

Original Research

## Coccydynia: Do Corticosteroid Injections Hit the Mark Over NSAIDs?

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### ABSTRACT

**Objective:** Coccydynia is a medical ailment that causes discomfort at the coccyx, or tailbone, which can make it difficult for a person to go about their regular business. Nonsteroidal anti-inflammatory medications taken orally, and corticosteroid injections are two potential treatments for Coccydynia. However, the most effective and appropriate course of treatment for this condition must be identified. The study aimed to compare the effectiveness of Corticosteroid Injection vs. NSAID for pain relief in Coccydynia patients.

**Materials & Methods:** A total of 47 patients with idiopathic coccydynia were allocated to receive either oral NSAIDs plus a tailbone cushion (n=24) or fluoroscopic corticosteroid injection (n=23). Pain levels were measured by a visual analog scale at baseline and 2-, 3-, and 4-months post-treatment. Chi-square and t-tests were used to compare treatment efficacy.

**Results:** The two treatment groups showed no significant differences. Both groups demonstrated reduced pain over time, with no significant difference between injections and NSAIDs (p=0.209). While injections provided more relief for mild pain, NSAIDs showed better results for no-pain patients. Overall mean pain scores were similar between groups. The treatments differed in effectiveness for certain pain levels but exhibited comparable efficacy in reducing overall coccyx pain. The hypothesis of differing treatment efficacy was not supported.

**Conclusion:** As a result, it can be considered a viable alternative therapy for patients who have difficulty adhering to oral medication regimens due to its one-time administration and affordable cost. To achieve optimal therapeutic outcomes, it is critical to choose the appropriate patients.

**Keywords:** Coccydynia, Corticosteroid Injection, A Nonsteroidal Anti-Inflammatory Drug, Fluoroscopic Guidance, Pain Relief.

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## INTRODUCTION

An individual's physical and psychological well-being can be greatly impacted by coccydynia, a condition that causes pain in the coccyx region. The causes, pathophysiology, and available treatments of this common condition are not well studied, despite how often it occurs. Many ways to treat Coccydynia exist, but there's a problem – no standard rules for diagnosis and treatment, making effectiveness vary. We lack enough research, especially on conservative therapies for Coccydynia without clear causes.<sup>1</sup>

When the tailbone hurts for no clear reason, it's called idiopathic Coccydynia. People with this often talk about past injuries causing instability or pain, especially after sitting a lot. Some also struggle with bowel issues.

The study looks at how well oral NSAIDs and corticosteroid injections (given under special X-ray guidance) ease pain in people with this kind of Coccydynia. It matters because Coccydynia can mess up life – it limits what you can do, makes moving hard, and costs a lot in healthcare. Sitting for a long time is tough for people with Coccydynia, affecting their work and social life.<sup>3</sup>

The problem is, that we don't have great treatments for Coccydynia, and that costs a ton in healthcare. Surgeries, special medicines, and tests can all be expensive. Plus, Coccydynia can mess with your mind, making you feel down and isolated. People with Coccydynia often struggle

with depression and anxiety, making good treatments super important.<sup>4</sup>

Everyone – people, hospitals, society – needs better ways to treat Coccydynia. This study wants to add more info about using anti-inflammatory pills and shots guided by X-rays to help with Coccydynia pain. It's about making sure we know more about how to treat Coccydynia and help people live better.

The study's findings have the potential to improve patient outcomes and quality of life by supporting clinicians in making better decisions while managing Coccydynia patients. Furthermore, the study's findings may help to better customize therapy regimens and enhance treatment outcomes by highlighting potential determinants of treatment response.<sup>5</sup>

The crippling condition known as coccydynia severely lowers the quality of life for those who have it. The paucity of research in this area emphasizes the need for additional investigations into the efficacy of conservative therapies for idiopathic coccydynia.

The study's results could inform clinical decision-making and improve patient outcomes, ultimately reducing the functional impairment and economic burden associated with Coccydynia. By presenting additional evidence on the efficacy of two commonly used treatment methods, this study has the potential to enhance the lives of those affected by Coccydynia and decrease its impact on society.

