Faculty of Medicine

University of Dhaka

Sitting Posture During Cooking as a Risk Factor for Low Back Pain Among Women in Rural Bangladesh: A Case Control Study

Efat Akter

Bachelor of Science in Physiotherapy (B.Sc. PT)

DU Roll no: 1734

Reg. no: 8772

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Saic College of Medical Science and Technology

Department of Physiotherapy

Mirpur-14, Dhaka-1216

Bangladesh

DECLARATION

This work has never before been approved in full for a degree, nor is it presently being presented as a candidate for one. A portion of the criteria for the B.Sc. in Physiotherapy degree are being met by submitting this dissertation.

I confirm that I will receive an inadequate rating and be subject to disciplinary action from the appropriate authorities if it is found in my work that I have plagiarized or otherwise cheated. I guarantee that the bound copy of the thesis and the electronic version are the same.

If the results of this project are published in the future, the research supervisor will be very concerned. The physiotherapy department of SAIC College of Medical Science and Technology (SCMST) will provide consent, and the project will be properly recognized as a graduate thesis.

Signature: Date:

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We, the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for the acceptance of this dissertation entitled-

"**Sitting Posture During Cooking as a Risk Factor for Low Back Pain among the Women in Rural Bangladesh: A Case Control Study"**

Submitted by **Efat Akter** for the partial fulfillment of the requirement for the degree of Bachelor of Science in Physiotherapy.

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Dr. Abul Kasem Mohammad Enamul Haque

Principal

SCMST, Mirpur-14, Dhaka

Supervisor

……

Dr. Mohammad Sohrab Hossain, PhD

Professor,

Department of Physiotherapy, BHPI, CRP

Executive Director,

Centre for the Rehabilitation of the Paralysed (CRP)

CRP Savar, Chapain, Savar, Dhaka-1343

……

Zahid Bin Sultan Nahid

Assistant Professor and Head

Department of Physiotherapy,

SCMST, Mirpur-14, Dhaka.

CHAPTER- I: INTRODUCTION

1.1 : Background

Low back pain (LBP) is recognized as a widespread health concern globally, affecting a significant portion of the population. Globally, women bear a higher burden of LBP than men, with middle-aged populations experiencing the most (Li et al. 2024, p. 148). LBP is usually defined as a pain localized below the margin of last ribs (costal margin) and above the inferior gluteal lines, with or without lower limb pain (Sharif et al. 2024, p. 1273).

Causes of LBP can be categorized into non-specific and specific causes. Approximately 90% LBP cases are classified as non-specific, meaning no identifiable pathology is found. LBP is commonly caused by muscle strain, herniated disc, poor posture, sedentary lifestyle. Muscle often results from overstretching or tearing of lower back muscles ((Veenstra et al. 2019, p. 34). The prevalence of LBP varies widely, with rural populations, particularly women engaged in strenuous physical activities, being more susceptible due to limited healthcare access (Mitra, 2017, pp. 226-228). High prevalence of LBP is observed among women with low physical activity, which impacts the quality of life of the rural women (Tazri, 2024, p. 76).

The prevalence of musculoskeletal pain is greater in women than in men, with older women experiencing musculoskeletal pain more frequently than older males. In the United States, Ontario, and Quebec in Canada, the rates of injuries among women were 79%, 65%, and 50%, respectively (Babak et al. 2016, pp. 53-62). The prevalence of LBP in South Asia is 18-32% according to the age group, occupation (Hoy et al., 2014). Bangladesh, an LMIC, is witnessing rapid urbanization which contributes to higher level of physical inactivity, occupation stress and lifestyle related health problems leading to risk of LBP (Choudhury et al. 2019, pp. 1374-1382). An investigation of Haque et al. (2015) study in Bangladesh recorded that a high percentage of the middle-aged people, especially the class employed with manual labor as well as desk-bounded job, suffered from LBP.

In Iran, 53% of housewives have musculoskeletal diseases (Fazli et al. 2016, pp. 53-62). In India, 83% of non-working rural housewives experience back pain and

consequent limitations in their activities (Gupta et al. 2015, pp. 313-320). Bangladesh is a densely populated country with 169.3 million people. Most of the people who live in the country depend upon farming. Traditionally, women are responsible for homemaking, which is hard work and includes many activities like cooking, cleaning, and caring for children. Half of the population is made up of women who live in rural areas. They spend 14 to 20 hours a day doing household chores, which can cause musculoskeletal problems because of the way they do them and the way they are organized up (Habib and Rahman, 2015, p. 348).

Even though Musculoskeletal disorders (MSDs) are a serious risk for people who work at home, they don't know more about these individuals or how to avoid them, which makes their health problems worse (Nazish et al. 2020, p. 215). Residents of rural areas were more likely to experience low back discomfort than those in metropolitan areas. Additionally, women are seen as superior to men in several agricultural occupations; they work 8 to 9 hours a day in agriculture and 4 to 5 hours in domestic chores. Rural women have a very hard and demanding schedule every day, which has correlation with development of LBP (Gupta & Nandini, 2015, pp. 313-320).

Musculoskeletal disorders (MSDs) that happen at work, like low back pain and repetitive strain injuries, have a big effect on productivity and quality of life. Heavy lifting, bad posture, and doing the same thing over and over again are all things that can lead to MSD (Soares et al. 2020, p. 415). Women living in underdeveloped area suffer from low back pain from doing regular housework and bending forward (Barua et al. 2015, p. 47). One study found that 47.5% of people who were cooking had moderate LBP and 31% had severe LBP. Also, sitting in a low position while washing clothing or dishes was strongly linked to LBP (Arju et al. 2020, p. 194). Poor ergonomic postures, hard lifting, and vigorous activity were all major risk factors (Liza et al. 2023, pp. 7-8). LBP can be caused by excessive stress, incorrect posture, weak muscles, degenerative disc condition, or injuries that have happened in the past as well (Bagheri et al. 2019, pp. 927-936).

Furthermore, in a sample of rural homemakers, 68.5% reported musculoskeletal pain over the last year, and half faced limitations in daily activities, yet healthcare seeking remained low (Nawrin & Hasan, 2020, pp. 2-3). In addition to posture, lifestyle and

individual characteristics interact with work hazards. A recent study indicated that physical inactivity, ergonomic sitting (e.g., soft leather chairs), and prolonged standing elevated the risk of lower back pain (LBP), whereas being younger, unmarried, more educated, or experiencing reduced stress correlated with a diminished risk (Faruk et al. 2025, p. 151).

Housework is one of the most important professions for women, and there are a lot of risk factors that make it highly probable that they may get MSDs (Widanarko et al. 2014, p. 1610). The main contributors to low back pain LBP include standing or bending for long periods and lifting heavy objects. Obesity and LBP were found to have a moderately positive connection. It also highlighted that middle-aged individuals are more prone to LBP, with women being more affected than men. As people age, the risk of developing LBP increases, suggesting that age plays a key role in the prevalence of the condition.

Housewives are particularly vulnerable to LBP. According to a study, the overall prevalence of LBP was 64.9%, with 56.1% of men and 73.8% of women affected. LBP often results in functional limitations and disabilities that impact daily activities (Bener et al. 2013, p. 95). Women usually do a lot of housework, like cooking, cleaning, washing, shopping, and taking care of family members and kids. All of these things take a lot of time and include physical, emotional, and mental strain. All of this contributed a lot of stress on their bodies and minds (Mirsalimi, 2016, p. 117).

Pregnancy-related or postpartum low back pain has been linked to a history of low back pain and low back pain during the menstrual cycle. Younger patients are more likely to have pregnancy-related joint instability, greater spinal flexibility, and the onset or exacerbation of associated low back pain, as is well known. Increased weight also contributes to sacroiliac low back discomfort, which is associated with low back pain (Carvalho et al. 2017, pp. 266-270). Particularly in rural India, a woman is the center of the family. Rural women have a very hard and demanding schedule every day. Aside from domestic and agricultural tasks, rural women spend the remaining time engaging in energy-demanding activities like as caring for animals, which is not only taxing but also monotonous, leaving them overworked and putting their health at constant risk (Jia et al. pp. 111-115).

Humans are living longer on average, but their fitness-related quality of life has not kept up with their increased durability, which has led to a rise in morbidity. The prevalence and disability of low back pain are increasing (Hurwitz et al., 2018, pp. 796-801). It has been discovered that a number of negative outcomes, such as tardiness in returning to work, difficulties with hobbies, and pain endurance, are independently related to low self-efficacy (the belief that one can function despite pain), negative expectations of recovery, avoidance of work or hobbies due to fear of pain and damage (fearavoidance), negative thoughts about the causes or effects of lower back pain (catastrophization), mental distress, and reliance on passive coping techniques (Darlow, 2016, pp. 53-61).

The major objectives of treating low back pain are to lessen discomfort, enhance or restore function, and prevent recurrence; more advice leans toward conservative, minimally invasive treatment and rehabilitation. While interventional therapy is typically undertaken after conservative care and medicine have failed, pharmacologic therapy is typically the first line of treatment (Shiri et al. 2019, pp. 290-299). The treatment for LBP is a multifaceted approach with the goal of decreasing pain, regaining function and improving the quality of life for the patient. Physiotherapy is one of the most efficacious and commonly used non-pharmacological strategies for LBP.

It is crucial not only in pain reduction but in biomechanical correction, increased range of motion, and self-management (Qaseem et al. 2017, pp. 34-39). Physical therapists tailor the intervention on the basis of the severity, duration, and functional limitations of LBP and the timing of the treatment must be fitted with each patient's physical and psychological profile. Treatment plans can be customized based on the patient's level of pain, acuity of the condition (acute, sub-acute, or chronic), and functional objectives. For instance, gentle exercise or TENS, and pain education could be emphasized during an acute exacerbation. Active exercise-based rehabilitation, behavioral coaching and self-management strategies are, however, more likely to be in focus in the chronic phase. This individualized rehabilitation model allows therapy to remain meaningful and effective across the rehabilitation spectrum ((Delitto et al. 2012).

1.2 Justification:

This study was conducted in a rural setting (Dohar Upazila) to explore the specific risk factors contributing to low back pain among the rural women.

I chose this title because it aligns with my career goal to work in rural communities along underprivileged population. In terms of choosing case control study design for this study, it is particularly suitable for investigating association between potential risk factors and outcome in a relatively short period of time. By comparing women with low back pain (case group) to those without (control group), this study aims to identify modifiable and non-modifiable risk factors – which can highlight preventive strategies and improve the health and well-being of rural women.

