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Functional Disability A mong Power Loom Workers with Chronic Ankle Symptoms Assessed Using the Foot and Ankle Ability Measure (FAAM): A Cross-Sectional Study

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Abstract

Background: Chronic ankle disability is a common occupational problem among industrial workers, especially power loom workers, because their work involves long hours of standing, walking, and repeated foot movements. Continuous stress on the ankle joint can lead to pain, instability, reduced function, and long-term disability, which affects work performance and quality of life. The Foot Ankle Ability Measure (FAAM) is a self-reported tool used to assess functional problems related to foot and ankle conditions. It contains two sections: Activities of Daily Living (ADL) and Sports, which help to evaluate both routine and higher-level activities and functional assessment in occupational settings.

Aim of the Study: To analyze the prevalence and impact of chronic ankle disability among power loom workers using the (FAAM) scale.

Method: This cross-sectional study was conducted among 100 power loom workers aged 20–60 years with ankle discomfort more than three months. Participants were selected from selected power loom industries. Data were collected using the (FAAM), along with a demographic and occupational profile questionnaire. The FAAM was administered in the local language under supervision.

Result: The study found a high prevalence of chronic ankle disability among power loom workers. Using the Foot and Ankle Ability Measure (FAAM), moderate disability was identified as the most common condition (49%), followed by moderate to severe disability (33%). Gender-wise analyze showed a similar pattern among males and females, indicating that prolonged occupational strain significantly contributes to ankle-related functional limitations.

Conclusion: In this study, we conclude that chronic ankle instability is prevalent among power loom workers. Assessment using the FAAM scale in a sample of 100 workers revealed that a substantial proportion of individuals experience functional limitations related to ankle instability, affecting their activities of daily living and work performance.

INTRODUCTION

Chronic ankle disability (CAD) is the recurrent deterioration of the lateral side of the ankle joint, usually developing after repeated ankle sprains and characterized by mechanical instability, pain, swelling, and functional limitations [(7)]. The power loom sector is one of the largest segments of the Indian textile industry,

providing employment to approximately 2.5–2.8 million workers across the country. Major power loom clusters are located in Bhiwandi (Maharashtra), Surat (Gujarat), Erode, Tiruppur, Coimbatore, and Salem (Tamil Nadu), Ichalkaranji (Maharashtra), Bhilwara (Rajasthan), and Malegaon (Maharashtra).The prevalence of CAD is high, and about 40% of people who suffer an ankle sprain will eventually develop CAD, physically demanding occupations (8,9). If it is not treated properly, the condition may lead to long-term disability and early arthritis of the ankle joint [(9)].

CAD occurs when the ankle does not fully recover after an injury. Instead of healing completely, the ankle remains painful, unstable, or weak for months or even years. Many people describe the feeling that their ankle may "give way" during daily activities such as walking on uneven ground and climbing stairs. This condition is not only the result of a single injury but also a combination of changes affecting ligaments, tendons, muscles, cartilage, and nerves around the ankle joint. Because it lasts for a long time, it often reduces physical ability and has an adverse impact on quality of life [(13)].

The ankle joint functions through the coordinated action of the talocrural and subtalar joints, which provide stability, mobility, and load transmission during weight-bearing activities [(1)]. Repeated injury or inadequate healing may result in ligamentous laxity, altered joint kinematics, and abnormal load distribution. These biomechanical changes increase joint stress, contribute to progressive joint degeneration, reduce shock absorption, and ultimately result in chronic functional impairment [(17)]. In addition, sensory deficits and impaired neuromuscular control may further reduce balance and stability, leading to repeated episodes of weakness, pain, and loss of confidence in the ankle joint [(19)].

Patients with CAD commonly present with recurrent sprains, ankle pain, stiffness, swelling after activity, tenderness over damaged ligaments, reduced ankle strength, restricted movement, abnormal laxity in joint stability tests, and difficulty balancing on one foot [(5)]. Diagnosis depends on patient history, physical examination, and imaging investigations such as plain radiography, magnetic resonance imaging (MRI), computed tomography (CT), and ultrasonography [(2)].

