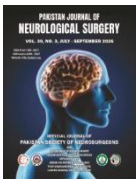

**PAKISTAN JOURNAL OF NEUROLOGICAL SURGERY (QUARTERLY) – OFFICIAL JOURNAL OF PAKISTAN SOCIETY OF NEUROSURGEONS**

Original Research

# Observations on the Outcome of Lumbar Microdiscectomy

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## ABSTRACT

**Objective:** A retrospective observational study of seven cases aimed to find out the outcomes of Lumbar Microdiscectomy as an excellent choice to treat Lumbar Disc Disease causing Neurologic symptoms of pain, numbness, and/or weakness.

**Materials & Methods:** Cases were included who underwent Lumbar Microdiscectomy at the Department of Neurosurgery, Ali Fatima Hospital/Abu Umara Medical and Dental College, Green International University, Lahore. MRI of the lumbosacral spine was done in all patients. Lumbar Microdiscectomy was done in all cases at the affected level. Post-operatively, all patients were mobilized in bed on the same day, and out-of-bed mobilization was done the next morning after surgery (1st post-operative day). The results were analyzed using the modified McNab Criteria.

**Results:** Four (57.1%) patients were male, and 3 (42.9%) were female. The age range was 26 years to 48 years, with a mean age of 40 years. Five (71.4%) patients showed excellent recovery with no post-operative complications. One (14.3%) patient developed post-operative wound infection that was treated with wound debridement and antibiotics and recovered. One (14.3%) patient developed recurrence and was re-operated 5 months after the first surgery. After revision surgery, the patient recovered completely.

**Conclusion:** Lumbar Microdiscectomy is an excellent procedure for the management of Lumbar Disc Disease resulting in Neurologic symptoms of pain, numbness, and weakness. The outcome depends upon appropriate diagnosis and timely surgical intervention.

**Keywords:** Back Pain, Leg Pain, Numbness, Weakness, Lumbar Disc Herniation, Microdiscectomy.

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## INTRODUCTION

Lumbar disc herniation is one of the most common diseases treated by Neurosurgeons all over the world.[1] Lumbar disc disease accounts for a large amount of lost productivity in the workforce. Lumbar discectomy is one of the most commonly

performed elective operations in the United States in this era.[1,2,3,4.] Lumbar disc herniation is one of the most common diseases for which neurosurgeons will be called upon for treatment globally. It is estimated that 50% of working adults suffer from back pain every year.[1] Out of those patients, more than 50% will be diagnosed with diseases of the lumbar spine, including lumbar disc herniation. More than 296 000 intervertebral disc operations are performed in the United States per year.[7]

Two of the most common symptoms of Lumbar Disc Disease, sciatica and back pain, are leading causes of physical disability in the United States. Sciatica is characterized by radiating pain in an area of the leg typically served by one nerve root in the lumbar or sacral spine, often associated with sensory and motor deficits, and commonly caused by a herniated disc. The estimated annual incidence of sciatica in Western countries is 5 cases per 1000 adults.[10] In the United States, approximately 25% of individuals between 18 and 44 years of age suffer from back pain. This percentage rises to 31% and 33% for those aged 45 to 64 years and greater than 65 years, respectively.[11] The economic impact of low back pain in the United States is sizeable, with a financial burden estimated at over $100 billion.[12] Although most of these patients will not require surgical intervention, surgery may be mandatory in some patients. The lumbar discectomy is the most common surgical procedure performed in the United States today for back and leg pain, and the outcomes are considered excellent for patients who are good surgical candidates.[13]

Microdiscectomy for symptomatic patients with lumbar disc disease having leg pain who have failed non-operative treatment is associated with a high success rate. Patients with herniations at the L5-S1 level were found to have better outcomes than did those at the L4-L5 level. Lumbar Microdiscectomy for symptomatic disc herniation is associated with a high success rate, patient satisfaction, and return to normal life.[9.] In brief, Lumbar Discectomy is one of the most common elective operations performed in the United States these days.[1,2,3,4]

## MATERIALS & METHODS

### Study Design and Duration

This is a retrospective observational study. We present a series of 7 cases who underwent Lumbar Microdiscectomy at the Department of Neurosurgery, Ali Fatima Hospital/Abu Umara Medical and Dental College, Lahore, from December 2024 to March 2026. The study was approved by the ethical review board (ref# AUMDC/REC/023) from Abu Umara Medical and Dental College.

