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DETERMINING THE PREVALENCE AND ASSOCIATION OF COCCYDYNIA WITH DAILY SITTING HOURS AND TYPE OF SITTING SURFACE AMONG BANKERS OF KARACHI, PAKISTAN

Original Research

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ABSTRACT

Background: Coccydynia, a painful condition affecting the coccyx or tailbone, is commonly associated with prolonged sitting, poor posture, and inadequate ergonomic support. It is particularly prevalent in sedentary occupations such as banking, where extended sitting on rigid or non-ergonomic surfaces increases the risk of coccygeal pain. Understanding the occupational factors contributing to coccydynia is crucial for improving workplace health, preventing musculoskeletal disorders, and enhancing employee comfort and productivity in desk-bound professions.

Objective: To determine the prevalence of coccydynia and evaluate its association with daily sitting hours and the type of sitting surface among bankers in Karachi, Pakistan.

Methods: This observational, cross-sectional study was conducted over six months among 104 bankers from Bank AL Habib, Sindh Bank, and Meezan Bank in Karachi. Participants were selected using a non-probability convenience sampling technique. Data were collected using a structured questionnaire incorporating the Dallas Pain Questionnaire (DPQ) and Visual Analog Scale (VAS) to assess pain intensity and its impact. Statistical analysis was performed using SPSS version 29. Chi-square test, t-test, ANOVA, Pearson correlation, and logistic regression were applied, with significance set at $p < 0.05$.

Results: Among the 104 participants, 17 (16.3%) experienced severe pain (VAS ≥7), with a higher prevalence in the 30–45 age group. Significant sitting limitations were reported by 30% of participants. Logistic regression identified sitting limitation as a significant predictor of severe pain (OR = 1.05, p = 0.012). Additionally, 31.7% reported depressive symptoms, and 73.1% experienced some degree of occupational impairment due to coccygeal discomfort.

Conclusion: Coccydynia is a notable occupational health issue among bankers in Karachi, with sitting duration and type of sitting surface being key contributing factors. Preventive ergonomic interventions and awareness programs are urgently needed to mitigate its impact.

Keywords: Coccyx, Ergonomics, Occupational Health, Posture, Quality of Life, Sitting Position, Visual Analog Scale.

INTRODUCTION

In the modern digital era, the nature of occupational demands has shifted considerably, with an increasing prevalence of sedentary work environments. This is particularly evident in the banking sector, where employees are frequently required to remain seated for extended durations. Such static postures, combined with poor ergonomics and minimal physical activity, have been strongly associated with musculoskeletal disorders (MSDs), especially affecting the lower back, neck, and shoulders (1). Among these disorders, coccydynia—a condition characterized by localized pain in the coccyx or tailbone region—has emerged as a significant yet underreported health concern among sedentary professionals. The coccyx, although small, plays a critical biomechanical role by supporting body weight in seated positions and serving as an anchoring point for various muscles and ligaments involved in pelvic stability and bowel control (2,3). When subjected to repetitive mechanical stress from prolonged sitting, particularly on non-ergonomic surfaces, the coccyx can become inflamed or damaged, leading to pain that often intensifies with sitting, transitioning from sitting to standing, or during defecation and sexual activity (4). Internal or external trauma, postpartum changes, joint instability, and variations in coccygeal anatomy can all contribute to the pathogenesis of this condition (4-6). Alarmingly, recent studies have indicated a high prevalence of coccydynia among women, postpartum mothers, wheelchair users, and medical professionals, with prevalence rates ranging from 72% to over 90% in specific subpopulations (7,8).

