# Standing Duration And Leg Pain Among Teachers At Selected School In Airmadidi

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***Abstract -*** *Standing for long hours can cause muscle fatigue and tension, leading to leg pain due to pressure on the lower extremities' muscle caused by muscle strain. In addition, it can also interfere with blood circulation which can disrupt productivity in carrying out teaching activities at school. This study aims to investigate the relationship between standing duration and leg pain among teachers at selected school in Airmadidi. Research method used in this study was a quantitative approach with a cross-sectional design with statistical analysis of Spearman correlation. The sampling technique used was total sampling, with a total of 74 respondents. Data were collected using a questionnaire of Numeric Rating Scale (NRS). The results showed that the average standing duration among teachers was 180 minutes. Most respondents (37.8%) experienced severe leg pain. Spearman correlation test showed p value of 0.089 indicating that there is no significant relationship between standing duration and foot pain. These results indicate that standing duration alone cannot be considered the primary cause of foot pain among respondents, however, most of the respondents still experience discomfort due to fatigue and leg pain. Future researchers are advised to include additional variables such as footwear, BMI, physical activity, and to record standing duration and pain in a more detailed and accurate manner.*

***Keywords:*** *Leg Pain, Standing Duration, Teachers*

## I. INTRODUCTION

Teachers often work in a standing position to teach, interact with students, and supervise learning activities, both in theoretical and practical classes. Prolonged standing, especially in a static posture, can impede blood circulation, cause fluid accumulation, and increase the risk of musculoskeletal disorders, particularly in the legs and back Simarmata et al., 2020; Mohd Noor et al., 2016). Previous studies indicate that teachers may spend more than 70% of their working time standing or walking (Handel, 2016), and standing for more than 40 consecutive minutes can increase the risk of lower extremity pain (Kebede et al., 2019). The prevalence of foot pain among teachers is high, ranging from 60% to 86%, with most cases reported as moderate to severe (Alrashidi et al., 2022; Alqahtani, 2020; Iqbal et al., 2024). Considering this high risk, the present study aims to examine the relationship between standing duration and leg pain among teachers at selected school in Airmadidi.

Teachers generally teach while standing, both in theory and practical classes, to maintain authority, interact with students, and facilitate explanations. However, standing for more than one hour per day carries the risk of foot pain due to muscle strain and circulatory problems. Factors such as age, gender, workload, working hours, and standing posture influence the occurrence of foot pain (Melinda & Batubara, 2023 ; Jayanegara & Sulistomo, 2019).

Leg pain is classified as a musculoskeletal disorder, with a prevalence among teachers ranging from 39% to 95%, commonly involving calf cramps and ankle pain. The risk is higher in older teachers and those who remain in static standing positions for extended periods (Tahernejad et al., 2024; Gates et al., 2019). If left unaddressed, this condition may reduce comfort and teaching productivity.

Studies show that prolonged standing, especially with non-ergonomic postures, increases the risk of musculoskeletal complaints in various professions, including teaching (Anggrianti et al., 2017; Simarmata et al., 2020). Therefore, it is recommended to rest for 5–10 minutes after every 30–60 minutes of standing, perform stretching exercises, wear comfortable shoes, and engage in light physical activity for prevention (Alqahtani, 2020). This is in line with Virginia Henderson's nursing theory, which emphasizes the importance of movement, proper body posture, and adequate rest in maintaining health and mobility (Sahrudi et al., 2019).

## II. LITERATURE REVIEW

Standing for a long duration is classified as a static posture, which causes the muscles of the legs and back to contract continuously without relaxation. This condition may hinder blood circulation, lead to fluid accumulation, and increase the risk of discomfort as well as musculoskeletal disorders (Delleman et al., 2017). From an ergonomic perspective, the duration of standing during work activities should be limited and alternated with rest or position changes, such as sitting or walking, to maintain comfort and body health. Standing for more than 8 hours per day without adequate breaks can increase the risk of muscle fatigue, circulatory problems, and foot pain (Waters & Dick, 2017; Arianti & Novendy, 2022).