### Inclusion & Exclusion Criteria

All patients with Symptomatic Lumbar Disc Disease with radiologic evidence of neurologic compression were included. Patients with Degenerative Spinal Stenosis, patients having Spinal Instability, and patients with Infective disease of the spine and space-occupying lesions of the spine were excluded.

### Study Institution

The study was conducted at the Department of Neurosurgery, Ali Fatima Hospital/Abu Umara Medical and Dental College, Lahore. At Ali Fatima Hospital, we have a 14-bedded Neurosurgery Unit in addition to a 7-bedded Surgical ICU. We have an operating microscope and C-Arm Fluoroscope. We have a Neurosurgery OPD that works from 08:00 AM to 02:00 PM from Monday to Saturday. The Department of Neurosurgery is affiliated with Abu Umara Medical and Dental College, Green International University Lahore.

### Investigations

MRI of the lumbosacral spine was done in all patients. After the diagnosis of Lumbar disc disease was made on MRI, the admission was done

to the Neurosurgery Ward. Laboratory investigations, including Full Blood Counts, Liver Function Tests, Renal Function Tests, Hepatitis Profile, HIV Screening, Prothrombin Time, APTT, and INR, were done in all cases. ECG and chest X-ray were done in all patients. Blood Grouping and Cross Matching were done in all cases. Anaesthesia review was arranged for all patients on the evening before surgery. Pre-Operative Marker X-Ray was done in all cases.

## Surgical Technique

All patients were operated under general anesthesia and were positioned prone on Wilson's Frame in "Superman Position" with both arms flexed and on padded armrests. Fluoroscopy was done in all cases to confirm the operative level.

Optimal flexion of the spine was achieved. Skin incision was made using Surgical Blade No. 23 in all cases. Subcutaneous tissue dissection was done using Monopolar electrocautery in all cases. Curved self-retaining retractors were used to retract the muscles in all cases. A surgical Concorde-shaped drill with a diamond burr, along with Kerrison Rongeurs 1 mm and 2mm were used for laminotomy in all cases. A microscope was employed in all cases at this point. In all patients, fat was removed using Pituitary Rongeur forceps. Ligamentum flavum was removed using surgical blade No. 15 and with the Help of Kerrison Rongeur 1mm. Reconfirmation of the Level through intra-operative Fluoroscopy was done in all cases (Figure 1). Table 1 describes the criteria for Lumbar Microdiscectomy.

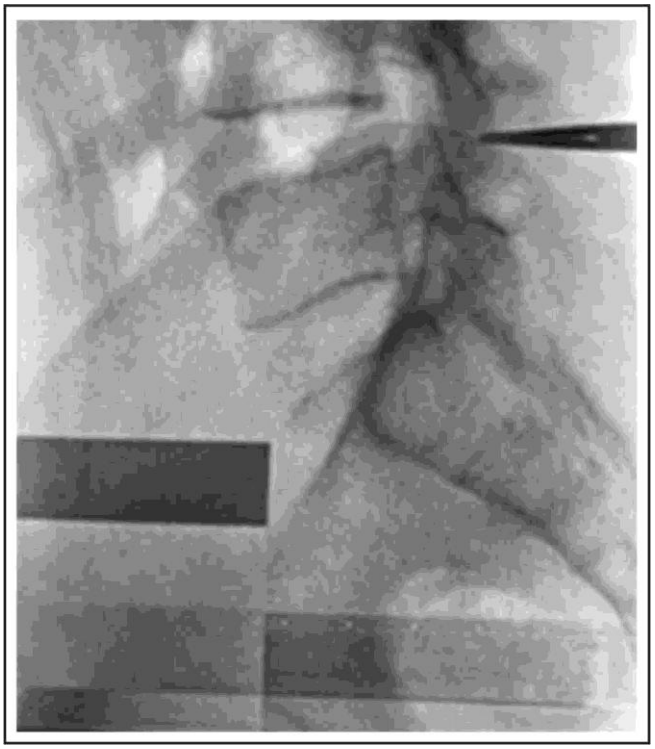

**Figure 1:** *Intra-operative Fluoroscopy to confirm L4/5 Level after surgical exposure, before the start of Microdiscectomy L4/5.*