The Foot and Ankle Ability Measure (FAAM) is a self-reported outcome measure used to assess functional limitations associated with foot and ankle disorders [(3)]. The instrument consists of Activities of Daily Living (ADL) and Sports subscales, enabling assessment of routine and higher-level functional activities. Individuals with CAD commonly experience pain, weakness, stiffness, and poor balance, which affect daily activities and functional performance. Therefore, FAAM provides a measurable method to determine the impact of ankle problems on function and to monitor progress over time [(10,11)].

Power loom workers are frequently exposed to prolonged standing, repetitive foot movements, and continuous mechanical loading of the ankle joint. These occupational demands may increase the risk of CAD and related functional limitations. Therefore, the present study was conducted to analyse the prevalence and impact of CAD among power loom workers using FAAM.

METHODOLOGY

Ethical approval was obtained from the Institutional Ethics Committee (Ethical Clearance Number: IEC-RIPT/DT/21/0522) A cross-sectional study was conducted to analyze the prevalence and impact of chronic ankle disability (CAD) among power loom workers using the Foot and Ankle Ability Measure (FAAM). The study was carried out among power loom workers from selected power loom industries in Palladam and Tiruppur. Palladam was selected as the study area because it is a major power loom industrial region in the Tiruppur district, with a large concentration of power loom industries and workers. Therefore, the area was considered appropriate for recruiting power loom workers and assessing the prevalence and functional impact of chronic ankle disability among this occupational population. A total of 100 participants aged between 20 and 60 years were recruited using simple random sampling. Both male and female workers with chronic ankle symptoms, including pain, weakness, or instability lasting for more than three months, and having a minimum of one year of continuous work experience were included in the study. Participants with acute ankle injuries, major lower limb surgery or fractures within the previous year, neurological disorders affecting lower limb function, systemic illnesses limiting mobility, congenital deformities of the ankle or foot.

Prior to data collection, the study procedure was explained to all participants and informed consent was obtained The Foot and Ankle Ability Measure (FAAM) questionnaire was administered to assess their functional ability related to ankle problems. Each item of the FAAM was explained to the participants in a language that was convenient and easily understandable to them, considering their level of literacy and comprehension. The participants were given sufficient time to understand each question and provide their responses based on their current functional difficulties. Any clarification required by the participants was provided without influencing their responses. Demographic information including age and gender was

recorded. Functional limitations associated with CAD were assessed using FAAM, a valid and reliable self-reported outcome measure for foot and ankle disorders (1,10,11). The Activities of Daily Living (ADL) subscale was used to evaluate functional performance. The collected data were compiled and analysed using descriptive statistics, including frequency and percentage distributions, to determine the prevalence and impact of CAD among power loom workers.

STUDY PROTOCOL

The study was initiated after obtaining permission from the concerned authorities. Participants were recruited from selected power loom industries in Palladam and Tiruppur based on the predefined inclusion and exclusion criteria. The purpose and procedure of the study were explained to all participants, and informed consent was obtained prior to data collection.

Demographic information, including age and gender, was recorded using a structured data collection form. Eligible participants were then assessed using the Foot and Ankle Ability Measure (FAAM), a self-reported outcome measure used to evaluate functional limitations associated with chronic ankle disability (1,10,11). The Activities of Daily Living (ADL) subscale of FAAM was administered under supervision to ensure accurate completion of the questionnaire.

The obtained FAAM scores were documented and compiled for analyze Descriptive statistical methods, including frequency and percentage distributions, were used to summarize the demographic characteristics and functional status of the participants. The analysed data were interpreted to determine the prevalence and impact of chronic ankle disability among power loom workers.

PARTICIPANT REQUIREMENTS

Participants included in the study were power loom workers aged between 20 and 60 years from selected power loom industries in Palladam and Tiruppur. Both male and female workers with chronic ankle symptoms, including pain, weakness, or instability persisting for more than three months, and having a minimum of one year of continuous work experience were eligible to participate. Individuals with acute ankle injuries, a history of major lower limb surgery or fractures within the previous year, neurological disorders affecting lower limb function, systemic illnesses limiting mobility, congenital deformities of the ankle or foot, or those unable to understand the Foot and Ankle Ability Measure (FAAM) questionnaire were excluded from the study.

