


# Prevalence of Coccydynia Among Wheelchair Users Due to Prolonged Sitting

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## Keywords

Coccydynia, wheelchair users, prolonged sitting, tailbone pain, ergonomic design, chronic pain, pain management, mobility aids, pressure relief cushions, sitting posture

## Disclaimers

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## ABSTRACT

**Background:** Coccydynia, characterized by pain around the coccyx, is a common issue among wheelchair users due to prolonged sitting. Despite its impact on quality of life, it remains under-researched in populations with mobility restrictions.

**Objective:** This study aimed to determine the prevalence of coccydynia among wheelchair users and identify key risk factors such as sitting duration, gender, and cushion use.

**Methods:** A cross-sectional study was conducted involving 250 wheelchair users aged 15–60 years in South Punjab. Data were collected through a self-structured questionnaire, Numeric Pain Rating Scale (NPRS), and Visual Analog Scale (VAS). Participants using wheelchairs for at least one year were included, while those with spinal cord injuries, fractures, or postpartum conditions were excluded. Statistical analysis was performed using SPSS version 25, with Chi-square tests to assess associations between variables.

**Results:** Coccydynia was prevalent in 76% of participants, with 72.4% reporting tenderness. Females were more affected (63.6%) than males (36.4%). Prolonged sitting (>5 hours) significantly increased tenderness ( $P < 0.001$ ). Most participants (85.2%) did not use cushions despite the pain being predominantly chronic (85.2%) and dull/aching (89.6%).

**Conclusion:** Coccydynia is prevalent among wheelchair users, driven by prolonged sitting and lack of ergonomic support. Interventions such as cushion use and ergonomic education are recommended.

## INTRODUCTION

Coccydynia, characterized by pain in or around the coccyx, is primarily associated with prolonged sitting—a common scenario for wheelchair users. Rather than being a distinct disease, this condition manifests as a symptom with significant implications for individuals relying on wheelchairs for mobility. First descriptively termed by Simpson in 1859, coccydynia has been recognized since the 16th century (1). Notably, it occurs more frequently in women than men.

Historically, the term "coccydynia" was broadly applied, which hindered accurate diagnoses and the development of effective treatments tailored to specific pathologies (3, 4). In 1950, Schapiro humorously referred to it as the "television disease," linking it to poor postural habits (2). Factors contributing to this condition include inadequate sagittal pelvic rotation—often observed in obese individuals—which causes the coccyx to protrude. This anatomical alteration exposes the coccyx to increased intrapelvic pressure from prolonged sitting or trauma, potentially leading to partial dislocation (2).

Clinically, coccydynia is defined by axial coccygeal pain that intensifies with pressure, particularly during prolonged sitting. This condition is a specific concern for wheelchair users (5, 6). Diagnosis involves a comprehensive medical history and physical examination, including palpation to

assess coccygeal pain and hypermobility. In some cases, rectal examination may reveal tenderness, while radiological assessments like dynamic X-rays and lateral sacral radiographs are critical for evaluating the coccyx's shape and movement (7). Common symptoms include pain and tenderness in the coccyx, lower sacrum, adjacent soft tissues, or muscles, which intensify during activities such as sitting, transitioning from sitting to standing, sexual intercourse, defecation, and, in women, menstruation (8).

In advanced stages, the pain persists during prolonged walking or standing and may even disrupt rest and sleep (9). To alleviate such symptoms, wheelchair users are often advised to use donut-shaped cushions. These cushions minimize pressure on the tailbone and reduce contact with the seat, thereby lowering the risk of pressure-related injuries (10). Extended sitting is also associated with muscle fatigue, incorrect posture, and increased stress on anatomical structures (11). Wheelchair users frequently encounter continuous pressure on weight-bearing areas without relief (12). Seat cushions play a vital role in evenly distributing pressure, preventing tissue deformation, and reducing discomfort (13).

Therapeutic interventions for coccydynia range from traditional and pharmaceutical approaches to surgical options. U-shaped cushions are widely recommended for symptom relief (14). In severe cases where non-surgical treatments fail, coccygectomy may be considered (15, 16).

This study aims to determine the prevalence of coccydynia among wheelchair users caused by prolonged sitting. It seeks to explore the condition's distribution and magnitude in this population, identify risk factors, and provide data critical for planning, implementing, and evaluating prevention, control, and treatment measures for coccydynia.