Low back pain (LBP), a common musculoskeletal disorder, affects million worldwide and significantly impairs daily functioning along quality of life. Rural women are frequently involved in strenuous tasks like cooking, farming and domestic works – which are susceptible to experiencing low back pain. Despite it's high prevalence, there is limited research focusing on this specific population in rural areas.

Furthermore, this research may enhance awareness among healthcare providers, local authorities and the community regarding the significance of ergonomic practices, postural correction and timely intervention.

1.3 Research Question:

Is sitting posture during cooking associated with low back pain among the rural women of Dohar Upazila in Dhaka District?

1.4 Aim of the study

- The aim of the study is to analyze the association between sitting posture during cooking and low back pain among the rural women of Dohar Upazila in Dhaka district.

1.5 Objectives of the study

1.5.1 General objective

- To analyze the association between sitting posture during cooking and low back pain among the rural women of Dohar Upazila in Dhaka district.

1.5.2 Specific objectives:

- To identify and recruit women having low back pain from different villages of Dohar Upazila as case for the present study.
- To select women without low back pain from the same villages of Dohar Upazila regarded as control for the present study.
- To interview both case and control to collect information on posture and duration of work, pregnancy, lifestyle and physical activity, sleeping pattern, weight lifting.
- To determine the socio demographic characteristics of the respondents of both case and control groups.
- To analyze the association between risk factors and the low back pain of the study respondents by using appropriate statistical tests.

1.6 Research Hypothesis:

1.6.1 Null hypothesis (H_0):

There is no association between sitting posture during cooking and low back pain among the rural women of Dohar upazila in Dhaka district.

H_0: $\mu_1 - \mu_2 = 0$

1.6.2 Alternative hypothesis (H_a):

There is an association between sitting posture during cooking and low back pain among the rural women of Dohar upazila in Dhaka district.

H_a: $\mu_1 - \mu_2 \neq 0$

Here,

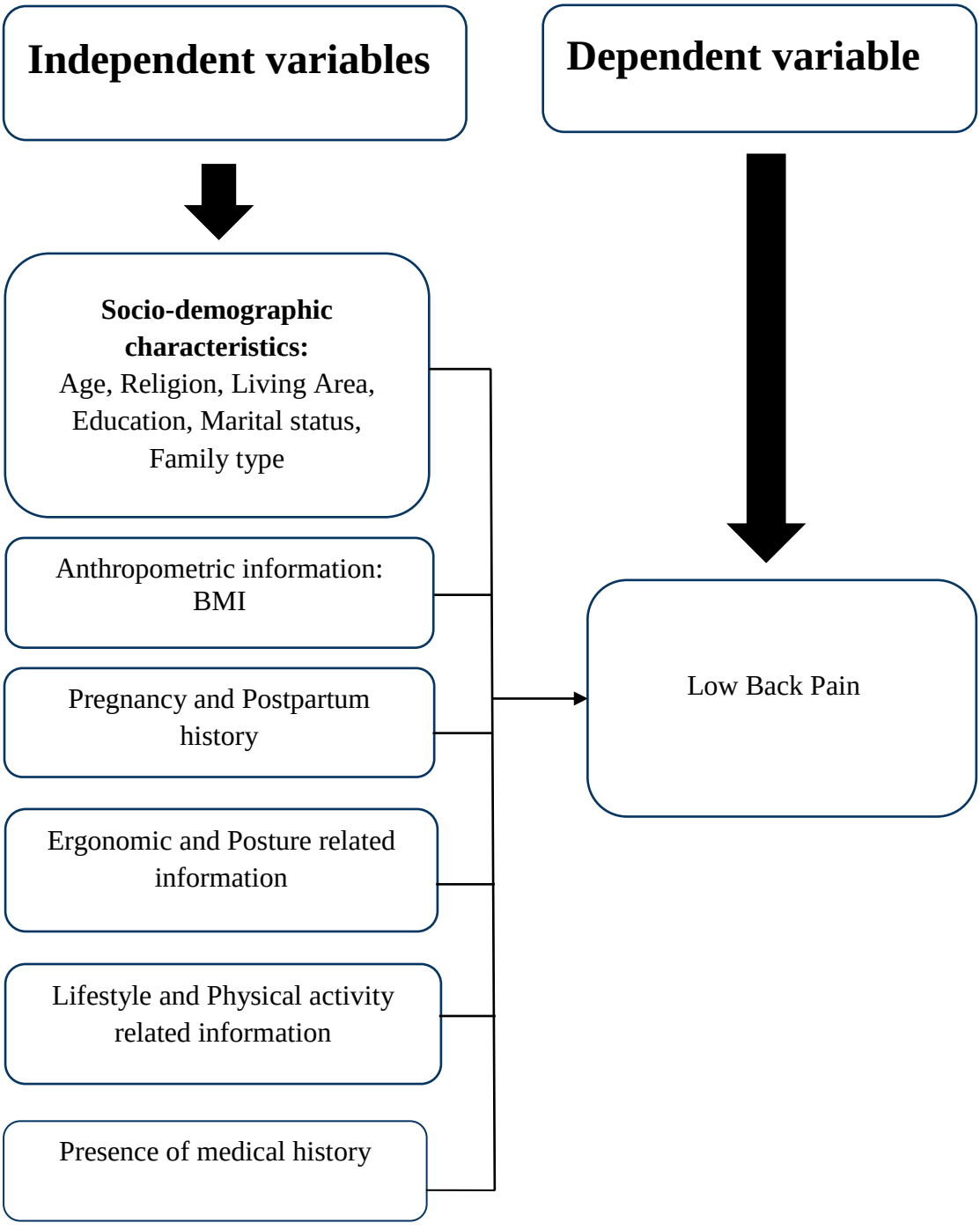
H_0 = Null hypothesis

H_a = Alternative hypothesis

μ_1 = Mean of population 1

μ_2 = Mean of population 2

1.7 Conceptual framework:



1.8 Operational Definition

Low Back Pain:

Any self reported pain, ache or discomfort in the lower back region. In this study, the presence of low back pain is assessed by asking respondents about their experiences using a simple, structured questionnaire.

Sitting Posture During Cooking:

It is the posture, adopted while performing cooking tasks by the respondents of the present study.

Working Posture:

The usual body posture, adopted by the women while performing household chores or other routine work.

Physical Activity:

Number of hours per week spent performing moderate to vigorous physical tasks by the study subjects.

Body Mass Index (BMI):

Weight in kilograms divided by height in meters squared, measured using a digital weighing machine and tape.

CHAPTER – II: LITERATURE REVIEW

Low back pain has been identified as one of the most common causes of disability worldwide. Findings from the Global Burden of Disease Study indicate that low back pain ranks higher than 390 out of 743 specific health conditions. In 2020, approximately 619 million people were estimated to be affected as the global population continued to age (Wu et al. 2020, pp. 299). According to a study, on the basis of investigating the prevalence of low back pain and related disability among adult women in a rural community, it was revealed that, 31% of women experienced low back pain in the preceding week, whereas 40% reported it over the past year. The greatest prevalence was noted in women aged 61 to 70 year, which indicated the association between increasing age and LBP (Paul et al. 2019, pp. 22-28).

The article titled 'Low Back Pain in a Population of Women in Southern Brazil' by Santanna highlights the prevalence and associated risk factors of low back pain. The study was conducted in Sao Leopoldo, Brazil with 1,128 women aged between 20 to 69 years. 46.5% of the participants reported having low back pain. Risk factors included biomechanical, behavioral, socio-demographic and anthropometric factors. Additionally studies have demonstrated that abnormal spinal alignments, poor posture and altered movement patterns raise the mechanical stress on lumbar spine, which contributes to the development of low back pain. Physical inactivity, obesity and advanced age were found to be significantly associated with low back pain. The study also highlighted the importance of preventive measures and interventions aimed at promoting physical activity, improving posture and addressing obesity in order to reduce low back pain among this population (Santanna et al. 2021, pp. 9-17).

Existing evidence suggests that prevalence rates of low back pain increases with older age, As compared to working aged adults, older adults are more likely to develop certain low back pain pathologies. Importantly, various age related physical, psychological and mental changes as well as multiple risk factors may affect the prognosis and management of LBP in older adults (Wong et al. 2017, p. 14). Significant risk factors included gender, exercise habits, work stress, and poor working posture for LBP. Among the affected, a large percentage experienced reduced work activity and minimal functional disability. The findings from the study

also revealed the functional impact of LBP and highlighted the need for targeted preventive interventions (Rahman & Wazir, 2022, pp. 169-180). Women in Nigeria frequently engage in strenuous domestic tasks that increase their susceptibility to musculoskeletal pain. A study conducted on women in rural Nigerian communities revealed that household activities such as water fetching, sweeping, washing, and carrying heavy loads are physically demanding and repetitive, often performed without ergonomic support. Such domestic routines contribute significantly to the development of musculoskeletal pain, particularly low back pain (Osinuga et al. 2022, pp. 152).

Another study conducted on African women further confirmed that chronic exposure to water fetching tasks results in both acute and long-term back pain, negatively affecting their functional capacity and overall well-being. Socio-cultural norms designate women as the primary water collectors, often requiring them to walk long distances while carrying heavy water containers. According to the findings from the study, it was reported that women carrying heavy water containers were more susceptible to development of low back pain. Among the 215 participants, 72% complained of having low back pain (Patil & Sangle, 2022, pp. 3506-3511).

According to the findings of a study conducted on 1,000 postmenopausal women in rural Bangladesh, a high prevalence of low back pain was reported. Low back pain was noted higher among the women with low level of physical activity (76%) compared to those who were more engaged with physical activity (48%). Socio-demographic status and age at menopause were also identified as significant predictors of low back pain ($p < 0.05$). Lifestyle habits, educational attainments, self perceived health status were also found as determinants of low back pain among the postmenopausal women (Tazri & Anam, 2024, pp. 73-82).

In a mixed method study, thirteen studies assessed sitting time, ten examined sitting posture, and thirteen focused on sitting behavior. Among those exploring sitting time, five found no relationship with LBP prevalence, whereas eight demonstrated a positive association. Similarly, seven studies reported a relationship between poor sitting posture and LBP. In terms of sitting behavior, only one study showed no association, while twelve identified significant relationships with LBP. It was also

found that longer sitting time, poor posture, and fewer breaks with more static sitting behaviors were associated with LBP (Alaca et al. 2025, p. 23).

A study conducted on female farmers in a rural setting by Hassan et al. (2022) involved 182 female farm workers to gather data on work-related physical discomfort. The study reported that 160 participants (87.9%) experienced some form of physical discomfort, which was further analyzed in relation to other occupational and personal factors. Studies revealed that poor posture, characterized by abnormal spinal alignment, can increase mechanical stress on lumbar structures, including inter-vertebral discs, facet joints, and surrounding musculature. Movements that combine spinal flexion and rotation, especially under load, can place significant stress on inter-vertebral discs and ligaments.