## MATERIAL & METHODS

### Study Design & Settings

The design used for the study was observational comparative design. Data was collected on two different interventions used commonly for the management of Coccydynia Group A (Oral nonsteroidal anti-inflammatory medicines and Group B (fluoroscopically guided corticosteroid injection). Comparing the efficacy of these two

treatment methods was the study's main goal. The evaluators/data collectors were blinded. They were unaware of the treatment that each participant received, so a single-blind assessment was used. This helped minimize the potential for bias in evaluating treatment effectiveness.

### Sample Size & Technique

In this study, a total of 49 patients who visited the Orthopaedics/Neurosurgery clinic between April 2022 and June 2022 were included. Idiopathic Coccydynia, which causes unidentified discomfort in the coccyx or the surrounding area, was identified as the underlying condition in these individuals. Only while shifting positions from sitting to standing did the discomfort extend to other areas. 2 of the patients refused to get involved in the study so they were excluded from the analysis. In the NSAIDs group, 24 patients were included and 23 were in the Corticosteroid Injection group.

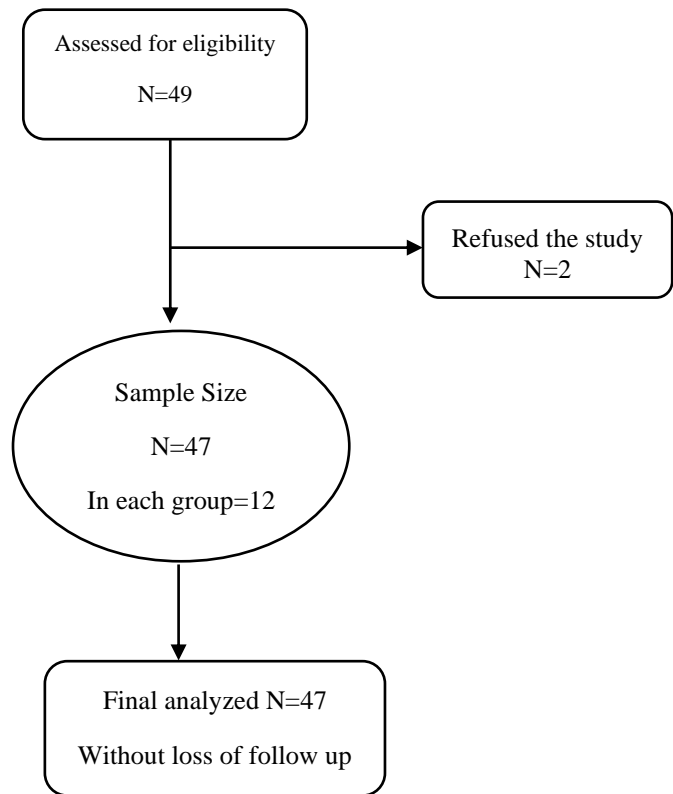
Participants gave informed permission before enrolling in the trial and were able to withdraw at any time.

A sample volume of 49 patients was obtained based on research, taking an accuracy coefficient of 0.1 and a power of 80% into consideration. 2 participants refused to participate in the study, 23 patients received fluoroscopically guided steroid injections, while the other 24 patients received oral NSAIDs. According to Figure 1, the age, sex, and BMI of the two groups were matched.

### Treatment Protocol

The treatment protocol for the NSAID group was a month-long treatment, celecoxib 200 mg capsules were given to them every 12 hours, and they were also instructed to sit on a tailbone pillow. A local procedure was performed on the second group (Corticosteroid Injection Group), which involved administering a periarticular injection of methylprednisolone 40 mg and 1% lidocaine 20 mg 92 cc at two different locations in

the coccyx. The injection was performed under fluoroscopic guidance in an operating room, as illustrated in Figure 2.