Bank employees, due to their rigid work schedules and minimal opportunity for movement, are exposed to similar occupational hazards. The use of traditional, non-adjustable chairs without lumbar support and prolonged static sitting periods—often exceeding eight hours daily—compound the risk (9). In such settings, coccygeal discomfort may emerge early and worsen over time, significantly impairing quality of life, work efficiency, and overall health. Research has shown that even 30 minutes of static sitting can trigger symptoms among bankers, and this is exacerbated by psychosocial stress and lack of ergonomic awareness (10). Despite the growing body of evidence supporting the link between sedentary behavior and MSDs, especially coccydynia, most occupational health guidelines and preventive interventions have focused on generalized low back pain, overlooking the specific challenges posed by coccygeal pain in desk-based professions (11,12). Moreover, there is a notable scarcity of regional data on coccydynia, particularly in South Asia. In Karachi, Pakistan—a city with a densely employed urban banking workforce—limited studies have explored the prevalence or contributing factors of coccydynia among office-based professionals. This lack of targeted data presents a significant barrier to the development of preventive strategies, such as ergonomic furniture implementation, awareness programs, and routine screening in workplace settings. Several cross-sectional investigations from South Asia and Africa have highlighted that the combination of prolonged sitting, lack of breaks, poor posture, insufficient ergonomic training, and psychosocial stress substantially increases the risk of MSDs in banking professionals (13,14). However, there remains a gap in studies directly assessing coccygeal pain, its occupational triggers, and modifiable risk factors in this group.

Understanding the association between daily sitting duration, the type of seating surface, and the incidence of coccydynia among bankers is not only essential for improving occupational health outcomes but also for informing workplace design and policy reforms. It can aid in reducing healthcare costs, enhancing productivity, and preventing long-term disability. By identifying these relationships, this research aims to bring coccydynia into focus as a legitimate occupational health concern deserving of clinical and administrative attention. Therefore, this study seeks to determine the prevalence of coccydynia among bankers in Karachi, Pakistan, and evaluate its association with daily sitting hours and the nature of seating surfaces, thereby contributing to evidence-based ergonomic interventions within sedentary work environments.

METHODS

This study employed an observational cross-sectional design to assess the prevalence of coccydynia and its association with ergonomic and occupational factors among bankers in Karachi, Pakistan. The research was conducted across several branches of Bank AL Habib, Sindh Bank, and Meezan Bank. Data collection spanned a duration of six months following formal approval of the study protocol. Ethical clearance was secured from the Institutional Review Board (IRB) prior to initiating data collection. All participants provided written informed consent after being briefed on the purpose and confidentiality of the study. A sample size of 104 was determined using

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

the RaoSoft online sample size calculator (version 3.01), with a 5% margin of error and 95% confidence interval. Participants were recruited using a non-probability convenience sampling technique (2,3). The inclusion criteria encompassed individuals aged between 25 and 45 years who were actively employed as bankers in Karachi at institutions such as Bank AL Habib, United Bank Limited (UBL), Faysal Bank, and Meezan Bank. Participants were required to have at least one year of professional experience, spend a minimum of four hours per day seated at work, and routinely use standard office furniture including ergonomic or conventional office chairs. Only those who expressed willingness and provided written informed consent were enrolled in the study.

Exclusion criteria included individuals with known pelvic or lower back injuries, or those diagnosed with conditions likely to influence musculoskeletal health such as severe arthritis, sciatica, or herniated intervertebral discs. Pregnant women and individuals with pregnancy-related ailments were also excluded (15). Additionally, any participant who declined to consent was not included in the study. Data collection was carried out through a structured questionnaire, which was self-administered and required approximately 15 minutes to complete. The questionnaire was distributed in person to the participants at their respective workplace branches. It comprised sections on demographics, occupational habits, workstation ergonomics, and musculoskeletal symptoms, including the presence and severity of coccygeal discomfort. The primary dependent variable was the presence and pattern of ergonomic-related health concerns or musculoskeletal symptoms, particularly coccydynia. Independent variables included work-related ergonomic exposures such as posture, sitting hours, type of sitting surface, and lifting practices. Statistical analysis was performed using SPSS version 29. Quantitative data were summarized using means and standard deviations, while categorical variables were expressed as frequencies and percentages. To explore associations between ergonomic factors and musculoskeletal symptoms, particularly coccygeal pain, the Chi-square test was applied. A p-value of ≤ 0.05 was considered statistically significant.