The main contributors to low back pain include standing or bending for long periods and lifting heavy objects. Obesity and LBP were found to have a moderately positive connection. It was also highlighted that middle-aged individuals are more prone to LBP, with women being more affected than men. As people age, the risk of developing LBP increases, suggesting that age plays a key role in the prevalence of the condition. Clinical evaluation emphasizes identifying risk factors that may indicate serious underlying conditions or predict persistent disabling symptoms, guiding the selective use of diagnostic tests, including imaging, and appropriate treatments (Gorce and Jacquier-Bret, 2025, p. 221).

According to a study, it was revealed that increasing age is a significant risk factor for LBP. As people age, the risk of developing LBP increases, suggesting that age plays a key role in the prevalence of the condition. Housewives are particularly vulnerable to LBP. Findings indicated that, the overall prevalence of LBP was 64.9%, with 56.1% of men and 73.8% of women affected. LBP often results in functional limitations and disabilities that impact daily activities (Bener et al. 2013, p. 95). The development of LBP is significantly influenced by lifestyle choices. Being engaged in exercise is related with a lower chance of developing musculoskeletal disorder. However, sedentary lifestyle during leisure time are linked to a higher incidence of pain, especially lower back pain. Furthermore, consuming more fruits and vegetables each day is linked to a decreased risk of pain in lower back (Kirsch-Micheletti et al. 2019, pp. 1-8).

Several studies have explored the relationship between co-morbidities and low back pain (LBP). Hypertension and hyperlipidemia are among the most prevalent co-morbid conditions in patients with LBP, and their presence has been shown to significantly influence pain severity. Evidence suggests that individuals with multiple co-morbidities are more likely to experience LBP and report higher levels of pain, highlighting the need for a comprehensive management approach that addresses both the pain and concomitant conditions to improve treatment outcomes and quality of life (Ala Tarigan et al. 2024, pp. 201-206).

One study comparing the incidence of LBP following natural childbirth with cesarean delivery under spinal anesthesia reported no significant difference between the two groups. However, the study had a small sample size and did not compare cesarean delivery with other anesthesia methods, such as epidural anesthesia or general anesthesia, relative to vaginal delivery. In contrast, a retrospective study of 11,701 women found that chronic LBP occurred more frequently in women who received epidural anesthesia during labor compared to those who did not (19% vs 11%), suggesting a potential causal relationship between epidural anesthesia and postpartum back pain (Chia et al. 2016, pp. 154-156).

Weight lifting, particularly with high loads or at a high frequency, has been identified as a significant risk factor for low back pain (LBP), especially when lifting technique is poor or muscle imbalances are present. Prevention strategies focus on proper load management, correct lifting techniques, and, in occupational settings, the use of lifting aids to reduce spinal stress. While certain interventions, such as structured exercises in rehabilitation programs, have shown promise in strengthening the back and reducing LBP, no single approach has proven universally effective. Therefore, individualized strategies that consider the worker's physical capacity, lifting demands, and ergonomic conditions are recommended to prevent and manage LBP effectively (Conen et al. 2016, p. 3468).

A case control study conducted in Sri Lanka showed how certain structural changes in the lumbar spine relate to low back pain in women. Using radiographic analysis, the researchers evaluated vertebral fractures, intervertebral disc space narrowing, vertebral osteophytes and spondylolisthesis. Results from the study showed that fractures in the fourth and fifth lumbar vertebrae, along with narrowing of the

intervertebral disc space, were strongly linked to the development of low back pain. In contrast, vertebral osteophytes and spondylolisthesis did not display any meaningful association.Furthermore, the study highlighted that specific degenerative changes in the lower spine, particularly vertebral fractures and reduced disc space may have a significant influence on the persistence of chronic low back pain (Karunanayake et al. 2017, pp. 602-610).

Low back pain (LBP) is a significant contributor to poor sleep quality. However, evidence on the type of mattress that may prevent back pain and improve sleep quality is inconsistent. Results highlight that medium-firm mattresses are most effective in promoting spinal alignment, enhancing comfort, and improving sleep quality. Poorly designed or excessively firm/soft mattresses may worsen spinal discomfort and contribute to sleep disturbances (Caggiari, 2021, pp. 1-24). LBP is one of the common causes of absenteeism and decrease in productivity in the workforce. Non-pharmacologic interventions, such as exercise and psychosocial management, are recommended for most patients, with adjunctive drug therapies used as needed Surgery and interventional procedures are reserved for a small subset of patients who do not respond to standard treatments (Maher et al. 2017, pp. 736–747).

In a rural community of Bangladesh, a case-control study indicated that health related factors and occupation related lifestyle were significantly associated with the development of low back pain. People who spent long hours sitting or standing, squatted or bent frequently, lifted heavy objects or had chronic diseases were more likely to suffer from low back pain. The study also suggested that both physical strain and psychological stress were linked with low back pain. The need for better ergonomic awareness, healthier habits and psychological care to help prevent and manage low back pain among the study subjects (Shahin et al. 2022, p. 871).

A study conducted on 404 pregnant women in Malawi reported that low back pain during pregnancy has a profound impact on daily functioning, with many women experiencing restrictions in walking, sitting, lifting, and standing. Pain also interferes with personal care, sleep quality, and sexual activity, with 43% reporting sleep disturbances and 34% reporting sexual discomfort. Social participation is further reduced, as some women become confined to their homes due to severe pain. In terms of management, non-pharmacological strategies are most commonly employed since

analgesic use carries potential risks during pregnancy. Resting from painful activities (34%), engaging in opposite activities (12%), and massage or stretching were among the most reported coping measures, though a notable proportion (34%) took no action to relieve pain. Despite the high prevalence and significant impact of LBP, antenatal attention remains limited. Only 28% of women sought clinical consultation for low back pain (Manyozo et al. 2019, pp. 71-76).

Another study was conducted to identify the primary risk factors associated with low back pain (LBP) among the women aged 40 to 60 years, which include both pre-menopausal and post-menopausal individuals. Various factors were examined, including body mass index (BMI) classification, duration of daily work, general health status, pre-existing medical conditions, history of referred pain, previous episodes of low back pain, and psychological aspects such as stress, anxiety, and depression. The findings revealed that these variables collectively play a significant role in the occurrence of LBP within this age group. In particular, higher BMI, prolonged working hours, and poor general health status were strongly associated with an increased prevalence of LBP. Furthermore, psychological factors such as stress and anxiety were identified as important contributors, highlighting the multi-factorial nature of LBP. Additionally, importance of addressing both physical and psychosocial components in understanding and managing LBP among middle-aged women was also mentioned (Madhavudu et al. 2023, pp. 231-233).

A longitudinal study investigating low back pain among middle-aged women in Australia reported that age of 49.5 years, with more than half of the participants (54%) experienced back pain. Results identified body weight and depression as significant predictors of back pain over successive three-year intervals and across the 15-year follow-up period. The association between excess weight and back pain was particularly strong among women with a body mass index (BMI) of 25 or above. The findings indicate that increased body weight, weight gain, and depressive symptoms independently contribute to the risk of back pain, whereas regular participation in vigorous exercise can help mitigate it. The study highlights the importance of addressing modifiable lifestyle factors suchasweight control, mental well-being, and physical activity to reduce the long-term burden of back pain in middle-aged women (Brady et al. 2017, p. 1102).

CHAPTER – III: METHODOLOGY

3.1: Study design:

It was a case control study carried out with the objective of analyzing the association between sitting posture during cooking and low back pain among the rural women of Dohar Upazila in Dhaka District.

3.2 Study area

The data for this study were collected from the rural women living in some selected villages of Dohar Upazila in Dhaka district.

3.3 Study place

The study was carried out at SAIC College of Medical Science and Technology, Mirpur, Dhaka.

3.4 Duration of the study

The duration of the study was one year, from June 2024 to July 2025.

3.5 Study Population

The rural women living at some selected villages of Dohar Upazila constituted the population for this study.

3.6 Sample size calculation:

The sample size of the study was calculated by the following statistical formula.

Here,

$p_1 = 41.6$ [anticipated probability of exposure among cases (from previous study)]

$p_2 = 6.7$ [anticipated probability of exposure among control (from previous study)]

(Khokhar et al. 2022)

$z_\alpha = 1.96$

$z_\beta = 1.28$

Now,

$$n = \frac{p_1(100-p_1)+p_2(100-p_2)}{(p_1-p_2)^2} \times (z_\alpha + z_\beta)^2$$

$$= \frac{41.6(100-41.6)+6.7(100-6.7)}{(186)^2} \times (1.96 + 1.28)^2$$

$$= \frac{2429.5+625.11}{186} \times 6.48$$

$$= \frac{3054.61}{186} \times 6.48$$

$$= 16.42 \times 6.48$$

$$= 106$$

Therefore, sample size = 106

The calculated sample size for this study is 106. For better statistical analysis, a total of 136 respondents (case: 64, control: 72) were included in the study.

3.7 Eligibility criteria

3.7.1 Inclusion criteria for case:

1. Rural women living in the selected villages of Dohar upazila in Dhaka district.
2. Age: (18 - 60) were included.

3.7.2 Inclusion criteria for control:

1. Rural women living in the selected villages of Dohar upazila in Dhaka district.
2. Age: (18 - 60) were included.

3.7.3 Exclusion criteria for case:

1. Unwillingness
2. Mentally unstable women
3. Pregnant women
4. Mothers undergoing postpartum period

3.7.4 Exclusion criteria for control:

1. Unwillingness
2. Mentally unstable women
3. Pregnant women
4. Mothers undergoing postpartum period

3.8 Sampling technique

Convenient sampling technique was adopted to select the respondents for case and control group from the study population.

3.9 Method of data collection

3.9.1 Technique of data collection:

Face to face formal interview was applied to collect data from the respondents (case and control group).

3.9.2 Instrument and tool of data collection:

Instrument:

A pretested structured questionnaire was the instrument of data collection for this study. The questionnaire consisted of seven parts. The first part contained personal information of the respondents, the second part contained questions on socio demographic characteristics, the third part contained questions on presence of disease (Low Back Pain), the fourth part contained questions on pregnancy and postpartum history, the fifth part contained questions regarding ergonomic and posture related information, while sixth part and seventh part contained questions on lifestyle, physical activity and presence of any medical history.