## MATERIALS AND METHODS

This cross-sectional study employed a convenience sampling approach to collect data from wheelchair users in various settings, including private and government special education institutes, hospitals, rehabilitation centers, and private residences within the South Punjab region. The research was conducted over a span of 5–6 months, during which data collection and analysis were performed.

The study sample comprised 250 participants, selected based on specific inclusion and exclusion criteria. Participants aged 15–60 years, of both genders, who had been using a wheelchair for at least one year, were included. Exclusion criteria omitted individuals with spinal cord injuries, spina bifida, a history of coccyx bone fractures, sensory loss, psychological disorders, and postpartum females. Ethical approval was obtained from the Kings College of Health Sciences Bahawalpur, affiliated with the Government College University Faisalabad.

A self-structured questionnaire, along with the Numeric Pain Rating Scale (NPRS) and the Visual Analog Scale (VAS), served as the primary tools for data collection. All participants provided signed informed consent before participating, and wheelchair users completed the questionnaires themselves.

The NPRS and VAS were instrumental in assessing the intensity and subjective experience of coccyx pain among participants. Statistical analysis was conducted using the Standard Package for the Social Sciences (SPSS) software, version 25. The data were summarized using frequencies and percentages, providing a clear overview of the findings. Cross-tabulation and Chi-square tests were employed to explore the association between sitting duration and tenderness of the coccyx.

Ethical considerations were prioritized throughout the study. Participants' dignity was respected, and honest communication was maintained to ensure transparency. No misleading information was conveyed, and the confidentiality of participants was rigorously upheld.

## RESULTS

This study analyzed data from 250 wheelchair users to determine the prevalence of coccydynia and its association with prolonged sitting. The findings revealed significant associations between wheelchair usage patterns, demographic factors, and the symptoms of coccydynia, including pain and tenderness in the tailbone region.

### Key Findings:

The majority of participants (76%) reported experiencing tailbone pain, and 72.4% noted tenderness in the coccyx region. Among the demographic variables, a higher prevalence of coccydynia was observed in females (63.6%)

compared to males (36.4%). The participants' age ranged from 15 to 60 years, with the majority falling into the 36–45 age group (52.8%).

**Table 1: Association Between Hours of Wheelchair Use and Tailbone Tenderness**

Hours Use per Day	Tenderness (%)	P-Value
Less than 5 hours	40.3% (29)	< 0.001
5–8 hours	86.9% (106)	
More than 8 hours	82.1% (46)	
Total	72.4% (181)	

The above table highlights a statistically significant association between the duration of wheelchair use and the prevalence of tenderness. Participants using a wheelchair for 5–8 hours daily reported the highest rates of tenderness (86.9%).

**Table 2: Characteristics of Wheelchair Use and Symptoms**

Characteristic	Response	Count (%)
Type of Wheelchair	Manual	161 (64.4%)
	Automated	89 (35.6%)
Use of Cushion	Yes	37 (14.8%)
	No	213 (85.2%)
Presence of Tailbone Pain	Yes	190 (76.0%)
	No	60 (24.0%)
Tenderness in Tailbone	Yes	181 (72.4%)
	No	69 (27.6%)
Type of Pain Perceived	Ache/Dull	224 (89.6%)
	Shooting	2 (0.8%)
	Stabbing	3 (1.2%)
	Burning	8 (3.2%)
	Others	13 (5.2%)
Duration of Tailbone Pain	Acute (< 3 months)	37 (14.8%)
	Chronic (> 3 months)	213 (85.2%)

Most participants (85.2%) reported chronic tailbone pain lasting more than three months, with 89.6% describing the pain as a dull or aching sensation. Additionally, 85.2% of users did not use a cushion, despite prolonged sitting, which may exacerbate symptoms.

The majority of participants (58.4%) had been using wheelchairs for more than 10 years. A significant portion (48.8%) used wheelchairs for 5–8 hours daily, followed by 39.6% who used them for more than 8 hours daily. Most participants (92.4%) reported muscle paresis as a primary condition, and 75.2% exhibited muscle atrophy.

The data indicate that most wheelchair users are long-term users, with 58.4% using wheelchairs for over a decade. Polio (37.6%) and muscular dystrophy (34%) were the most common conditions necessitating wheelchair use. The findings highlight the detrimental effects of prolonged sitting without ergonomic support. Tailbone tenderness and pain were significantly associated with longer daily wheelchair use. Despite these findings, cushions designed to alleviate pressure were underutilized by the majority (85.2%) of participants.