A nerve root retractor was used to retract the compressed nerve root in all cases. Surgical blade No. 11 was used to open the annulus fibrosus of the disc. A straight pituitary rongeur was used initially to remove the disc content, followed by an angled Pituitary Rongeur. All the loose disc content was removed, and the disc space was thoroughly irrigated with normal saline in all cases. Bleeding from the venous plexus was observed in two cases, which was secured using bipolar electrocautery and Haemostatic oxidized cellulose (SurgiCell).

**Table 1:** *Our Criteria for Lumbar Microdiscectomy.*

| | |
|---|---|
| Clinical Criteria | Sciatica for 6 months or more, not responding to conservative management<br>Restricted Straight Leg Raising Test from 30-70 degrees<br>Hypoesthesia of the corresponding dermatome and/or weakness of the corresponding myotome |
| Radiological Criteria | Lumbar Disc Prolapse causing neurologic compression, evident on Magnetic Resonance Imaging (MRI) of the lumbosacral spine |

Lumbar Microdiscectomy was done in all cases at the affected level. In 3 (42.9%) patients with disc disease at the L4/5 Level, Microdiscectomy was done at the L4/5 Level. In 3 (42.9%) patients having Disc Disease at the L5/S1 Level, Microdiscectomy was done at the L5/S1 Level. In one patient (14.3%) who was having 2-level disc disease: at the L3/4 level and L5/S1 level, the upper level (L3/4-Level) was operated on first, followed by the lower level (L5/S1 level) during the same anesthesia.

## Post-Operative Course

All the patients were extubated after surgery and were assessed in the post-operative recovery room for relief from pre-operative symptoms of pain and for sensations and motor power of the lower limbs. Post-operatively, all patients were mobilized in bed on the same day, and out-of-bed mobilization was done the next morning after surgery (1st post-operative day).

## Outcome Assessments

Pre-Operative Pain score was analyzed on the Visual Analogue Scale (VAS). The results were analyzed using the modified MacNab Criteria.

# RESULTS

## Age and Gender Distributions

Four (57.1%) patients were male, and 3 (42.9%) were female. The age range was 26 to 48 years, with a mean age of 40 years. One (14.3%) patient was in the age range of 20-30 years, 2 (28.6%) patients were in the age range of 30-40 years, and 4 (57.1%) patients were in the age range of 40-50 years.

## Clinical Information on Disc Prolapses

One (14.3%) patient was a known case of Diabetes Mellitus. One (14.3%) patient was a known case of Hepatitis C, from which he suffered 2 years before admission and had fully recovered after treatment. Three (42.9%) patients had disc prolapse at the L5/S1 level, three (42.9%) patients had disc prolapse at the L4/5 level, and one (14.3%) patient had two-level disc prolapse at the L3/4 Level and L5/S1 level. Two (28.6%) out of 3 (42.9%) patients having disc prolapse at the L5/S1 Level were having Right sciatica, Lasegue sign positive in the right lower limb, hypoesthesia of the right S1 dermatome, and right paracentral L5/S1 disc prolapse. One (14.3%) out of those two (28.6%) patients having right paracentral L5/S1 intervertebral disc prolapse, was also had weakness of plantar flexion of the right foot. One (14.3%) patient with L5/S1 intervertebral disc prolapse presented with bilateral symptoms, had a positive Lasègue sign bilaterally, and had a central disc prolapse at the L5/S1 Level. This patient had bilateral hypoaesthesia of the S1 dermatome. One (14.3%) patient having a two-level disc prolapse at the L3/4 Level and at the L5/S Level was having weakness of knee extension bilaterally and hypoesthesia of L4, L5, and S1 dermatomes bilaterally. One (14.3%) out of two (28.6%) patients with right paracentral L5/S1 disc prolapse had wasting of the right calf muscles, and his right ankle jerk was absent. One (14.3%) out of two (28.6%) patients with right paracentral L5/S1 intervertebral disc prolapse had diminished right ankle jerks. One (14.3%) patient with central L5/S1 disc prolapse had normal ankle jerks. One (14.3%) patient with two-level intervertebral Disc prolapse at L3/4 and L5/S1 levels had normal ankle jerks.