Tools:

Measuring tape was used to measure the height of the respondents. Weighing machine was also used to measure weight of the respondents.

3.9.3 Procedure of data collection

The research proposal was approved in due time and permission was obtained from the 'Institutional Review Board' (IRB) of Saic College of Medical Science and Technology (SCMST). It was a case control study. The researcher analyzed the relationship between sitting posture during cooking and low back pain among the rural women of Dohar Upazila in Dhaka district. The rural women with low back pain constituted the case of this study. The researcher also selected the rural women, who did not have low back pain and they formed the control group of the study. Matching

of the group was done before data collection. Then, the respondents (included on the basis of inclusion criteria) were approached by the researcher herself at some villages of Dohar Upazila. The aims and objectives of the study were explained in detail to every prospective respondents. The researcher obtained written informed consent from the respondents before the interview and verbal consent from the non-literate individuals. The interview took place in a cordial environment. A pretested questionnaire was used to collect data from both groups. After completion of the interview, the researcher thanked the respondents.

3.10 Data management

3.10.1 Data editing:

The questionnaire was reviewed after data collection to identify any error or inconsistencies. Necessary corrections were done as needed. All responses were adequately coded for analysis.

3.10.2 Data entry:

The coded data were entered into a computer based on the variables of the study.

3.10.3 Analysis of data

The data were analyzed by using the Statistical Package for the Social Sciences (SPSS) program. Descriptive statistics, such as frequency, distribution, range, mean, and percentage, were performed. Inferential statistics were used to analyze the relationship between independent and dependent variables.

3.11 Ethical consideration:

The investigator obtained written permission from the Institutional Review Board of Saic College of Medical Science and Technology to ensure the study met ethical standards. The investigator followed the World Health Organization (WHO) & Bangladesh Medical Research Council (BMRC) guidelines. Informed written consent was obtained from all the respondents, ensuring they were fully aware of the study's purpose, procedures, and their right to withdraw. Finally, confidentiality of the data was maintained throughout the research, ensuring respondents' privacy and the secure storage of sensitive information.

CHAPTER-IV: RESULTS

The objective of the study was to examine the association between cooking posture and low back pain among the rural women of Dohar Upazila in Dhaka. Data were collected from 136 respondents through face-to-face formal interviews using a pre-tested questionnaire. The collected data were analyzed by SPSS program. The findings of the study have been presented by frequency tables and description.

Table no. 1: Frequency distribution of the respondents by age

Age group in years	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
18 - 30	21	32.8	44	61.1	65	47.8
31 - 40	18	28.1	12	16.7	30	22.1
41 - 50	12	18.8	7	9.7	19	14.0
51 - 60	13	20.3	9	12.5	22	16.2
Total	64	47.1	72	52.9	136	100.0

Mean: 35.30 years & Standard Deviation: 12.82

Regarding the frequency distribution of the respondents by age, it was found that out of 64 cases, 21 (32.8%) respondents belonged to age group of 18 - 30 years. It was also found that 18 (28.1%) respondents were in the age group of 31 - 40 years. Among the respondents of control group 44 (61.1%) belonged to the age group of 18 – 30 years and 12 (16.7%) respondents were in the age group of 31 – 40 years. The mean age of the respondents was 35.30 years and standard deviation (SD) was 12.82 (Table no. 01).

Table no. 02. Frequency distribution of the respondents by educational qualification

Educational Qualification	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Illiterate	15	23.4	9	12.5	24	17.6
Primary	19	29.7	23	31.9	42	30.9
Secondary	23	35.9	26	36.1	49	36.0
Higher Secondary	6	9.4	12	16.7	18	13.2
Graduate above	1	1.6	2	2.8	3	2.2
Total	64	47.1	72	52.9	136	100.0

The study showed that 15 (23.4%) respondents of case group were illiterate. It was also found that out of 64 cases 19 (29.7%) respondents and in the control group it was 23 (31.9%) out of 72 respondents received primary education respectively. The study also revealed that 6 (9.4%) respondents of cases and 12 (16.7%) respondents of control group had higher secondary level of education (Table no. 02).

Table no. 03. Frequency distribution of the respondents by occupation.

Occupation	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Housewife	57	89.1	66	91.7	123	90.4
Student	2	3.1	6	8.3	8	5.9
Teacher	1	1.6	0	0.0	1	0.7
Shopkeeper	2	3.1	0	0.0	2	1.5
Housemaid	2	3.1	0	0.0	2	1.5
Total	64	47.1	72	52.9	136	100.0

It was revealed in the study that out of 64 respondents of case group, 57 (89.1%) respondent were housewives and out of 72 respondents of the control group, 66 (91.7%) were housewives respectively. From the study it is also represented that students comprised 2 (3.1%) of the case group and 6 (8.3%) of the control group. Other occupations, including teacher, shopkeeper and housemaid were represented exclusively in the case group, each constituting 1 (1.6%), 2 (3.1%), 2 (3.1%), while being absent in the control group (Table no. 03).

Table no. 4. Frequency distribution of the respondents by marital status.

Marital status	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Married	52	81.3	62	86.1	114	83.8
Unmarried	2	3.1	6	8.3	8	5.9
Widow	6	9.4	4	5.6	10	7.4
Divorce	2	3.1	0	0.0	2	1.5
Separated	2	3.1	0	0	2	1.5
Total	64	47.1	72	52.9	136	100.0

In the frequency distribution of respondents by marital status, the majority were married, comprising 52 out of 62 respondents (81.3%) in the case group and 62 out of 72 respondents (86.1%) in the control group. Unmarried respondents accounted for 2 (3.1%) of the case group and 6 (8.3%) of the control group. Widowed respondents made up 6 (9.4%) of the case group and 4 (5.6%) of the control group (Table no. 4).

Table no. 5. Frequency distribution of the respondents by family type.

Family type	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Nuclear	46	71.9	60	83.3	106	77.9
Extended	18	28.1	12	16.7	30	22.1
Total	64	47.1	72	52.9	136	100.0

The study revealed that 46 (71.9%) out of 64 respondents in the case group belonged to nuclear families, while 60 (83.3%) out of 72 respondents in the control group were from nuclear families. Additionally, 18 respondents (28.1%) in the case group and 12 respondents (16.7%) in the control group belonged to extended families (Table no. 5).

Table no. 6. Frequency distribution of the respondents by BMI.

BMI	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Underweight (< 18.5)	2	3.1	10	13.9	12	8.8
Normal weight (18.5 – 24.99)	35	54.7	33	45.8	68	50.0
Overweight (>25)	27	42.2	29	40.3	56	41.2
Total	64	47.1	72	52.9	136	100.0

($\chi^2 = 5.480$, $df = 5$, $p = 0.360$)

Regarding the frequency distribution of respondents by BMI, it was found that 35 respondents (54.7%) in the case group had normal weight (BMI 18.5 – 24.99), while 27 respondents (42.2%) were overweight (BMI > 25). In the control group, 33 respondents (45.8%) had normal weight and 29 respondents (40.3%) were overweight. The distribution of the respondents by BMI between case and control group was found not statistically significant (Table no. 6).

Table no. 7. Frequency distribution of the respondents by mode of delivery.

Mode of delivery	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Normal Vaginal Delivery	27	49.1	29	52.7	56	50.9
Cesarean Section	28	50.9	26	47.3	54	49.1
Total	55	50.0	55	50.0	110	100.0

$\chi^2 = 0.146$, $df = 1$, $p = 0.703$

Among the 55 respondents in the case group, 27 (49.1%) had a normal vaginal delivery, while in the control group, 29 out of 55 respondents (52.7%) had a normal vaginal delivery. The study also showed that 28 respondents (50.9%) in the case group and 26 respondents (47.3%) in the control group underwent cesarean section delivery. The distribution of respondents by mode of delivery between the case and control groups was not statistically significant (Table no.7).

Table no. 8. Frequency distribution of the respondents by working posture.

Working posture	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Sitting	48	75.0	37	51.4	85	62.5
Standing	5	7.8	2	2.8	7	5.15
Walking	11	17.2	33	45.8	44	32.35
Total	64	100.0	72	100.0	136	100.0

($\chi^2 = 13.285$, $df = 2$, $p = 0.001$)

Regarding the frequency distribution of respondents by working posture, it was found that in the case group, 48 respondents (75%) worked in a sitting position, while 11 respondents (17.2%) had a walking posture at work. In the control group, 37 respondents (51.4%) worked in a sitting position, and 33 respondents (45.8%) had a walking posture. The distribution of respondents by working posture between the case and control groups was found to be statistically highly significant (Table No. 8).

Table no. 9. Frequency distribution of the respondents by average duration of sitting.

Respondents	N	Mean	*t* value	*Df*	*P value*
Case	64	5.0859	2.404	134	0.018
Control	72	4.5417			

($t = 2.404$, $df = 134$, $p = 0.018$)

The study showed that the mean duration of sitting among the case group was 5.09 hours, while it was 4.54 hours in the control group. The difference in sitting duration between the case and control groups was found to be statistically highly significant (Table no. 9).

Table no. 10. Frequency distribution of the respondents by cooking posture.

Cooking posture	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Sitting	52	81.3	29	42.0	81	60.9
Standing	12	18.8	40	58.0	52	39.1
Total	64	48.1	69	51.9	133	100.0

($\chi^2 = 21.450$, $df = 1$, $p = 0.000$)

About cooking posture, it was found that out of 64 respondents in the case group, 52 (81.3%) reported a preference for cooking in a sitting posture, compared to 29 respondents (42.0%) in the control group. Additionally, 12 respondents (18.8%) in the case group preferred cooking in a standing posture, while this preference was reported by 40 respondents (58.0%) in the control group. The distribution of respondents by cooking posture between the case and control groups was found to be statistically highly significant (Table no.10).

Table no. 11. Frequency distribution of the respondents by sleeping posture.

Sleeping posture	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Supine lying	3	4.7	3	4.2	6	4.4
Prone lying	4	6.3	4	5.6	8	5.9
Side lying	57	89.1	65	90.3	122	89.7
Total	64	47.1	72	52.9	136	100.0

($\chi^2 = 0.054$, $df = 1$, $p = 0.973$)

It was revealed in the study that 57 respondents (89.1%) from the case group and 65 respondents (90.3%) from the control group adopted a side-lying sleeping posture. These figures were out of a total of 64 and 72 respondents in the case and control groups, respectively. The distribution of respondents by sleeping posture between the case and control groups was found not to be statistically significant (Table no.11).

Table no. 12. Frequency distribution of the respondents by type of sleeping mattress.