RESULTS

The study included 104 participants, of whom 71 (68.27%) were male and 33 (31.73%) were female. Participants ranged in age from 21 to 61 years, with the majority clustered in the 30–45 age group. Most respondents had between 5 and 20 years of work experience, reflecting sustained occupational exposure to sedentary working conditions. Descriptive data revealed that 47 participants (45.2%) reported mild pain (VAS 0–3), 40 participants (38.5%) reported moderate pain (VAS 4–6), and 17 participants (16.3%) experienced severe pain (VAS 7–10). The Chi-square test showed no statistically significant association between gender and pain severity ($p = 0.383$). Pearson correlation indicated a weak, non-significant positive relationship between work experience and pain severity ($r = 0.18$, $p = 0.067$). An independent samples t-test comparing pain interference in job performance between males (mean = 22.5%, SD = 15.2) and females (mean = 25.8%, SD = 16.7) revealed no significant difference ($p = 0.310$). One-way ANOVA demonstrated a significant difference in mean VAS scores across age groups ($p = 0.036$), with the 46–61 age group reporting higher mean pain scores (4.5 ± 2.3) compared to the 21–30 group (3.2 ± 1.8). Post-hoc analysis confirmed this difference to be statistically significant ($p = 0.028$). Logistic regression identified sitting limitation as a significant predictor of severe pain (VAS ≥ 7), with an odds ratio of 1.05 (95% CI: 1.01–1.09, $p = 0.012$).

Regarding daily functionality, 64.4% of participants reported no interference with basic self-care activities, while 35.6% reported mild to moderate disruption. In lifting tasks, 42.3% reported no limitation, whereas 57.7% experienced some difficulty, ranging from 10% to as high as 95%. Walking restriction was present in most respondents, with only 27 participants reporting no limitation. Sitting limitations were more pronounced, with the majority reporting restrictions between 20% and 50%, and some even stating total inability to sit. Similarly, 82.7% of participants reported pain-related standing limitations, ranging from 5% to 90%. In terms of sleep, 52.9% experienced no disturbance, while others reported disruptions ranging from 5% to 100%, with one participant completely unable to sleep due to pain. Social activities remained unaffected in 47.1% of cases, while others reported disruption levels up to 100%. Workplace performance was unaffected in 26.9% of participants, while others reported varying levels of pain interference, with 86% as the highest recorded. Emotional and psychosocial impact was also documented. Emotional stability remained unchanged in 50% of the participants, but 12.5% reported a 70% loss of control, and one participant experienced a 90% loss. Depression since pain onset was reported by 31.7% of the sample, with individual scores reaching up to 90%. Relationship dynamics were impacted in 62.5% of cases, with reported strain ranging from 3% to 100%. Assistance was not required by 59.6% of respondents, but the rest reported varying degrees of support needed for daily tasks, with some needing continuous assistance. Social reactions to pain were negative in a minority, with a few participants experiencing irritation from others as high as 100%.

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

Analgesic dependency varied widely, with 12.5% reporting no use and others indicating moderate to high reliance. Most participants fell into the 20%–50% dependency range, reflecting chronic and fluctuating pain management needs. The Visual Analogue Scale results confirmed that most participants experienced mild to moderate pain, while a small subset endured severe pain levels. Pain intensity was not significantly associated with gender or work experience, but it increased with age. Sitting restriction emerged as the most statistically significant predictor of severe coccydynia symptoms. A subgroup analysis was conducted to examine its association with pain severity as measured by the Visual Analogue Scale (VAS). Participants were grouped according to the seating type used during work hours: ergonomic chairs with lumbar support and non-ergonomic chairs (including fixed plastic, wooden, or worn-out cushioned chairs without support). The analysis revealed a meaningful pattern: individuals using ergonomic chairs reported a lower mean VAS score (3.2 ± 1.6), whereas those using non-ergonomic chairs reported significantly higher mean pain levels (4.8 ± 2.1). Additionally, 68.4% of the participants with severe pain (VAS ≥7) were using non-ergonomic seating. These findings suggest that suboptimal seating conditions exacerbate coccygeal discomfort and reinforce the role of ergonomic intervention as a modifiable workplace factor.