Two (28.6%) out of 3 (42.9%) patients with L4/5 Disc Disease were having Lasegue sign positive bilaterally, bilateral hypoesthesia of the L5 dermatome, and weakness of dorsiflexion of both feet. These two (28.6%) patients had central L4/5 intervertebral disc prolapse. One (14.3%) out of 3 (42.9%) patients having L4/5 intervertebral disc prolapse had a positive Lasegue sign on the right side, right L5 hypoaesthesia, and right paracentral intervertebral disc prolapse at L4/5 level (Figures 2-a and 2-b).

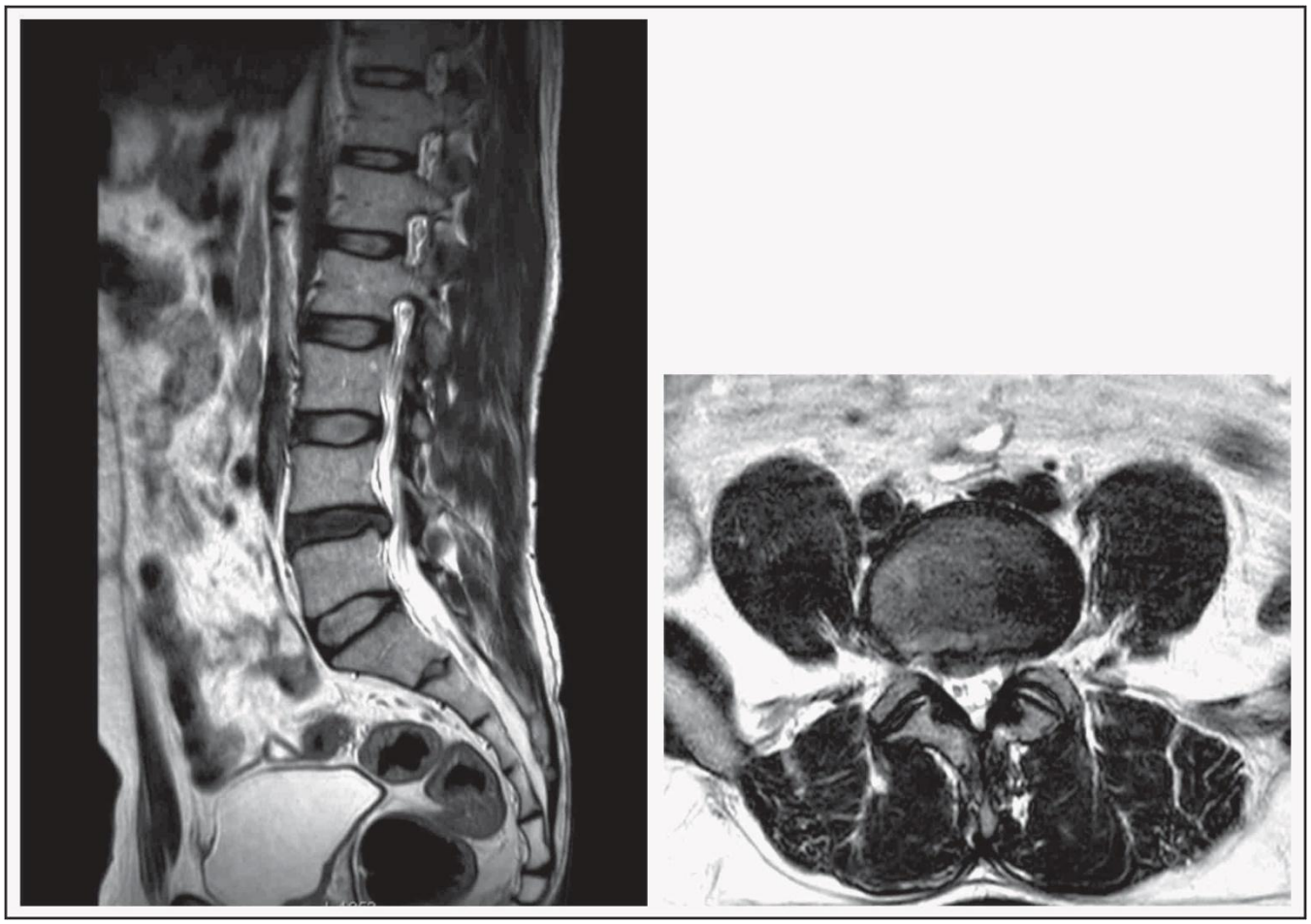

**Figure 2-a:** **Figure 2-b:**

**Figure 2:** *MRI Lumbosacral Spine T2-weighted Images, Sagittal* **(Figure 2-a)** *and Axial* **(Figure 2-b):** *views suggestive of Right Paracentral L4/5 Intervertebral Disc Prolapse. (Images included with patients' permission).*

**Table 2:** *Pain score as analyzed on the Visual Analogue Scale.*

| Sr. No. | Diagnosis | No. of Patients | Pain score | |
|---|---|---|---|---|
| | | | Pre-Operative | Post-Operative |
| 1. | Lumbar Disc Disease L4/5 | 1 | 4/10 | 0/10 |
| | | 1 | 6/10 | 0/10 |
| | | 1 | 8/10 | 2/10 |
| 2. | Lumbar Disc Disease L5/S1 | 2 | 4/10 | 0/10 |
| | | 1 | 6/10 | 0/10 |
| 3. | Lumbar Disc Disease L3/4 and L5/S1 | 1 | 6/10 | 0/10 |

## Analysis of Pain Score on Visual Analogue Scale (VAS):

Pre-Operative Pain score, as analyzed on the Visual Analogue Scale, out of 3 (42.9%) patients with L4/5 Disc Disease, was 4/10 in 1 (14.3%) patient, 6/10 in one (14.3%) patient, and 8/10 in one (14/3%) patient. Out of 3 (42.9%) patients with L5/S1 Disc Disease, the pain score was 4/10 in two (28.6%) patients and 6/10 in one (14.3%) patient. One (14.3%) patient with two-level disc disease at L3/4 and L5/S1 had a pain score of 6/10. Post-Operative Pain score was 0/10 in 6 (85.7%) patients and 2/10

in one (14.3%) patient, who was operated on for L4/5 Disc Disease and developed post-operative infection (Table 2).