Mattress type	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Firm	47	73.4	28	38.9	75	55.1
Soft	17	26.6	44	61.4	61	44.9
Total	64	47.1	72	52.9	136	100.0

($\chi^2 = 16.350$, $df = 1$, $p = 0.000$)

The study revealed that 47 respondents (73.4%) in the case group used a firm mattress out of a total of 64 respondents, compared to 28 respondents (38.9%) in the control group. It was also found that 17 respondents (26.6%) in the case group used a soft mattress, compared to 44 respondents (61.4%) in the control group. The distribution of respondents by type of sleeping mattress between the case and control groups was found to be statistically highly significant (Table no. 12).

Table no. 13. Frequency distribution of the respondents by physical exercise.

Physical exercise	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Yes	2	3.1	16	22.2	18	13.2
No	62	96.9	56	77.8	118	86.8
Total	64	47.1	72	52.9	136	100.0

($\chi^2 = 10.761$, $df = 1$, $p = 0.001$)

The frequency distribution of respondents based on physical exercise indicated that only 2 respondents (3.1%) in the case group engaged in physical exercise, compared to 16 respondents (22.2%) in the control group. Conversely, 62 respondents (96.9%) in the case group and 56 respondents (77.8%) in the control group were not involved in any physical exercise. These figures are based on a total of 64 respondents in the case group and 72 in the control group. The distribution of respondents by physical exercise between the case and control groups was found to be statistically highly significant (Table no. 13).

Table no. 14. Frequency distribution of the respondents by sleeping hour.

Respondents	N	Mean	*t value*	*Df*	*p value*
Case	64	6.2656	3.705	134	0.000
Control	72	7.6250			

(t = 3.705, df = 134, p = 0.000)

The study showed that the mean sleeping duration was 6.27 hours for the case group and 7.63 hours for the control group. The difference in mean sleeping duration between the case and control groups was found to be statistically highly significant (Table no. 14).

Table no. 15. Frequency distribution of the respondents by water collection from tube well.

Water collection from tube well	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Yes	49	76.6	36	50.0	85	62.5
No	15	23.4	36	50.0	51	37.5
Total	64	47.1	72	52.9	136	100.0

($\chi^2 = 10.200$, $df = 1$, $p = 0.001$)

Regarding the frequency distribution of respondents based on water collection from tube wells, it was found that 49 respondents (76.6%) in the case group were involved in collecting water from a tube well, out of a total of 64 respondents. In the control group, 36 respondents (50.0%) were involved in tube well water collection. Additionally, 15 respondents (23.4%) in the case group and 36 respondents (50.0%) in the control group did not collect water from a tube well. The distribution of respondents by water collection source between the case and control groups was found to be statistically highly significant (Table no. 15).

Table no. 16. Frequency distribution of the respondents by lifting heavy objects.

Lifting heavy object	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Yes	37	57.8	13	18.1	50	36.8
No	27	42.2	59	81.9	86	63.2
Total	64	47.1	72	52.9	136	100.0

($\chi^2 = 23.036$, $df = 1$, $p = 0.000$)

The study showed that 37 respondents (57.8%) in the case group were involved in lifting heavy objects, compared to 13 respondents (18.1%) in the control group. It was also revealed that 27 respondents (42.2%) in the case group and 59 respondents (81.9%) in the control group were not involved in lifting heavy objects. The distribution of respondents by heavy object lifting between the case and control groups was found to be statistically highly significant (Table no. 16).

Table no. 17. Frequency distribution of the respodents by sewing activity.

Sewing	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Yes	9	14.1	4	5.6	13	9.6
No	55	85.9	68	94.4	123	90.4
Total	64	47.1	72	52.9	136	100.0

($\chi^2 = 2.836$, $df = 1$, $p = 0.092$)

Regarding the frequency distribution of respondents by sewing activity, it was found that 55 respondents (85.9%) in the case group and 68 respondents (94.4%) in the control group were not involved in sewing activity. The distribution of respondents by sewing activity between the case and control groups was found to be statistically not significant (Table no. 17).

Table no. 18. Frequency distribution of the respondents by farming activity.

Farming	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Yes	15	23.4	6	8.3	21	15.4
No	49	76.6	66	91.7	115	84.6
Total	64	47.1	72	52.9	136	100.0

($\chi^2 = 5.920$, $df = 1$, $p = 0.015$)

The study showed that 15 respondents (23.4%) in the case group and 6 respondents (8.3%) in the control group were involved in farming activity. Conversely, 49 respondents (76.6%) in the case group and 66 respondents (91.7%) in the control group were not involved in farming. The distribution of respondents by farming activity between the case and control groups was found to be statistically highly significant (Table no. 18).

Table no. 19. Frequency distribution of the respondents by co-morbidities.

Co-morbidities	Frequency				*p value*
	Case		Control		
	N	%	N	%	
Hypertension	18	28.1	9	12.5	0.023
Hypotension	12	18.8	21	29.2	0.157
Diabetes Mellitus	6	9.4	8	11.1	0.739
Asthma	7	10.9	2	2.8	0.156
Arthritis	5	7.8	3	4.2	0.367
Neck pain	21	32.8	6	8.3	0.000
Knee pain	5	7.8	2	2.8	0.185

Regarding co-morbidities, it was found that 18 respondents (28.1%) in the case group and 9 respondents (12.5%) in the control group had hypertension. Additionally, 12 respondents (18.8%) in the case group and 21 respondents (29.2%) in the control group had hypotension. The study also showed that 21 respondents (32.8%) in the case group and 6 respondents (8.3%) in the control group had neck pain. The distribution of respondents by hypertension and neck pain between the case and control groups was found to be statistically significant ($p < 0.05$) [Table no. 19].

Table no. 20. Frequency distribution of the respondents by trauma on lumbar spine.

History of trauma on lumbar spine	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Yes	11	17.2	1	1.4	12	8.8
No	53	82.8	71	98.6	124	91.2
Total	64	47.1	72	52.9	136	100.0

($\chi^2 = 10.512$, $df = 1$, $p = 0.00$)

Among the 64 respondents in the case group, 11 respondents (17.2%) had a history of trauma to the lumbar spine, compared to 1 participant (1.4%) in the control group. The study also revealed that 53 respondents (82.8%) in the case group and 71 respondents (98.6%) in the control group had no history of lumbar spine trauma. The distribution of respondents by history of trauma to the lumbar spine between the case and control groups was found to be statistically highly significant (Table no. 20).

Table no. 21. Frequency distribution of the respondents by menopause

Menopause	Frequency				Total	
	Case		Control			
	N	%	N	%	N	%
Yes	19	29.7	13	18.1	32	23.5
No	45	70.3	59	81.9	104	76.5
Total	64	47.1	72	52.9	136	100.0

($\chi^2 = 2.548$, $df = 1$, $p = 0.110$)

Regarding the frequency distribution of respondents by menopausal status, it was found that 19 respondents (29.7%) in the case group experienced menopause, out of a total of 64 respondents. In the control group, 13 respondents (18.1%) had experienced menopause. The study also showed that 45 respondents (70.3%) in the case group and 59 respondents (81.9%) in the control group had not experienced menopause. The distribution of respondents by menopause between the case and control groups was found to be statistically not significant (Table no. 21).

Table no. 22. Frequency distribution of the respondents by post menopausal length

Respondents	N	Mean	*t value*	*Df*	*p value*
Case	19	7.74	1.376	30	0.179
Control	13	9.92			

($t = 7.74$, $df = 30$, $p = 0.179$)

The study presented that mean post menopausal length of cases was 7.74 and control was 9.92 respectively. The difference of post menopausal length between case and control was found statistically not significant (Table no. 22).

Risk factors associated with low back pain:

Variable		Odds Ratio (OR)	95% CI		*P* value
			Lower	Upper	
Working Posture	Sitting	**Reference**			0.001
	Standing	0.519	0.95	2.826	
	Walking	3.892	1.738	8.713	
Cooking posture	Standing	**Reference**	2.715	13.156	0.001
	Sitting	5.977			
Mattress type	Soft	**Reference**	2.095	9.011	0.001
	Firm	4.345			
Physical exercise involvement	Yes	**Reference**	1.949	40.244	0.001
	No	8.857			
Tube well usage	Yes	**Reference**	1.558	6.848	0.001
	No	3.267			
Lifting heavy object	Yes	**Reference**	1.34	3.42	0.001
	No	2.15			
Farming activity	Yes	**Reference**	1.07	2.78	0.015
	No	1.32			
Presence of hypertension	Yes	**Reference**	1.09	3.21	0.023
	No	1.87			
Presence of neck pain	Yes	**Reference**	1.95	5.99	0.001
	No	3.42			
Trauma on lumbar spine	Yes	**Reference**	2.11	8.68	0.001
	No	4.28			

Binary Logistic Regression was performed to analyze the association between the predictors and outcome.

In case of working posture, walking had a 3.892 times higher odds of developing low back pain compared to those who worked in a sitting posture. Since the (CI = 1.738-8.713) does not include 1, the association is statistically significant. In contrast, women who worked in standing posture had an odd ratio of 0.519, which indicates a lower risk in comparison to working posture.

Cooking posture was a significant predictor of low back pain. Participants who cooked while sitting had 5.98 times higher odds of developing low back pain compared to those who cooked standing.

Type of sleeping mattress type was also an important determinant, as women who used firm mattresses had more than 4.35 times higher odds of developing low back pain compared to those using soft mattresses. The CI was 2.095 - 9.011, since it does not include 1, a statistical significance is found between mattress firmness and low back pain.

Women who did not engage in exercise had nearly 8.86 times higher odds of developing low back pain compared to those who exercised regularly. It indicates a strong and statistically significant association between the stated predictor and low back pain.

Participants who did not use tube well were found to have 3.26 times higher odds of developing LBP compared to those who used tube well for water collection (OR = 3.267, CI: 1.56 - 6.85). From the study, it can be interpreted that participants who use alternative sources of water may be exposed to different ergonomic that increase their risk of LBP.

Lifting heavy objects was significantly associated with LBP. Participants who did not lift heavy objects had an OR of 2.15 (95% CI: 1.35 - 3.42) compared to those who did, indicating that lifting heavy loads contributes to the risk of LBP. This indicates the role of mechanical strain and occupational stress on the lumbar spine.

Participants engaged in farming were used as the reference category. Those who did not participate in farming exhibited an odds ratio of 1.32 (95% CI: 1.07 - 2.78), indicating a statistically significant higher likelihood of experiencing low back pain.

The presence of hypertension was significantly associated with low back pain. Participants without hypertension had an odds ratio of 1.87 (95% CI: 1.09 - 3.21) compared to those with hypertension, indicating that systemic health factors may interact with other determinants to influence susceptibility to LBP.