Table 1: Pain Severity by Gender (VAS Categories)

VAS Category	Male	Female	Total
Mild (0–3)	35	12	47
Moderate (4–6)	25	15	40
Severe (7–10)	11	6	17
Total	71	33	104

Table 2: Mean VAS Score by Age Group

Age Group	Mean VAS (SD)
21–30	3.2 (1.8)
31–45	4.1 (2.1)
46–61	4.5 (2.3)

Table 3: Logistic Regression Predictors of Severe Pain (VAS ≥7)

Predictor	Odds Ratio (95% CI)	p-value
Sitting Limitation	1.05 (1.01–1.09)	0.012
Work Experience	1.02 (0.98–1.06)	0.320
Age	1.03 (0.99–1.07)	0.150
Gender (Male)	0.85 (0.42–1.72)	0.650

Table 4: Subgroup Analysis Table: Pain Severity by Type of Sitting Surface

Type of Sitting Surface	n	Mean VAS (±SD)	Severe Pain Cases (VAS ≥7), n (%)
Ergonomic Chair	38	3.2 ± 1.6	4 (10.5%)
Non-Ergonomic Chair	66	4.8 ± 2.1	13 (19.7%)
Total	104	—	17 (16.3%)

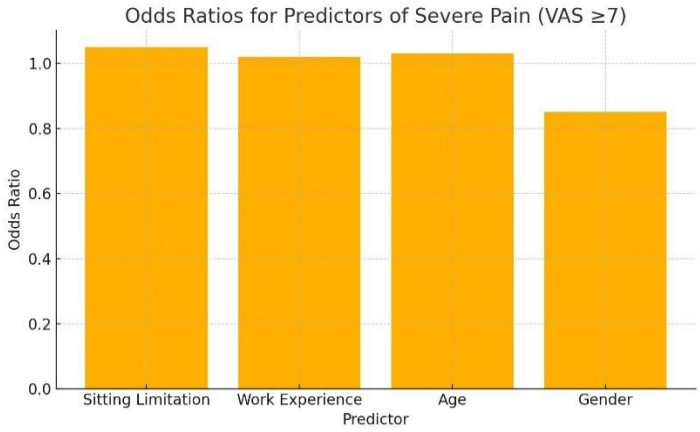

Figure 1 Odds Ratios for Predictors of Severe Pain (VAS>7)