Leg pain caused by prolonged standing usually appears in the form of soreness, cramps, or pain in the calves and ankles. This condition is triggered by continuous muscle contraction and impaired blood flow, which lead to muscle tension and discomfort. Risk factors that increase the likelihood of foot pain include long working periods, advancing age, and a high body mass index. If left unaddressed, these complaints may reduce comfort, decrease productivity, and potentially develop into more serious musculoskeletal disorders. Therefore, teachers are advised to maintain proper posture, wear appropriate footwear, perform stretching exercises, and take breaks after standing for long periods (Maulina, Leni Utami, 2021; Siregar et al., 2022).

Prolonged standing refers to maintaining an upright body position for an extended period without significant changes in posture (Delleman et al., 2017). From an ergonomic perspective, the duration of standing during work activities should be limited and alternated with rest periods or changes in position, such as sitting or walking, to maintain health and body comfort (Waters & Dick, 2017). In addition, standing for more than eight hours a day increases the risk of foot pain compared to standing for less than eight hours (Arianti & Novendy, 2022).

Leg pain is generally caused by injury but can also result from prolonged standing, which may lead to muscle fatigue and injury, causing discomfort such as pain and cramps while standing or walking. Prolonged standing is a common factor contributing to foot pain, particularly among individuals working in environments that require them to stand for extended periods (Kartawijaya, 2022).

Prolonged standing is considered a static posture that maintains an upright position without significant movement, leading to continuous muscle contraction, especially in the legs and back, thereby reducing blood circulation and increasing the risk of musculoskeletal disorders. In a work context, such as in the teaching profession, standing duration is often quite long, for example, during teaching hours (Delleman et al., 2017).

## III. MATERIALS AND METHODS

### Research Design

This study employed a quantitative approach with a cross-sectional design, in which data were collected at a single point in time, allowing the phenomenon under investigation to be observed during the data collection period. The research aimed to examine the relationship between the duration of standing among teachers at selected school in Airmadidi and the occurrence of leg pain, with both variables assessed simultaneously.

### Participants/Data Sources

The study population consisted of 82 teachers at selected school in Airmadidi. The sampling technique used in this study was total sampling technique and based on the inclusion criteria, there were 74 teachers included in this study with the criteria of the inclusion criterion in this study was teachers who were willing to participate as respondents. Meanwhile, the exclusion criteria were teachers with a history of physical disability in the lower limbs, as well as those with a medical history of certain diseases such as stroke, gout, or diabetes mellitus.

### Tools and Instruments

Leg pain was measured using the Numeric Rating Scale (NRS), while standing duration was assessed through a survey covering specific time intervals. During data collection, tools such as a checklist and a 0–10 pain scale were used. The instrument scale ranged from 0 to 10, where 0 indicated "no pain," 1–3 indicated "mild pain," 4–6 indicated "moderate pain," and 7–10 indicated "severe pain."

### Procedures

Data collection was conducted offline by distributing questionnaires to teachers at the end of their teaching hours. All participating teachers who met inclusion criteria were gathered in a single room, where the researcher introduced herself, explained the purpose of the study. The researcher then provided instructions on completing the questionnaire and clarified that pain ratings should reflect discomfort experienced after standing during teaching activities. Upon completion, questionnaires were collected, and the session was closed with an expression of gratitude to all participating teachers.

### Data Analysis

Data analysis in this study was carried out using SPSS. To answer the research question regarding the description of standing duration, mean, standard deviation, minimum, and maximum were used. To determine leg pain among teachers at selected school in Airmadidi, descriptive statistical formulas of frequency and percentage were applied. To analyze the relationship between standing duration and leg pain, a correlation analysis was conducted. First, a normality test was performed using the Shapiro-Wilk test to determine whether the data were normally distributed. The results showed a significance value of $p < 0.05$, indicating that the data were not normally distributed. Therefore, the Spearman correlation test was used.

## IV. RESULTS AND DISCUSSION

The results indicate that the respondents' standing duration in this study ranged from 70 to 420 minutes, with an average standing time of 180 minutes in one day teaching session and a standard deviation of approximately 73.428, suggesting considerable variation in standing duration among respondents as seen in table one.

Prolonged standing is considered a static posture that can impede blood circulation, cause fluid accumulation, and increase the risk of musculoskeletal disorders, particularly in the feet and back (Simarmata et al., 2020; Mohd Noor et al., 2016). Elementary school teachers have been reported to spend more than 70% of their working time standing or walking (Handel, 2016), making it a high-standing-load occupation. Previous studies have recommended that continuous standing should not exceed 40 minutes to prevent lower extremity pain (Kebede et al., 2019). Mohd Noor et al (2016) also added that prolonged standing can cause muscle fatigue, disrupt blood circulation and increase the risk of musculoskeletal disorders (MSDs).