DATA ANALYSIS

The collected data were analysed using descriptive statistics. Frequency and percentage distributions were used to summarize demographic characteristics and FAAM scores. Among the 100 power loom workers assessed, moderate disability was the most prevalent category (49%), followed by moderate-to-severe disability (33%), good functional status (16%), and severe disability (2%). These findings indicate that chronic ankle disability is common among power loom workers and has a considerable impact on functional performance.

Table 1: Prevalence of Chronic Ankle Disability among power loom workers

Disability Level	Frequency	Percentage
Moderate	49	49%
Moderate to Severe	33	33%
Good	16	16%
Severe	2	2%
Total	100	100%

Gender	Good	Moderate	Moderate to Severe	Severe	Total
Male	11	24	17	1	53
Total	16	49	33	2	100

Graph 1: Overall prevalence showing the distribution of disability levels among power loom workers

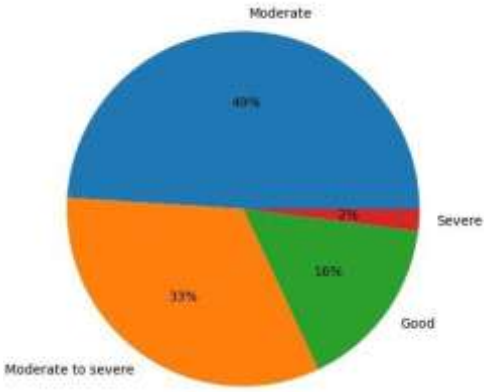
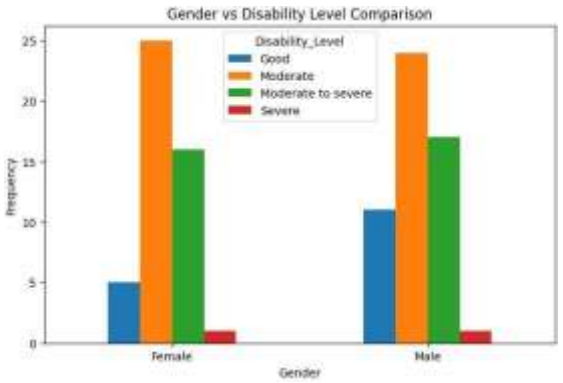


Table 2: Gender versus Disability Level in power loom workers

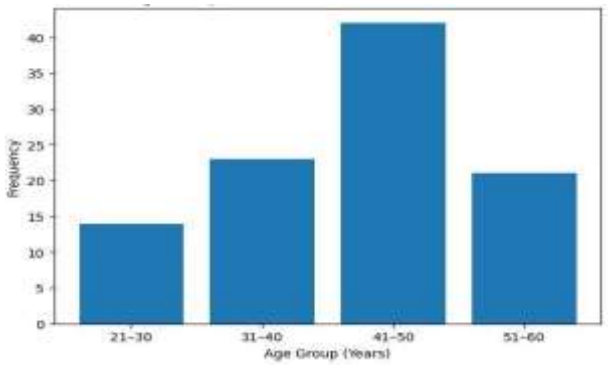
Gender	Good	Moderate	Moderate to Severe	Severe	Total
Female	5	25	16	1	47



Graph 2: Gender versus Disability Level in power loom workers

Table 3: Age Group Distribution among power loom workers

Age Group (Years)	Frequency	Percentage
21–30	14	14%
31–40	23	23%
41–50	42	42%
51–60	21	21%
Total	100	100%



Graph 3: Graphical Representation of Age Group distribution among power loom workers

DISCUSSION

The present cross-sectional study was conducted to determine the prevalence and functional impact of chronic ankle disability among power loom workers using the Foot and Ankle Ability Measure (FAAM). The findings demonstrated that chronic ankle disability is highly prevalent in this occupational group. Among the 100 participants, 49% exhibited moderate disability, 33% had moderate-to-severe disability, 16% showed good functional status, and 2% experienced severe disability, indicating that the majority of power loom workers have varying degrees of ankle-related functional impairment.