Participants without neck pain had an odd ratio of 3.42 (95% CI: 1.95 - 5.99) relative to those with neck pain, indicating a significant association between neck discomfort and low back pain. This finding suggests that musculoskeletal issues in the cervical region may influence lumbar spine function.

A history of lumbar spine trauma emerged as the strongest predictor of low back pain. Participants without prior trauma had an odds ratio of 4.28 (95% CI: 2.11 - 8.68) relative to those with a history of trauma, indicating that previous spinal injuries markedly elevate the risk of developing chronic or recurrent low back pain.

CHAPTER-V: DISCUSSION & LIMITATION

5.1 Discussion:

It was a case control study carried out with the aim of analyzing the association between sitting posture during cooking and low back pain among the rural women of Dohar Upazila. Data were collected from 136 respondents by face to face interview using pre–tested questionnaire. Analysis of the data was done by SPSS-22 program. The discussion part of the thesis have been presented in the following section.

Out of 136 respondents, 64 (47.1%) were in the case group and 72 (52.9%) in the control group.

The age distribution of respondents in this study was relatively proportionate. Highest percentage of respondents in case group – 32.8% in the age group of 18 – 30 years and second higher 28.1% respondents were in the age group 31 – 40 years. In the control group, 61.1% respondents were in the age group of 18 – 30 years (Table no. 01). A study conducted on low back pain showed that low back pain is more prevalent in women and people aged 40 - 69 years old (Maher et al. 2017, pp. 736-747). The age group distribution in this study did not observe a similar pattern like the findings of previous study. The divergence may be attributed to target population, study area or sampling methods.

About educational qualification of the respondents in case group, the largest portion of both case and control groups had education up to the secondary level - 35.9% among cases and 36.1% among controls. However, when comparing the lower education groups (illiterate and primary education), the case group was more heavily represented in illiteracy. It aligns with a study conducted by (Batista et al. 2018) where individuals with higher educational levels experience lower prevalence rates of low back pain, indicating that education is an important factor influencing the occurrence of low back pain.

In case of marital status of the respondents, a high percentage of both case and control respondents were housewives - 89.1% and 91.7%, respectively. The case group had more occupational diversity, which may have influenced the overall risk. A similar finding was observed in the present study, where marital status showed a significant association with the prevalence of low back pain. This aligns with previous research

by Batista et al. (2018, pp. 351-361) that also identified marital status as a contributing factor to low back pain among adults, with noticeable variations. Occupations such as housemaid, shopkeeper, and teacher were represented exclusively in the case group, with no corresponding respondents in the control group. Students made up 3.1% of cases and 8.3% of controls, possibly indicating a lower risk of low back pain.

About family type, among the respondents from case group, majority of them belonged to nuclear family with a percentage of 71.9%. In contrast, less population shared the percentage from extended family and it was 28.1%. In control group, highest percentage of respondents belonged to nuclear family and it was 83.3%. On the other hand, lowest percentage was seen in control group and it was from extended family type. Here, the percentage was 16.7%. In the overview, respondents mostly belonged to nuclear family in case of this study. The AUTBACK study (Carvalho-e-Silva et al. 2020) explored familial factors, both genetic and non-genetic, that may influence physical activity engagement and the development of low back pain. In comparison, the present study focused more on socio-demographic and lifestyle factors rather than genetic predispositions. While the AUTBACK study highlighted hereditary and family-environmental influences on LBP, the current research emphasized the role of marital status, education, and daily activities as significant contributors.

In the case group, 3.1% were underweight (<18.5) followed by 13.9% in the control group. 54.7% respondents had normal weight (18.5 – 24.99) in the case group. It demonstrated that 45.8% respondents had normal weight in the control group. In case of overweight, 42.2% from case group were overweight and from control group it was 40.3%. From the study, it was shown that majority of the respondents had normal weight. In the contrast, one additional risk factor linked to low back pain is body mass index. A healthy body mass index lowers the strain on the lower spine and so lessens lower back pain (Janke et al., 2007).

Among rural women, a strong correlation between low back pain and working posture was found. The majority of patients (75.0%) indicated sitting as their primary posture, while the majority of controls (45.7%) reported walking. Both groups reported standing the least. Walking seems to have a preventive effect, whereas extended

sitting may raise the risk of low back pain, according to the study. According to many high quality reviews and cross sectional studies, longer sitting periods and worse sitting posture are linked to higher prevalence and severity of lower back pain (LBP) in adults, office workers, and students. A study by Markova (et al 2014, p. 231) has shown that prolonged static sitting and poor posture at the workplace are significant risk factors for developing chronic low back pain, as they contribute to musculoskeletal strain and lumbar discomfort. Similarly, the present study found a notable association between occupational posture and the occurrence of LBP among rural women. While earlier studies primarily focused on sedentary or office-based workers, this study extends the understanding of postural risk factors to agricultural and domestic settings, where prolonged bending, squatting, or awkward positions are common. This comparison highlights that, regardless of occupational type, sustained poor posture and static loading on the spine remain key determinants of low back pain.

In this study, no significant correlation was found between rural women's low back pain and the mode of child delivery. Nearly similar percentages of cases and controls underwent normal vaginal delivery (49.1% & 52.7%) and cesarean section delivery (50.9% & 47.3%). This result implies that the probability of having low back pain is not independently influenced by the style of delivery. A study conducted by Alzahrani (et al. 2022) found that prolonged sitting might not cause low back pain to develop, but it could worsen the disability experienced by individuals suffering from it.

This study found no evidence of a significant correlation between rural women's sleeping position and low back discomfort. The most often reported sleeping position in both patients and controls was side-lying, indicating that sleep posture does not significantly contribute to low back pain in this group. Many people with LBP avoid sleeping prone (on their stomachs), as it increases lumbar strain and is most often associated with greater discomfort (Saini et al. 2025, p. 714). The type of mattress used was found to be associated with low back pain among rural women. A majority of cases (73.4%) reported sleeping on firm mattresses, while controls predominantly used soft mattresses (61.4%). Firm mattresses may increase pressure on certain spinal regions, potentially contributing to discomfort and low back pain (Saini et al. 2025, p. 34).

Among rural women, physical activity was negatively correlated with low back pain. Of the controls, 22.2% reported regular exercise, while just 3.1% of patients did so. The majority of the respondents in the case group were not involved in any form of physical activity, compared to 77.8% in the control group. This statistically significant difference suggests that a lack of physical exercise may be associated with the condition under study.

In terms of water collection from tube well, a statistically difference was found between the case and control group. A larger proportion of respondents in the case group (76.6%) collected water from tube well, compared to 50.0% in the control group. Conversely, a smaller proportion of the case group (23.4%) used alternative water sources rather than tube well. These findings suggest a potential association between tube well water collection and the condition under study. Socio-demographic factors including household location, accessibility may influence their water source selection and the risk of developing low back pain.

A statistically significant association was found between lifting heavy objects and low back pain in this study. More than half of the respondents in the case group (57.8%) was involved in lifting heavy objects, compared to only 18.1% in the control group. Contrarily, 42.2% respondents of the case group and 81.9% of the control group reported no involvement in lifting heavy objects. The difference was found to be statistically significant that heavy lifting is an important risk factor. These findings are consistent with the previous studies reporting that repetitive or excessive lifting of heavy objects can place considerable strain on the musculoskeletal system, particularly the lumbar spine.

Majority of the respondents in both case and control group were not engaged with sewing activity, with 85.9% in the case group and 94.4% in the control group – reporting no involvement. Previous study by Pramesti & Nurcahyo (2024) have identified that prolonged sitting, awkward postures, and repetitive movements are common sewing practices contributing to low back pain among individuals involved with sewing activity. In comparison, the present study also revealed that sustained postural strain during daily activities, such as prolonged bending, squatting, and other repetitive movements, significantly increased the risk of LBP among rural women.

History of hypertension was found statistically significant, which aligns with the study with Ala Tarigan (et al. 2024, pp. 201-206). Another study investigated the relationship between low back pain and hypertension , emphasizing that chronic pain can activate a stress response leading to elevated blood pressure. However, it did not specifically examine the correlation between low back pain and hypertension in individuals with sedentary lifestyles. In contrast, the present study considered lifestyle and occupational factors, revealing that reduced physical activity and prolonged static postures were significantly associated with the occurrence of LBP. This comparison underscores that while physiological mechanisms such as stress-induced hypertension are important, lifestyle-related factors, particularly inactivity and poor posture also play a crucial role in the development and persistence of low back pain.

5.2 Limitations:

- **Selection bias:**

  This study utilized a convenience sampling method, choosing respondents based on their availability and consent to participate. This may result in selection bias and restrict the sample's representativeness.

- **Time constraints:**

  The study was executed within a limited timeframe, limiting the duration for data collection.

- **Recall bias:**

  Data on posture and daily activities were self reported, which may introduce recall bias, as respondents may not accurately remember or report their past behaviors.

- **Researcher experience:**

  The researcher is a fourth-year B.Sc. Physiotherapy student conducting her first thesis. Limited prior experience in research techniques and strategies may have introduced methodological shortcomings.

CHAPTER-VI CONCLUSION AND RECOMMENDATION

6.1: Conclusion

This case–control study explored the association between postural, occupational, and lifestyle factors with low back pain among rural women. The findings demonstrated that posture during daily activities plays a crucial role in musculoskeletal health. Specifically, walking as a working posture and standing while cooking were significantly associated with higher odds of developing low back pain, while sitting posture was relatively protective. Use of a soft mattress and carrying out household tasks without the use of tube wells further increased the risk. Occupational exposures such as lifting heavy objects and farming activity were also found to be important determinants.

In addition, co-morbidities such as neck pain and a history of lumbar spine trauma strongly predicted the occurrence of low back pain. Overall, the results highlight that low back pain among rural women is influenced by a combination of ergonomic, occupational, and health-related factors. These findings emphasize the need for preventive strategies, including ergonomic modifications in cooking and working postures, use of firm mattresses, promotion of regular physical exercise, and safe handling of heavy loads. Targeted awareness programs and community-based interventions can play a significant role in reducing the burden of low back pain in rural populations.

6.2: Recommendation

- While this study provides valuable insights into the association between posture, occupational, and lifestyle factors with low back pain among rural women, further research is warranted. Longitudinal studies are needed to establish causal relationships and track the progression of low back pain over time.
- Future investigations should also explore intervention-based strategies, such as ergonomic modifications and structured exercise programs, to evaluate their effectiveness in prevention and management.
- Ergonomic modifications can be pointed out.
- Occupational safety measures should be focused on.