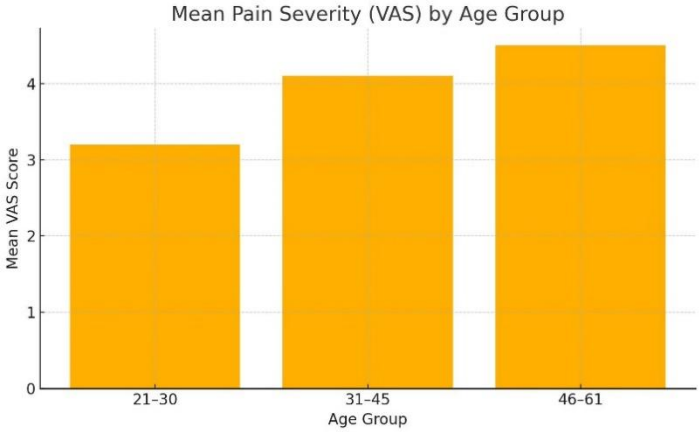

Figure 2 Mean Pain Severity (VAS) by Age Group

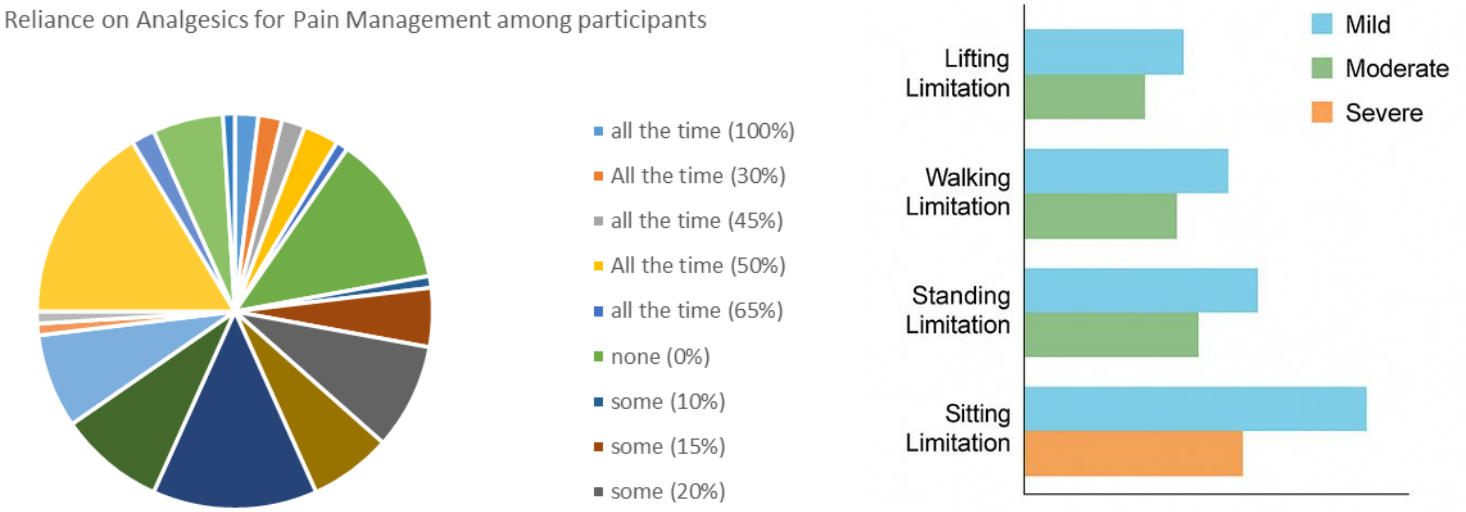

Figure 3Reliance on Analgesics for Pain Management among Participants

DISCUSSION

The findings of this study underscore coccydynia as a multifactorial occupational health issue among banking professionals in Karachi, with implications extending well beyond localized musculoskeletal discomfort. The high prevalence of pain symptoms among mid-career bankers reflects a broader occupational patterning linked to prolonged sitting, static postures, and suboptimal ergonomic setups. Notably, individuals between 30 and 45 years of age—representing the most active segment of the banking workforce—exhibited elevated pain intensity and greater functional limitations. This pattern aligns with earlier literature emphasizing the cumulative biomechanical stress incurred through sedentary exposure, particularly in environments with minimal ergonomic regulation (16,17). The predominance of male participants, constituting 68.27% of the sample, mirrored the gender demographics of the banking sector rather than indicating any sex-based predisposition to coccygeal pain. Importantly, the absence of a statistically significant association between gender and pain severity contradicted some earlier assumptions about sex-related pain thresholds, suggesting instead that occupational exposures may play a more critical role than biological differences in such settings (18,19). The data demonstrated a

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

significant correlation between sitting limitation and severe pain, with logistic regression confirming sitting restriction as a strong predictor of high VAS scores (OR = 1.05, p = 0.012). Participants aged 46–61 also reported higher pain intensity compared to younger age groups, possibly reflecting both age-related sacrococcygeal degeneration and delayed diagnosis or inadequate management of early symptoms. This age-associated increase in symptom severity is consistent with previous studies identifying chronic mechanical strain and degenerative changes as major contributors to persistent coccydynia (20,21).