Five (71.4%) patients had an excellent outcome and had no post-operative complications. One (14.3%) patient, who underwent Microdiscectomy at the L4/5 level, developed wound infection, for which she underwent wound debridement 7 days after the first operation and recovered completely after debridement and a 3-week course of appropriate antibiotics. One (14.3%) patient who had initially recovered very well after Microdiscectomy at the L4/5 Level, developed left sciatica after 4 months. His follow-up MRI revealed a tiny extruded disc fragment at the operated level on the left side between the traversing and exiting nerve roots. We performed re-exploration for him re-exploration and the recurrent disc fragment was removed. He showed very good recovery after revision surgery.

Six (85.7%) patients were discharged on the 3rd post-op day, and one (14.3%) patient (who had developed wound infection) was discharged on the 14th post-operative day after the first surgery and the 7th post-operative day after the 2nd surgery. Skin sutures were removed on the 11th post-operative day in 6 patients. In the patient who developed wound infection and had undergone wound debridement under General Anaesthesia, stitch removal was done on the 11th post-operative day after the 2nd surgery. The patients were followed up in the Neurosurgery Clinic on the 11th post-op day, after one month, 3 months, 6 months, 12 months, and 18 months. The minimum follow-up was 3 months and the maximum 18 months.

## Follow-up

The Follow-Up was from 3 to 18 months, with a mean follow-up of 12 months. Five (71.4%) patients showed excellent recovery with relief from pre-operative symptoms (pain, numbness and/or weakness) and had no post-operative complications. One (14.3%) of the three (42.9%) female patients developed a post-op wound infection, which was treated with debridement and antibiotics, and she recovered completely. One (14.3%) of the four (57.1%) male patients developed recurrence and was re-operated on 5 months after the first surgery. After revision surgery, he showed very good recovery.