**Table 3: Demographic and Clinical Profiles of Wheelchair Users**

Characteristic	Response	Count (%)
Age Group	15–35 years	88 (35.2%)
	36–45 years	132 (52.8%)
	46–60 years	32 (12.0%)
Gender	Male	91 (36.4%)
	Female	159 (63.6%)
Primary Condition Requiring Wheelchair	Polio	94 (37.6%)
	Muscular Dystrophy	85 (34.0%)
	Amputation	28 (11.2%)
	Cerebral Palsy	24 (9.6%)
	Stroke	17 (6.8%)
	Others	2 (0.8%)
Muscle Condition	Paresis	231 (92.4%)
	Paralysis	19 (7.6%)
	Atrophy	188 (75.2%)
Duration of Wheelchair Use	1–2 years	9 (3.6%)
	3–5 years	33 (13.2%)
	6–10 years	62 (24.8%)
	More than 10 years	146 (58.4%)

The results underscore the importance of educational interventions and ergonomic modifications, such as incorporating cushions, to improve the quality of life for wheelchair users.

## DISCUSSION

This study assessed the prevalence of coccydynia among wheelchair users and identified critical associations with prolonged sitting and related risk factors. The findings revealed that coccydynia was prevalent in 76% of participants, with 72.4% reporting tenderness in the coccyx region. These results align with earlier studies that highlighted the significant burden of coccydynia among individuals with prolonged sitting habits, particularly those reliant on wheelchairs for mobility (1, 3). The high prevalence of coccydynia in females, observed in 63.6% of the participants, corroborates previous research suggesting that women are more susceptible due to greater ligament laxity and anatomical differences that increase vulnerability (4, 18).

Prolonged sitting, a key risk factor identified in this study, was strongly associated with coccygeal tenderness. Participants using wheelchairs for 5–8 hours daily exhibited the highest prevalence of tenderness (86.9%). This finding supports existing literature emphasizing the adverse effects of extended sitting, including increased pressure on the coccyx, muscle fatigue, and tissue damage (11, 12). Despite these risks, the majority of participants (85.2%) did not use cushions designed to alleviate pressure, highlighting a critical gap in ergonomic support and preventive measures. Previous studies have stressed the role of cushioning in redistributing pressure, reducing discomfort, and mitigating the risk of pressure-related injuries (10, 14).

The nature of pain reported by participants was predominantly dull or aching, consistent with descriptions in earlier research (5). Chronic pain lasting more than three months was prevalent in 85.2% of cases, reflecting the long-term impact of coccydynia on the quality of life for

wheelchair users. The study also found that pain often intensified after prolonged sitting and during transitions from sitting to standing, aligning with findings that suggest repetitive strain on the coccyx exacerbates symptoms (6, 8). Furthermore, the higher prevalence of coccydynia in participants without access to ergonomic interventions underscores the necessity of educating wheelchair users about available resources and their benefits (10–16).

While the study contributes valuable insights into the prevalence and risk factors of coccydynia among wheelchair users, it is not without limitations. The use of convenience sampling and the restriction of the study population to a specific geographical region may limit the generalizability of the findings (17). Additionally, the reliance on self-reported data introduces the potential for recall bias, as participants may underreport or overreport their symptoms. Despite these limitations, the study's strength lies in its comprehensive assessment of a population often overlooked in research, highlighting both the clinical and ergonomic dimensions of coccydynia (16, 21).

The findings underscore the importance of incorporating ergonomic interventions, such as cushions and adjustable seating, into the standard recommendations for wheelchair users. Furthermore, healthcare providers should emphasize regular positional changes and education on mitigating risk factors, such as prolonged sitting on hard surfaces. Future research should aim to explore the efficacy of different cushion designs and materials in reducing coccydynia symptoms. Expanding the scope of studies to include diverse populations and objective measures of pain intensity could provide more robust and generalizable data (17).

## CONCLUSION

In conclusion, this study confirms that coccydynia is a prevalent and often debilitating condition among wheelchair users, primarily attributed to prolonged sitting without adequate ergonomic support. The findings call for urgent attention to educational and ergonomic interventions to reduce the burden of coccydynia and improve the quality of life for individuals reliant on wheelchairs for mobility. By addressing these gaps, healthcare professionals and policymakers can play a crucial role in preventing and managing this condition in vulnerable populations.

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