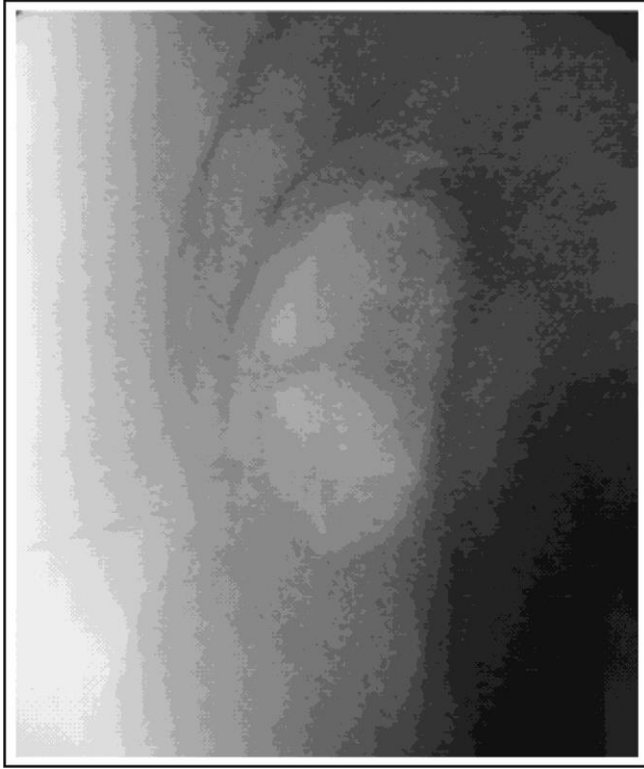
**Figure 1:** Flow diagram of the study protocol.

### Inclusion Criteria

The inclusion criteria for this research encompassed individuals who were aged 25 to 60 years, not on any form of antidepressant medications, maintained a body mass index (BMI) <30, no history of any previous spinal surgical interventions or severe pelvic trauma.

### Exclusion Criteria

Individuals with a history associated with the ingestion of oral nonsteroidal anti-inflammatory drugs (NSAIDs) or corticosteroids, narcotic misuse, recent NSAID utilization, or complications about rectal or gastrointestinal functionality or corticosteroids, narcotic misuse, recent NSAID usage, or rectal or digesting issues were excluded from the study.



**Figure 2:** Fluoroscopic image of coccygeal injection. (Picture shared after consent of the patient).

## Data Collection

Data was collected using a semi-structured questionnaire. Pain severity was assessed using a visual analog scale (VAS). Participants indicated their degree of discomfort on a 100-mm line, and VAS was assessed both before and after the intervention. Follow-up with patients continued for at least 4 months to monitor progress, and a reduction in pain of more than 50% was considered an appropriate treatment response. This study was conducted with great care to ensure accurate and reliable data collection.

## Data Analysis

The descriptive statistics used in the study included frequency, percentage, mean, and standard deviation (SD). To analyze categorical data, the chi-square test was used, and the exact Fischer test was used if needed. The independent t-test was used to analyze and contrast

quantitative data. A paired t-test and a repeated measure test were used to assess and compare the pain levels in each group before and after the intervention. A level of less than 0.05 was considered statistically significant. All statistical calculations were made using the SPSS program.

## Ethical Consideration

**The 1964 Helsinki Declaration, a set of ethical guidelines for medical research involving human participants, has been broadly embraced by the scientific world. These criteria were followed in this study to guarantee that the participant's rights, safety, and well-being were maintained. The study was authorized by the Ethics Committee. The participants supplied written agreement, willingly entered the study, and were aware of the potential risks and benefits of their involvement. To ensure the safety and well-being of the participants and the integrity of the research results, the study was done following the highest ethical standards, both rigorous and ethical.**

## RESULTS

### Demographics

Table 1 compares the two groups for Coccydynia, NSAID medication, and corticosteroid injection, based on demographic and clinical features. Age, sex, body mass index (BMI), duration of acute and chronic pain.

**Table 1:** Comparison of the demographic and clinical characteristics.

Variables	NSAID Treatment	Corticosteroid Injection
Age (yr.)	38.5±11.12	39.7±8.03
Sex (m/f)	13/11	11/12
BMI (kg/m <sup>2</sup> )	24.54±3.57	25.3±3.18
Acute pain (<6 months)	13	9

Chronic pain (> 6 months)	11	14
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The results demonstrated a statistically significant association between pain score and type of treatment, as evidenced by the chi-square test which yielded a p-value of 0.000 (Table 2). Specifically, the Oral Celbex group had more patients with no pain (n=15) while the Injection group had more with mild pain (n=12).

The pain levels between the two treatment groups were not significantly different, as the independent t-test showed a p-value of 0.209 (Table 3). Although the treatments differed in their effectiveness for certain pain levels, the Injection and Oral Celbex groups exhibited similar overall pain scores on average. While the type of treatment was related to pain level, there was no definitive evidence that one treatment was superior to the other in terms of reducing overall coccyx pain.

Both groups' ultimate pain scores were comparable, proving that both therapies had a similar impact on Coccydynia patients' pain levels.