The high prevalence of chronic ankle disability observed in this study may be attributed to the occupational demands of power loom work. Workers are required to stand for prolonged periods, perform repetitive foot movements, and maintain continuous weight-bearing postures while operating machinery. These repetitive mechanical stresses can lead to ligamentous strain, muscular fatigue, impaired proprioception, and altered ankle biomechanics, thereby increasing the risk of chronic ankle disability and functional limitations. The findings of the present study are consistent with those reported by Hertel, who described chronic ankle instability as a condition resulting from recurrent ligament injuries, impaired neuromuscular control, and mechanical instability, leading to persistent pain, recurrent episodes of giving way, and reduced functional performance. Chronic ankle disability occurs when the ankle does not fully recover after an injury instead of healing completely, the ankle remains painful, unstable, or weak for months or even years. This condition is not only the result of a single injury but also a combination of changes affecting ligaments, tendons, muscles, cartilage, and nerves around the ankle joint. Because it lasts for a long time, it often reduces physical ability and has adverse impact on quality of life.

Power-loom workers are routinely exposed to prolonged standing, repetitive foot movements, uneven floor surfaces, and frequent changes in posture while operating machinery may leads to repeated micro-trauma to the ankle ligaments, inadequate recovery following ankle sprains, and impaired proprioception, these are the common factors leads to chronic ankle disability.

Similarly, Gribble et al. reported that individuals with chronic ankle instability commonly experience decreased balance, impaired physical function, and reduced quality of life, supporting the functional limitations observed in the present study. Furthermore, Houston et al. demonstrated that chronic ankle instability has a significant negative impact on health-related quality of life and daily functional activities, which is in agreement with the present findings. The (FAAM) proved to be an effective patient-reported outcome measure for evaluating ankle-related functional disability in this study. The (ADL) subscale successfully identified varying levels of disability among workers and provided a reliable assessment of functional limitations associated with chronic ankle conditions. Therefore, FAAM can be recommended as a useful screening and outcome assessment tool in occupational health settings. Although gender-wise analyze revealed a similar distribution of disability among male and female workers, the study primarily indicates that occupational exposure rather than gender may play a greater role in the development of chronic ankle disability. Continuous exposure to repetitive occupational activities appears to increase the likelihood of functional impairment regardless of sex. The findings of this study have important clinical implications for physiotherapists and occupational health professionals. Early identification of workers at risk, implementation of workplace ergonomic modifications, ankle strengthening exercises, proprioceptive and balance training, flexibility exercises, and education regarding appropriate footwear may help reduce the incidence and severity of chronic ankle disability. Periodic functional assessment using validated tools such as FAAM may also facilitate early intervention and improve work performance and quality of life. However, the present study has certain limitations. The study included participants from selected power loom industries with a relatively small sample size, limiting the generalizability of the findings. The cross-sectional design does not permit determination of causality between occupational exposure and chronic ankle disability. In addition, functional disability was assessed using a self-reported questionnaire without objective biomechanical or radiological evaluation. Future studies with larger sample sizes, multicentre recruitment, longitudinal follow-up, and objective clinical assessments are recommended to further investigate occupational risk factors and evaluate the effectiveness of preventive physiotherapy interventions.

CONCLUSION

The present study concluded that chronic ankle disability (CAD) is highly prevalent among power loom workers. Assessment using the Foot and Ankle Ability Measure (FAAM) revealed that the majority of participants experienced moderate to moderate-to-severe functional limitations affecting their daily and occupational activities. Prolonged standing, repetitive foot movements, and continuous mechanical loading

associated with power loom work may contribute to the development of CAD. The findings highlight the importance of early identification, regular functional assessment, and appropriate physiotherapy interventions to reduce disability, improve functional performance, and enhance the quality of life among power loom workers.

Conflict of interest

The author declare that there is no conflict of interest regarding the publication of this manuscript.

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Authors Contribution

Manikaraj M: Conceptualization, Methodology, Participant recruitment, Data collection, Formal analysis, Manuscript drafting.
Dr. Athira M: Supervision, Methodology validation, Critical revision of the manuscript, Final approval of the manuscript.
Dr. P. Bright Alwin Victor: Research guidance, Manuscript review, Administrative support, Final approval of the manuscript.

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