## Outcome Measures

The results were analyzed using the modified MacNab Criteria. Five (71.4%) patients had excellent outcomes with complete recovery, no symptoms, and return to normal life. One (14.3%) patient had good recovery, who had post-op infection and, after debridement, returned to normal life. One (14.3%) patient had fair recovery, who recovered initially, then developed recurrence, and after revision surgery became better. No patient had poor recovery (Table 3).

**Table 3:** *Results as analyzed on Modified McNab Criteria.*

| Sr. No. | Recovery Criteria | No. of Patients | %age |
|---|---|---|---|
| 1 | Excellent | 5 | 71.4 |
| 2 | Good | 1 | 14.3 |
| 3 | Fair | 1 | 14.3 |
| 4 | Poor | 0 | 0 |
| Grand Total | | 07 | 100 |

# DISCUSSION

Symptomatic lumbar disc disease can be effectively treated by Microdiscectomy. Five (71.4%) of seven (100%) patients showed an excellent outcome. No patient deteriorated after surgery. Complications were seen in 2 (28.6%) patients, of whom one (14.3%) suffered from infection and recovered after debridement and appropriate antibiotics, and one (14.3%) suffered from recurrence and recovered after revision surgery. The overall excellent functional outcome was seen in 5 (71.4%) patients, good outcome in one (14.3%) patient, and fair outcome in one (14.3%) patient.

Surgical outcomes for lumbar discectomy are very good, but patient selection is very important for optimal results. An outcomes study of patients following lumbar microdiscectomy found that quality of life initially deteriorates but normalizes after about 6 months.[15.] The patient undergoing surgery showed better improvement.[14]

In a 5- year outcome report, 70% of surgical patients claimed back or leg pain improvement.[16]

In our Study group, although the number of patients is small (7 patients), 71.4% claimed improvement and were able to return to normal life after 3 months, so it is comparable to the aforementioned study.

The 2006 Spine Patient Outcomes Research Trial was a randomized, prospective, controlled trial comparing operative and non-operative management of patients with signs and symptoms of radiculopathy. In the randomized arm, results favoured surgical treatment.[17,18]

Secondary outcomes including sciatica, satisfaction with symptoms, and self- rated improvement significantly favoured surgery.[19] Although minimally invasive techniques have their own advantages, higher rates of recurrence have been recorded with such techniques when these procedures were compared to standard microdiscectomy.[20,21] Patients who underwent conventional discectomy were found to have a greater speed of recovery and fewer reoperations.[22]

Our results have confirmed that Lumbar Microdiscectomy is associated with optimal relief of symptoms, including pain, numbness, and weakness, and return to normal work and lifestyle after three months in 71.4% of patients. 14.3% developed infection, which recovered after debridement and use of antibiotics, and returned to normal life after 6 months. 14.3% had recurrence, which recovered after revision surgery, and returned to normal life after 9 months from the first surgery and 3 months after revision surgery.

If we analyze the results as a whole, then it can be seen that five (71.4%) of 7 (100%) patients could return to their normal life within three months after surgery; one (14.3%) patient who developed wound infection and underwent wound debridement returned to work after 6 months, and one (14.3%) patient who had recurrence could return to work 9 months after the first surgery and 3 months after revision surgery.

So, our results are comparable to the international Studies about the outcome of Lumbar Microdiscectomy.

## CONCLUSION

The symptomatic lumbar disc disease can be effectively treated by Microdiscectomy.

Our results have confirmed that Lumbar Microdiscectomy is an excellent procedure to treat Lumbar Disc Disease causing Neurologic symptoms of pain, numbness, and /or weakness. The outcome depends upon appropriate diagnosis and timely surgical intervention.

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## Additional Information

**Disclosures:** The author reports no conflict of interest.
**Conflicts of Interest:** In compliance with the ICMJE uniform disclosure form, the author declares the following:
**Financial Relationships:** The author has declared that he has no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.
**Other Relationships:** The author has declared that there are no other relationships or activities that could appear to have influenced the submitted work.
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## AUTHOR'S CONTRIBUTIONS

| Role | Contributing Author(s) |
|---|---|
| Conceptualization, Methodology, Investigation, Resources, Data Curation, Writing – Original Draft/ Literature Review. | Syed Salman Raza Jaafery |