The study concludes that for individuals who might have trouble adhering to an oral drug regimen, corticosteroid injection is a suitable substitute for NSAIDs.

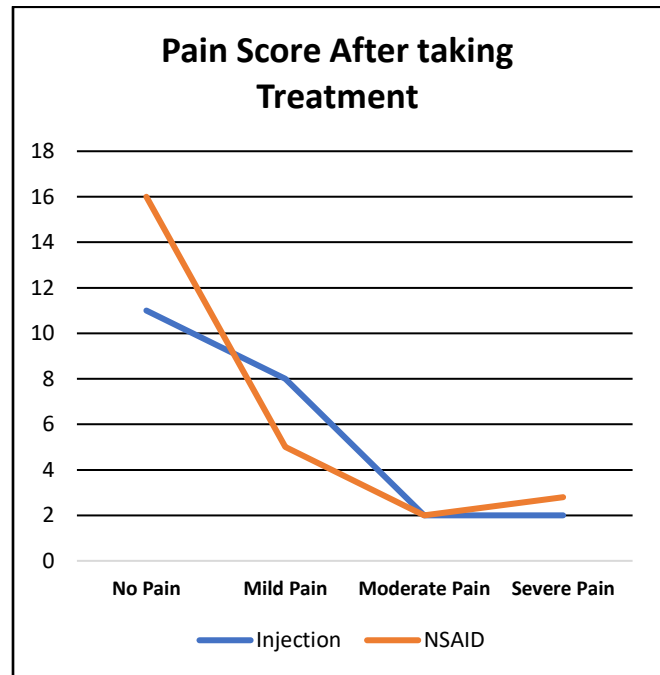
**Table 3:** Relationship between type of treatment and pain level.

Type of Treatment (N)	Mean	P Value
Injection (N=23)	1.70	0.209
Oral Celbex (N=24)	1.58	

## DISCUSSION

The treatment of Coccydynia depends on the underlying cause of the pain. Conservative therapies including rest, ice, and nonsteroidal anti-inflammatory medicines (NSAIDs) are frequently successful for individuals with

## Comparison of Pain Scores



**Figure 3:** Severity of pain between two groups.

**Table 2:** Relationship between the treatment and pain score.

Pain Score	Injection	Oral Celbex	Refused	Total	P Value
No pain	9	15	0	24	0.000
Mild	12	6	0	18	
Moderate	2	2	0	4	
Severe	0	0	2	2	
Very Severe	0	1	0	1	
Total	23	24	2	49	

traumatic Coccydynia. Patients with coccyx instability or subluxation may benefit from physical therapy or manual manipulation of the coccyx. Injections of corticosteroids may be used in some circumstances to lessen swelling and discomfort.<sup>6</sup>

In cases where conservative treatments are ineffective or there is severe coccyx instability, surgery may be considered. Coccygeal nerve blocks, which entail injecting a local anesthetic into the coccygeal nerve, and coccygectomy, which entails removing all or part of the coccyx, are surgical options.



There are few high-quality studies assessing the efficacy of conservative treatments like NSAIDs, physical therapy, or corticosteroid injections, which leaves idiopathic coccydynia with few evidence-based treatment options. A combination of corticosteroid injections and physical therapy can significantly reduce pain for people with coccydynia, according to research by White et al (2022). However, the study had two limitations: a small sample size and no control group.<sup>7</sup>

Mulpuri et al, (2022) found that patients with idiopathic coccydynia who had surgery to remove the coccyx bone (coccygectomy) improved more than those who had conservative treatment. However, the study was small and did not use standardized methods to measure outcomes. The benefits of coccygectomy must be weighed against the risks like bleeding, infection, and nerve damage.<sup>8</sup>

For coccydynia, non-surgical options exist including medications, physical therapy, and injections. Non-steroidal anti-inflammatory drugs (NSAIDs) are often used to reduce pain and inflammation. Avery et al, (2022) showed NSAIDs successfully treated pain and improved function in coccydynia patients. However, NSAIDs can cause side effects like stomach bleeding, kidney problems, and heart issues. Patients should be informed of these risks.<sup>9</sup>

Physical therapy for coccydynia involves exercises, electrotherapy, and manual therapy. Evidence that it works is limited because treatment methods vary and sample sizes are small. Electrotherapy using transcutaneous electrical nerve stimulation (TENS) and ultrasound has also been tried. Some studies suggest TENS helps coccydynia but others found no difference from placebo.<sup>10</sup>