REFERENCES

- Ala Tarigan, A, Tiara, A and Pane, MD 2024, 'The Impact of Comorbidities On Pain Severity in Patients With Low Back Pain: A Cross-Sectional Study', *Sagita Academia Journal*, vol. 2, no. 4, pp. 201-206.
- Alaca, N, Acar, AO, Ozturk, S, Tuwio, AE 2025, 'Low back pain and sitting time, posture and behavior in office workers: A scoping review', *Journal of Back and Musculoskeletal Rehabilitation*, vol. 10, no. 2, p. 23.
- Alzahrani, H, Alshehri, M.A, Alzhrani, M, Alshehri, YS and Al Attar, WSA 2022, 'The association between sedentary behavior and low back pain in adults: a systematic review and meta-analysis of longitudinal studies', *PeerJ*, vol. 10, no. 5, p. 127.
- Arju, A, Saha, S, Lama, N, Ahmed, K, Rahman, MH and Kabir, MA 2020, 'Pattern of household activities and its effects on low back pain among Bangladeshi housewives', *Bangladesh Medical Research Council Bulletin*, vol. 46, no 3, pp. 189-195.
- Batista, ADS, Henschke, N and Oliveira, VC 2017, 'Prevalence of low back pain in different educational levels: a systematic review, *Fisioterapia em Movimento*, vol. 30, no. 1, pp. 351-361.
- Bener, A, Alwash, R & Lovasz, G 2003, 'Obesity and low back pain', *Collegium Antropologicum*, vol. 27, no. 1, pp. 95-104.
- Brady, S, Monira Hussain, S, Brown, WJ, Heritier, S, Wang, Y, Teede, H, Urquhart, DM and Cicuttini, FM 2017, 'Predictors of back pain in middle-aged women: Data from the australian longitudinal study of women's health', *Arthritis care & research*, vol. 69, no. 5, pp. 709-716.
- Brady, SM, Georgopoulos, V, van Zanten, JJV, Duda, JL, Metsios, GS, Kitas, GD, Fenton, SA, Walsh, DA and McWilliams, DF 2023, 'The interrater and test–retest reliability of 3 modalities of quantitative sensory testing in healthy adults and people with chronic low back pain or rheumatoid arthritis', *Pain reports*, vol. 8, no. 6, p. 1102.
- Caggiari, G, Talesa, GR, Toro, G, Jannelli, E, Monteleone, G and Puddu, L 2021, 'What type of mattress should be chosen to avoid back pain and

improve sleep quality? Review of the literature', *Journal of Orthopaedics and Traumatology*, vol. 22, no. 1, pp. 1-24.

- Carvalho-e-Silva, AP, Pinheiro, M.B, Ferreira, ML, Hubscher, M, Calais-Ferreira, L and Ferreira, PH 2020, 'Cohort profile: the AUstralian Twin BACK pain and physical activity study (AUTBACK study)', vol. 10, no. 7, p. 981.
- Chia, YY, Lo, Y, Chen, YB, Liu, CP, Huang, WC and Wen, CH 2016, 'Risk of chronic low back pain among parturient who undergo cesarean delivery with neuraxial anesthesia: a nationwide population-based retrospective cohort study', *Medicine*, vol. 95, no. 16, p. 3468.
- Choudhury, Y, Bremner, SA, Ali, A, Eldridge, S, Griffiths, CJ, Hussain, I, Parsons, S, Rahman, A and Underwood, M 2013, 'Prevalence and impact of chronic widespread pain in the Bangladeshi and White populations of Tower Hamlets, East London', *Clinical rheumatology*, vol. 32, p. 9, pp. 1375-1382.
- Coenen, P, Gouttebarge, V, van der Burght, AS, van Dieen, JH, Frings-Dresen, MH, van der Beek, AJ and Burdorf 2014, 'The effect of lifting during work on low back pain: a health impact assessment based on a meta-analysis', *Occupational and environmental medicine*, vol. 71. no. 12, pp. 871-877.
- Faruk, MO, Begum, N, Hossain, K, Rahman, MR, Rahman, MS and Hossain, S 2025, 'Risk Factors Associated With Low Back Pain in Bangladesh: A Cross-Sectional Study', *Health Science Reports*, vol. 8, no. 8, p. 151.
- Gorce, P and Jacquier-Bret, J 2025, 'Continental Assessment of Work-Related Musculoskeletal Disorders Prevalence Among Surgeons: Systematic Review and Meta-Analysis', *Journal of Functional Morphology and Kinesiology*, vol. 10, no. 2, p. 221.
- Gupta, G and Nandini, N 2015, 'Prevalence of low back pain in non working rural housewives of Kanpur, India', *International journal of occupational medicine and environmental health*, vol. 2, no. 28, pp. 313-320.
- Hassani, M, Hesampour, R, Bartnicka, J, Monjezi, N and Ezbarami, SM 2022, 'Evaluation of working conditions, work postures, musculoskeletal disorders and low back pain among sugar production workers', *Work*, vol. 73, no. 1, pp. 273-289.

- Hershkovich, O, Friedlander, A, Gordon, B, Arzi, H, Derazne, E, Tzur, D, Shamis, A and Afek, A 2013, 'Associations of body mass index and body height with low back pain in adolescents', *American journal of epidemiology,* vol. 178, no. 4, pp. 603-609.
- Hoy, D, Bain, C, Williams, S, March, L, Brooks, P, Blyth, F, & Woolf, A 2014, 'A systematic review of the global prevalence of low back pain', *Arthritis and Rheumatism'*, vol. 64, no. 6, pp. 2028-2037.
- Izadirad, H, Zareban, I and Masoudy, G 2017, 'The prevalence of low back pain and its relationship with BMI, age, level of education and ergonomic principles education among rural women', *Journal of Health Literacy*, vol. 1, no. 4, pp. 265-272.
- Janke, EA, Collins, A and Kozak, AT 2007, 'Overview of the relationship between pain and obesity: What do we know? Where do we go next?', *Journal of rehabilitation research & development,* vol. 44, no. 2, p. 10.
- Kett, AR, Sichting, F and Milani, TL, 2021, 'The effect of sitting posture and postural activity on low back muscle stiffness', *Biomechanics*, vol. 12, no. 2, pp. 214-224.
- Khokhar, SK, Qamar A, Surti A, Fahim, MF and Mahar, Y 2022, 'Demographic Associations of Low Back Pain; A Case Control Study', *Pakistan Journal of Health Sciences*, vol. 19, no. 4, pp. 46-50.
- Kirsch Micheletti, J, Blafoss, R, Sundstrup, E 2019, 'Association between lifestyle and musculoskeletal pain: Cross-sectional study among 10,000 adults from the general working population', *BMC Musculoskeletal Disorders*, vol. 20, no. 3, pp. 1-8.
- Li, Y, Zou, C, Guo, W, Han, F, Fan, T, Zang, L. and Huang, G 2024, 'Global burden of low back pain and its attributable risk factors from 1990 to 2021: a comprehensive analysis from the global burden of disease study 2021', *Frontiers in Public Health*, vol. 12, no. 5, p. 148.
- Madhavudu, MV, Divya, N, Ranganathan, Subramanian, SS 2023, 'Determining the Predominant Risk Factor of Low Back Pain Among Pre-Menopausal and Post-Menopausal Women', *International Journal of Experimental Research and Review*, vol. 22, no. 7, pp. 231-233.

- Maher, C, Underwood, M. and Buchbinder, R 2017, 'Non-specific low back pain', *The Lancet*, vol. 13, no. 7, pp. 736-747.
- Manyozo, S 2019, 'Low back pain during pregnancy: Prevalence, risk factors and association with daily activities among pregnant women in urban Blantyre, Malawi', *Malawi Medical Journal*, vol. 31, no. 1, pp. 71-76.
- Markova, V, Markov, M, Petrova, Z and Filkova, S 2024, 'Assessing the impact of prolonged sitting and poor posture on lower back pain: A photogrammetric and machine learning approach', *Computers*, vol. 13, no. 9, p. 231.
- Mitra, K 2017, 'Prevalence of Low Back Pain and Disability among the Non-working Adult Women in a rural Community of Purba Barddhaman, West Bengal', *Journal of Medical Science and Clinical Research*, vol. 5, no. 5, pp. 226-228.
- Osinuga, A, Fethke, NB, Story, WT, Ibitoye, SE, & Baker, KK 2022, 'Assessing the relationship between domestic work experience and musculoskeletal health among rural Nigerian women', *PLOS ONE*, vol. 17, no. 12, p. 152.
- Patil, SP and Sangle, KK 2022, 'Water fetcher's lumbar load analysis while carrying heavy loads', *Materials Today: Proceedings*, 56, pp. 3506-3511.
- Paul, S, Mitra, K, Chakrabarty, A & Das, DK, 2019, 'Prevalence of low back pain and disability among the adult women in a rural community', *Journal of Dental and Medical Sciences*, vol. 5, no. 3, pp. 22–28.
- Pramesti and Nurcahyo, FA 2024, 'The Impact of Occupational Ergonomics on the Prevalence of Low Back Pain in Tailoring Professions: A Systematic Literature Review', *Bioscientia Medicina: Journal of Biomedicine and Translational Research*, vol. 8, no. 12, pp. 5570-5581.
- Rahman, PA and Wazir, AZ 2022, 'Low back pain among occupational therapists and its associated risk factors', *Malaysian Journal of Public Health Medicine*, vol. 28, no. 2, pp. 169-180.
- SantAnna, PCF, Olinto, MTA, Bairros, FSD, Garcez, A and Costa, JS 2021, 'Chronic low back pain in a population of women in Southern Brazil: prevalence and associated factors', *Fisioterapia e Pesquisa*, vol. 28, no. 9, pp. 9-17.

