advanced assessment tools should be used for more accurate measurement of muscle strength.

### ENGLISH CONSENT FORM

The study you are about to participate is a cross-sectional study titled as;

**“RELATIONSHIP BETWEEN WORK POSTURE AND CORE MUSCLE WEAKNESS WITH LOWER BACK DISABILITY AMONG BANKERS”**

The study has no potential harm to participants. All data collected from you was coded in order to protect your identity, and should not be disclosed to anyone. Following the study there was no way to connect your name with your data. Your answers to the questions will not affect the quality of education given to you. Any additional information about the study results was provided to you at its conclusion, upon your request.

You are free to withdraw from the study at any time. You agree to participate, indicating that you have read and understood the nature of the study, and that all your inquiries concerning the activities have been answered to your satisfaction.

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