Injections used for coccydynia include botulinum toxin, corticosteroids, and local anesthetics. Local anesthetics temporarily relieve pain and identify discomfort sources. Steroid injections reduce pain and improve function in

coccydynia.<sup>11</sup> However, optimal steroid dose and frequency are unknown. Side effects like infection, skin thinning, and adrenal gland problems can occur.<sup>12</sup> Some studies show botulinum toxin injections significantly decrease pain and improve function but evidence is limited due to varying methods and small samples.<sup>13</sup>

Treatment options for coccydynia include manipulation, physiotherapy, pain medication, coccygectomy, and steroid injections. But surgery should be avoided if possible. Success rates vary for coccygectomy, manipulation, and physical therapy. Outcomes from conservative treatments have been inconsistent.<sup>14</sup> The purpose of this study is to evaluate the effectiveness of fluoroscopically guided steroid injections and oral NSAIDs in treating coccyx pain in patients with coccydynia. Both treatments improved pain severity after one and three months, with no significant difference between them. Many factors, such as trauma, inactivity, labor, obesity, spinal canal stenosis, coccygeal spicules, and intervertebral disc herniation, can result in Coccydynia. However, the etiology is unknown in many cases.

Anti-inflammatory drugs may be used to treat Coccydynia if it is inflammatory. A tailbone cushion, NSAIDs, sitting in warm water, and physical therapy are examples of conservative care. Yet manipulation therapies haven't been effective in curing Coccydynia. Rectal manipulation with physiotherapy has also been shown to be ineffective in the long term. A fixed coccyx, a shorter symptom duration, a traumatic cause, and a low McGill University questionnaire score for Coccydynia assessment are all indicators of a favorable result.<sup>15</sup> Even though there is research evaluating steroid injection for Coccydynia, one study demonstrated that patients who received 40 mg of methylprednisolone acetate with 10 mL of bupivacaine 0.25% improved more when their coccyx was moved.<sup>16</sup> Another research found that Coccydynia pain quickly subsided after receiving

a steroid injection, but that there was no significant difference in pain intensity three months later.<sup>17</sup> For individuals who have poor compliance with oral drugs, a local steroid injection may be an alternative to traditional therapy. Nonetheless, it's important to pick the right people for a coccyx steroid injection, and patients shouldn't have any pelvic or rectal pathology. The study's main flaw is the limited sample size, hence larger studies are advised, especially ones that compare the efficacy of corticosteroid injection to placebo injection.

## CONCLUSION

Based on the results of the study, it can be concluded that fluoroscopically guided corticosteroid injection can provide similar benefits as oral NSAIDs in the treatment of Coccydynia. The advantage of this treatment option is that it only requires a single dose, which makes it a viable alternative for patients who may find it difficult to adhere to oral medication. However, it is important to ensure that patients are selected carefully based on their individual needs and medical history.

## LIMITATIONS OF THE STUDY

The study did not find any significant difference between the two treatment groups, the initial hypothesis predicting differing efficacy between the two treatments was therefore not supported statistically. Further studies with larger sample sizes would be beneficial to provide more conclusive findings regarding the comparative effectiveness of these coccydynia.