- Shahin, MA, Bhuiyan, R, Ara, R, Islam, MN, Choudhury, M.R, Haq, SA and Zaman, MM 2022, 'Risk factors of non-specific low back pain in a rural community of Bangladesh: A case-control study', *F1000Research*, vol. 11, no. 7, p. 871.
- Shahin, MA, Bhuiyan, R, Ara, R, Islam, MN, Choudhury, M.R, Haq, SA and Zaman, MM 2022, 'Risk factors of non-specific low back pain in a rural community of Bangladesh: A case-control study', *F1000Research*, vol. 11, no. 5, p. 871.
- Sharif, S, Ali, MYJ, Kirazl, Y, Vlok, I, Zygourakis, C and Zileli, M 2024, 'Acute back pain: The role of medication, physical medicine and rehabilitation', *World neurosurgery*, vol. 23, no. 7, p. 1273.
- Su, CA, Kusin, DJ, Li, SQ 2018, 'The association between body mass index and the prevalence, severity, and frequency of low back pain: Data from the osteoarthritis initiative', *Spine*, vol. 43, no. 12, pp. 848-852.
- Tazri, SA and Anam, K 2024, 'Prevalence of low back pain in post menopausal women in the peripheral community of Bangladesh', *Journal of Medicine and Surgery Research*, vol. 5, no. 6, pp. 73-82.
- Widanarko, B, Legg, S, Devereux, J and Stevenson, M 2014, 'The combined effect of physical, psychosocial/organizational and/or environmental risk factors on the presence of work-related musculoskeletal symptoms and its consequences', *Applied ergonomics*, vol. 5, no. 10, pp. 1610-1621.
- Wong, AYL, Karppinen, J & Samartzis D 2017, 'Low back pain in older adults: risk factors, management options and future directions', *Scoliosis and Spinal Disorders*, vol. 2, no. 4, p. 14.
- Wu, A, March, L, Zheng, X, Huang, Wang, X, Zhao, J, Blyth, FM, Smith, E, Buchbinder, R and Hoy, D 2020, 'Global low back pain prevalence and years lived with disability from 1990 to 2017: estimates from the Global Burden of Disease Study 2017', *Annals of translational medicine*, vol. 45, no. 4, p. 299.

APPENDIX

Verbal Consent Form

Assalamualaikum,

I am Efat Akter, a student of B.Sc in Physiotherapy, SAIC College of Medical Science and Technology (SCMST), affiliated with Faculty of Medicine, University of Dhaka. For the partial fulfillment of my bachelor degree, I have to conduct a research project and it is a part of my study. My research title is 'Sitting Posture During Cooking as a Risk Factor for Low Back Pain Among the Women in Rural Bangladesh: A case control study'.

I do expect that the interview will take 15-20 minutes. I also offer you to ask any sort of questions when you feel it necessary to get insight.

I would like to inform you that this is a purely academic study and will not be used for other purposes. I assure you that all data will be kept confidential. Your participation will be voluntary. You have the right to withdraw your consent and discontinue from the study at any point of time. You also have the right not to answer any other question that you do not like of this questionnaire.

If you have any query about the study, you may contact with me (01407391230) or my supervisor Dr. Abul Kasem Mohammad Enamul Haque, Principal of SCMST.

So, may I have your consent to proceed with the interview? Yes……., No……

Signature of the participant & Date…….

Signature of the researcher & Date……..

Signature of the witness & Date……...

Title: Sitting Posture During Cooking as a Risk Factor for Low Back Pain Among the Women in Rural Bangladesh: A case control study

Questionnaire

ID No……..

Date:/____/____/____/

Part-01 Personal Information:

Sl no.	Information
1.1	Name of participant:
1.2	Address:
1.3	Mobile number:

Part -02 Socio-demographic Information

Sl no.	Question	Code
2.1	Age (completed years):……years	/___/
2.2	Religion: [1] Islam [2]Hindu [3]Buddhism [4] Christianity	
2.3	Educational qualification: [1] Illiterate [2] Primary [3] Secondary [4] Higher secondary [5] Graduate & above	/___/
2.4	Occupation:……..	/___/
2.5	Marital status: [1] Married [2] Unmarried [3] Widow [4] Divorce [5]Separated	/___/
2.6	Family type: [1] Nuclear [2] Joint/Extended	/___/
2.7	Height:…….(cm) Weight…….(kg) BMI:……	/___/

Part-03 Disease related information:

Sl no	Question	Code
3.1	Presence of low back pain: [1] Yes [2] No	/___/
3.2	If 'Yes', since when you have been experiencing low back pain?……..year	/___/

Part-04 Pregnancy & Postpartum history:

Sl no.	Question	Code
4.1	Number of children……..	/___/
4.2	Time since last delivery……	/___/
4.3	Mode of delivery: [1]Normal Vaginal Delivery [2]Cesarean Section	/___/

Part-05 Ergonomic & Posture related information

Sl no.	Question	Code
5.1	In which posture do you work most of the time? [1] Sitting [2] Bending [3] Squatting [4] Standing [5] Walking	/____/
5.2	Average duration of sitting throughout the day:……..hours	/____/
5.3	Which posture do you prefer while cooking? [1] Sitting [2] Standing	
5.4	Which posture do you prefer while sleeping? [1] Supine lying [2] Prone lying [3] Side lying	/____/

5.5	Which type of mattress do you use while sleeping [1] Firm [2] Soft	/____/

Part – 06 Lifestyle & physical activity related information:

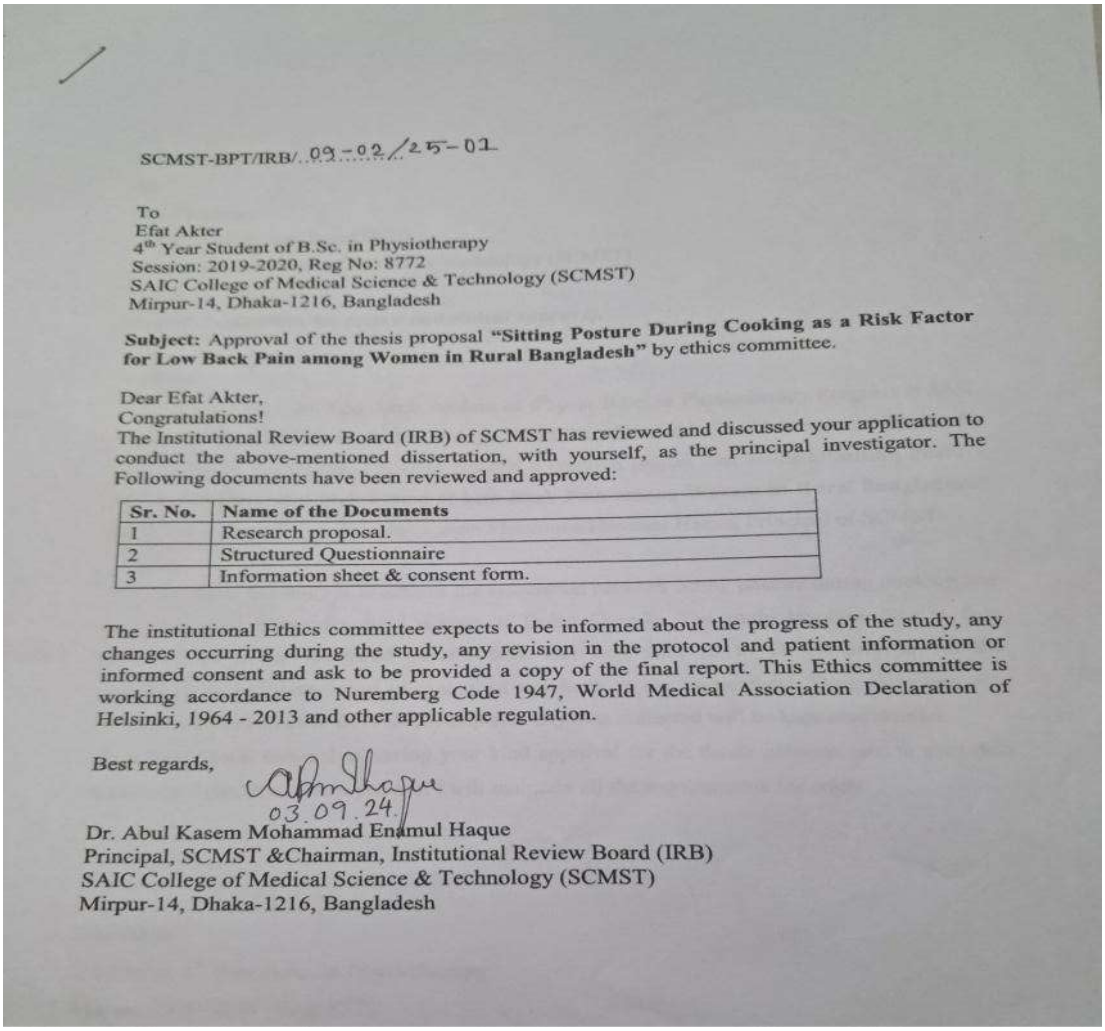
Sl no.	Question	Code
6.1	Do you engage in regular physical activity or exercise? [1] Yes [2] No	/____/
6.2	How many hours do you sleep daily?.....hours	/____/
6.3	Do you collect water from tube well? [1] Yes [2] No	/____/
6.4	Do you lift heavy object during work? [1]Yes [2] No	/____/
6.5	Do you do any sewing? [1]Yes [2] No	/____/
6.6	Do you participate in any farming activities? [1] Yes [2] No	/____/

Part - 07 Medical histories:

Sl no.	Question	Code
7.1	Do you have any history of the following comorbidites? [1] Hypertension [2] Hypotension [3] Diabetes Mellitus [4] Asthma [5] Arthritis [6] Neck pain [7] Knee pain [8] Others	/____/
7.2	Do you have any history of traumatic injury on lumbar spine? [1] Yes [2] No If yes, please mention the injury type:……	/____/

7.3	Have you experienced menopause? [1] Yes [2] No	/____/
7.4	Please mention the post menopausal length:……years	/____/

IRB Permission letter



SCMST-BPT/IRB/09-02/25-01

To
Efat Akter
4th Year Student of B.Sc. in Physiotherapy
Session: 2019-2020, Reg No: 8772
SAIC College of Medical Science & Technology (SCMST)
Mirpur-14, Dhaka-1216, Bangladesh

Subject: Approval of the thesis proposal **"Sitting Posture During Cooking as a Risk Factor for Low Back Pain among Women in Rural Bangladesh"** by ethics committee.

Dear Efat Akter,
Congratulations!
The Institutional Review Board (IRB) of SCMST has reviewed and discussed your application to conduct the above-mentioned dissertation, with yourself, as the principal investigator. The Following documents have been reviewed and approved:

Sr. No.	Name of the Documents
1	Research proposal.
2	Structured Questionnaire
3	Information sheet & consent form.

The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring during the study, any revision in the protocol and patient information or informed consent and ask to be provided a copy of the final report. This Ethics committee is working accordance to Nuremberg Code 1947, World Medical Association Declaration of Helsinki, 1964 - 2013 and other applicable regulation.

Best regards,

03.09.24

Dr. Abul Kasem Mohammad Enamul Haque
Principal, SCMST &Chairman, Institutional Review Board (IRB)
SAIC College of Medical Science & Technology (SCMST)
Mirpur-14, Dhaka-1216, Bangladesh