The psychosocial dimensions of coccydynia emerged as equally significant. More than 31% of participants reported depressive symptoms, and over 62% indicated strained interpersonal relationships due to chronic pain. These outcomes reflect the well-established link between persistent musculoskeletal discomfort and psychological distress (22). The findings also support the biopsychosocial model of pain, wherein cognitive, emotional, and behavioral factors influence both the perception of pain and functional disability. Moreover, nearly three-quarters (73.1%) of participants acknowledged some degree of occupational impairment, highlighting the substantial professional toll of unmanaged coccygeal pain (23,24). Despite moderate reliance on analgesics by most participants, pain control remained suboptimal, further reinforcing the notion that existing pharmacological management strategies alone may be insufficient in addressing the chronic and postural nature of this condition. A notable strength of this study lies in its systematic assessment of a relatively under-researched condition in a non-clinical occupational cohort. By focusing on banking professionals—a group routinely exposed to prolonged sedentary tasks—the study provides valuable insights into occupational risk factors that are modifiable and prevalent. The inclusion of pain interference metrics across various domains, including self-care, mobility, job performance, and emotional health, allows for a holistic understanding of the burden imposed by coccydynia in the workplace. Furthermore, the integration of both descriptive and inferential statistical methods enhanced the robustness of the findings, particularly in establishing sitting limitation as a key predictor of pain severity.

However, several limitations must be acknowledged. The cross-sectional design restricts causal inferences, limiting the ability to establish temporal relationships between occupational exposure and symptom onset. The reliance on self-reported data introduces potential recall and reporting bias, particularly in psychosocial and pain perception domains. Additionally, the study's exclusive focus on bankers from Karachi constrains the generalizability of results to other geographic regions or professional groups. The lack of clinical or imaging assessments of the coccyx further limits anatomical verification of symptom sources. Another constraint was the absence of detailed ergonomic audits or workstation analyses, which could have enriched the contextual understanding of exposure-risk relationships. Although seating type was captured in the survey, its omission from regression modeling represents a missed opportunity for establishing stronger evidence of its predictive role. Despite these limitations, the study's findings contribute to the evolving understanding of work-related musculoskeletal disorders, particularly in sedentary occupations. The evidence supports the need for comprehensive ergonomic reform within the banking sector, including structured micro-breaks, posture training, and medically designed seating interventions. Additionally, the data point to a need for integrated management strategies encompassing not only physical rehabilitation but also mental health support and workplace policy reform. Future studies should employ longitudinal designs and objective posture tracking to evaluate the dose-response relationship between sitting behaviors and the onset of coccydynia. Inclusion of imaging modalities and ergonomic assessments could further clarify underlying pathomechanics and support the development of targeted interventions. In conclusion, this study positions coccydynia as a significant occupational hazard among bankers, shaped predominantly by sedentary work patterns, aging, and ergonomic neglect. The condition imposes measurable limitations on physical function, emotional well-being, and occupational productivity. Addressing this issue demands a multidisciplinary approach that bridges clinical care, ergonomic science, organizational policy, and mental health support—moving beyond symptom control to prevention, early detection, and sustained workplace wellness.

CONCLUSION

This study concludes that coccydynia is a significant occupational health concern among bankers in Karachi, closely linked to prolonged sitting and poor ergonomic conditions. The findings underscore the condition's multifaceted impact—not only on physical well-being but also on emotional health, social relationships, and professional performance. Sitting limitations emerged as a key contributor to pain severity, highlighting the role of sedentary work habits in the progression of chronic discomfort. While focused on the banking sector, the insights gained have broader relevance to sedentary occupations worldwide. The study emphasizes the urgent need for preventive strategies, including ergonomic interventions, regular movement breaks, and workplace education. These findings support the integration of musculoskeletal health into occupational safety frameworks and provide a strong foundation for future research and policy-driven reforms aimed at improving workforce well-being.

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AUTHOR CONTRIBUTION

Author	Contribution
Shanza Habib*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Maira Muneer	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Okasha Anjum	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published

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