Table 1. Distribution of Respondents Based on Standing Duration

| Descriptive Statistics | Standing Duration |
|---|---|
| Mean | 180.405 |
| Std. Deviation | 73.428 |
| Minimum | 70.000 |
| Maximum | 420.000 |

Based on the data analysis, of the total 74 respondents, the majority experienced severe leg pain, with 28 individuals (37.8%). Meanwhile, 26 respondents (35.1%) reported mild pain, and 20 respondents (27.0%) reported moderate pain. From the cumulative percentage, 62.2% of respondents experienced mild to moderate leg pain. These findings indicate that leg pain complaints are relatively common, with the largest proportion in the severe category as shown in table two.

Leg pain may result from injury or prolonged standing, which can lead to muscle fatigue and discomfort such as pain, cramps when standing or even when walking (Kartawijaya, 2022). A study in Saudi Arabia reported that 85.5–86.7% of teachers experienced leg pain, some with severe intensity, related to the standing duration while teaching (Alrashidi et al., 2022; Alqahtani, 2020). Another study found that 60% of teachers experienced foot discomfort, with 30% reporting moderate to severe pain (Iqbal et al., 2024). Additionally, 25.4% of teachers were reported to have significant ankle/foot pain, and 33.7% had knee pain significantly related to prolonged standing (Alias et al., 2020).

Simamarmata (2020) recommends that standing for extended periods while teaching can cause muscle tension. This research is important for preventing leg pain which requires for a five to 10 minutes break every 30-60 minutes of standing. Teachers are also advised to perform light stretching after teaching to avoid excessive static load on the feet.

Table 2. Distribution of Respondents Based on Leg Pain

| Foot Pain | Frequency | Percent (%) |
|---|---|---|
| Mild Pain | 26 | 35.13 |
| Moderate Pain | 20 | 27.03 |
| Severe Pain | 28 | 37.84 |
| Total | 74 | 100 |

Based on result shown in table three, the p-value = 0.089 with a correlation coefficient r = 0.199, indicating no significant relationship between standing duration and leg pain among teachers at selected school in Airmadidi.

In line with Rabay-Pelay (2024), prolonged standing does not directly cause leg pain even though the respondents still felt uncomfortable and tired. This suggest that leg pain is most likely caused by other factors such as floor surfaces, shoes type rather than simply the duration of standing. Purvita et al. (2017) and Lunde et al. (2021) reported no strong relationship between standing duration and foot pain, while Rabal-Pelay et al. (2024) suggested that complaints are more influenced by factors such as muscle fatigue, flooring, and footwear. Conversely, Tahernejad et al. (2024) found that prolonged static standing is closely associated with pain and circulatory disorders. These findings highlight the need to consider other factors—such as footwear, body mass index, and physical activity—in leg pain research among teachers.

*Table 3. Relationship between Standing Duration and Leg Pain*

| **Variabel** | **Leg Pain** | | |
|---|---|---|---|
| | **r** | ***p*** | **Interpretation** |
| **Standing Duration** | 0.199 | 0.089 | Not Significant |

## V. CONCLUSION

Based on the results of the study involving 74 teachers at selected school in Airmadidi, the average standing duration in a workday was 180 minutes. Most respondents experienced severe leg pain. Statistical testing yielded a p-value of 0.089, indicating no significant relationship between standing duration and leg pain among teachers at selected school in Airmadidi.

Recommendations for future researchers include adding other variables such as type of footwear, body mass index (BMI), and history of physical activity to obtain more comprehensive results. It is also suggested to account for respondents' rest periods, record the total standing hours in a day in more detail, and measure standing duration specifically using tools such as a stopwatch for more accurate and in-depth data, as well as considering legpain experienced within 24 hours, which was not measured in this study.

### AUTHORS' CONTRIBUTIONS

Febyola Langi and Ailine Sanger was solely responsible for conceptualization, methodology, investigation, data analysis, and writing (original draft and revision). The researchers also conducted literature review, supervised the entire research process, and the final manuscript.

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