## REFERENCES

1. Seemal P, Ayub A, Dilshad M, Awan A, Nawaz A, Sameen T, Khan MS. Comparing Primal Reflex Release Technique and Stretching Exercises on Pain and Function in Coccydynia. *Iranian Rehabilitation Journal*. 2022;20(4):623-32.
2. Akşan Ö. Management of Persistent Coccygodynia and Health Behavior: A Survey Study on Patients with Coccygodynia of Age 41 to 69 years. *American Journal of Health Behavior*. 2022;46(6):821-33.
3. Safari MB, Tabrizi A, Hassani E, Nabiyyi F, Mohammadi S, Dindarian S. Effect of fluoroscopically guided corticosteroid injection versus oral nonsteroidal anti-inflammatory drugs for the treatment of coccydynia: A randomized, controlled, single-blind study. *Current Orthopaedic Practice*. 2020;31(1):54-7.
4. Lemmers GP, van Lankveld WG, Westert GP, Van der Wees PJ, Staal JB. Imaging versus no imaging for low back pain: a systematic review, measuring costs, healthcare utilization and absence from work. *European Spine Journal*. 2019;28:937-50.
5. Celenlioglu AE, Sir E. Predictive factors affecting treatment success in ganglion impar block applied in chronic coccygodynia. *Regional Anesthesia & Pain Medicine*. 2022;47(10):598-603.
6. Kulkarni G, Shen B. Maintenance of a healthy pouch. In: *Pouchitis and ileal pouch disorders 2019* (pp. 313-333). Academic Press.
7. White WD, Avery M, Jonely H, Mansfield JT, Sayal PK, Desai MJ. The interdisciplinary management of coccydynia: a narrative review. *PM&R*. 2022;14(9):1143-54.
8. Mulpuri N, Reddy N, Larsen K, Patel A, Diebo BG, Passias P, Tappen L, Gill K, Vira S. Clinical outcomes of coccygectomy for coccydynia: a single institution series with mean 5-year follow-up. *International Journal of Spine Surgery*. 2022;16(1):11-9.
9. White WD, Avery M, Jonely H, Mansfield JT, Sayal PK, Desai MJ. The interdisciplinary management of coccydynia: A narrative review. *PM&R*. 2022;14(9):1143-54.
10. Inamdar K, Molinini RM, Panibatla ST, Chow JC, Dusing SC. Physical therapy interventions to improve sitting ability in children with or at-risk for cerebral palsy: a systematic review and meta-analysis. *Developmental Medicine & Child Neurology*. 2021;63(4):396-406.
11. Sencan S, Yolcu G, Bilim S, Kenis-Coskun O, Gunduz OH. Comparison of treatment outcomes in chronic coccygodynia patients treated with

- ganglion impar blockade versus caudal epidural steroid injection: a prospective randomized comparison study. *The Korean Journal of Pain*. 2021;35(1):106-13.
12. Hahner S, Ross RJ, Arlt W, Bancos I, Burger-Stritt S, Torpy DJ, Husebye ES, Quinkler M. Adrenal insufficiency. *Nature Reviews Disease Primers*. 2021;7(1):19.
  13. Panunzio A, Tafuri A, Mazzucato G, Cerrato C, Orlando R, Pagliarulo V, Antonelli A, Cerruto MA. Botulinum toxin-a injection in chronic pelvic pain syndrome treatment: a systematic review and pooled meta-analysis. *Toxins*. 2022;14(1):25.
  14. Andersen GØ, Milosevic S, Jensen MM, Andersen MØ, Simony A, Rasmussen MM, Carreon L. Coccydynia—the efficacy of available treatment options: a systematic review. *Global Spine Journal*. 2022;12(7):1611-23.
  15. Maigne JY, Chatellier G, Faou ML, Archambeau M. The treatment of chronic coccydynia with intrarectal manipulation: a randomized controlled study. *Spine (Phila Pa 1976)*. 2006;31(18):E621-7.
  16. Galhom A, Al-Shatouri M, El-Fadl SA. Evaluation and management of chronic coccygodynia: Fluoroscopic guided injection, local injection, conservative therapy and surgery in non-oncological pain. *The Egyptian Journal of Radiology and Nuclear Medicine*. 2015;46(4):1049-55.
  17. Song C, Song C, Li C. Outcome of manipulation under anesthesia with or without intra-articular steroid injection for treating frozen shoulder: a retrospective cohort study. *Medicine*. 2021;100(13).

## Additional Information

**Disclosures:** Authors report no conflict of interest.

**Ethical Review Board Approval:** The study conformed to the ethical review board requirements.

**Human Subjects:** Consent was obtained by all patients/participants in this study.

**Conflicts of Interest:**

In compliance with the ICMJE uniform disclosure form, all authors declare the following:

**Financial Relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.

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## AUTHOR CONTRIBUTIONS

Sr.#	Author's Full Name	Intellectual Contribution to Paper in Terms of:
1.	Naveed Gul, Kashif Ramooz & Saad Javed	1. Study design and methodology.
2.	Yasir Shehzad & Fraz Mehmood	2. Paper writing.
3.	Shafiq ur Rehman Jamil & Sania Bhatti,	3. Data collection and calculations.
4.	Eesha Yaqoob	4. Analysis of data and interpretation of results.
5.	Saad Javed	5. Literature review and referencing.
6.	Naveed Gul & Yasir Shehzad	6. Editing and quality insurer.