

ORIGINAL RESEARCH

Telemedicine in Orthopedic Follow-Up: A Comparative Study in Western India

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Received date: 21 February, 2024

Acceptance date: 25 March, 2024

ABSTRACT

Background: Limited data exist on the impact of telemedicine in orthopedic care, especially in India. **Methodology:** In this one-year prospective observational study, patients with surgically intervened upper tibial fractures opting for teleconsultation services were included. Patient satisfaction scores were assessed pre-operatively, and post-operative care schedules of 5 and 14 days were randomly assigned to telemedicine and inpatient follow-up groups. **Results:** A total of 50 patients participated, showing identical satisfaction ratings in both groups. The average satisfaction score was 9.77 for inpatient visits and 9.79 for telemedicine consultations (on a 10-point scale). **Conclusion:** Telemedicine implementation in orthopedics reduces the necessity for physical outpatient visits, with high response rates and overall patient satisfaction. Addressing telemedicine limitations requires additional efforts.

Keywords: follow-up, orthopedic patients, postoperative care, teleconsultation, telemedicine

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INTRODUCTION

Telemedicine has emerged as a valuable tool in recent years, facilitating healthcare delivery by enabling remote monitoring of post-operative follow-ups and interpretation of diagnostic imaging. While the Western world has embraced telemedicine more readily, countries like India have seen a surge in its adoption, particularly due to the disruptions caused by the COVID-19 pandemic.

In response to this global health crisis, the Indian authorities, notably the National Medical Council, formulated guidelines in March 2020 for the appropriate use of telemedicine by registered medical practitioners and surgical specialists. These guidelines aimed to mitigate healthcare disruptions and prevent further spread of COVID-19 [1]. The utilization of telemedicine technologies holds significant promise for both patients and healthcare providers, particularly in complex surgical specialties like orthopedics [1,2]. Despite increased telemedicine use reported in countries such as China and the United States during the pandemic, there remains a dearth of comprehensive feedback on patient and provider satisfaction with telemedicine. Moreover, data regarding the use of telemedicine in orthopedic practice are scarce in Indian literature. Therefore, this study was designed to compare post-operative patient satisfaction between telemedicine and traditional in-

person hospital visits during the COVID-19 period [3,4].

MATERIALS AND METHODS**Study Design**

This one-year prospective observational study, conducted from May 2020 to April 2021, took place in the Department of Orthopedics at Tertiary care teaching hospital.

Patient Selection

Patients with fractures of the upper end of the tibia requiring surgical intervention were evaluated. After a thorough preoperative assessment, including COVID-19 RT-PCR tests, blood counts, biochemical investigations, and radiological tests, consenting patients were included in the study. Inclusion criteria comprised fresh fractures of the upper end of the tibia and age between 18 and 60 years. Exclusion criteria encompassed pathological fractures, fractures with impending compartment syndrome, compound fractures, comminuted fractures, co-morbid conditions (hypertension, diabetes mellitus, and chronic diseases), age less than 18 or above 60 years, and non-consent for enrollment.

Outcome Measurement

Both the groups were evaluated using validated pain scores and patient satisfaction scores. Telemedicine

consultations were given to the patients as per the national guidelines and were given without any charges during the study period. Patients who had telephonic consultations were asked to fill up a questionnaire a week after telephonic consultations. The pain scale of patients was measured with a numerical scale ranging from 0 to 10, with 0 indicating no pain, 1 indicating mild pain, 4-6 indicating minor pain, and 7-10 indicating severe pain.

The satisfaction score was calculated using an 11-point ordinal scale with five anchoring points. Patients gave feedback using the following scores from 0 to 10: (0-1) this visit was not what I hoped; (2-4) it could be better in many ways; (5) visit was helpful; (6-8) exceptionally beneficial visit; and (9-10) one of the most beneficial visits [5].

Fifty patients participated in the study, with a male predominance (80%, M:F ratio = 4:1). The majority fell within the 46-60 years age group (44%), followed by 31-45 years (42%) and 18-30 years (14%). Type 4 fractures were most prevalent (30%), followed by type 3 (20%) and type 5 (20%), with type 1 being the least common (4%). Immediate postoperative patient satisfaction was comparable in both inpatient and telemedicine groups. During telemedicine follow-ups, surgeons conducted virtual assessments, focusing on factors like wound healing, discharge, and swelling, using visual aids. Patient satisfaction scores were identical between inpatient visits (average score of 9.77) and telemedicine follow-ups (average score of 9.79). Some patients (15%) preferred alternative follow-up methods. Pain scores showed similar improvement in both groups on the day of surgery and at follow-up.

RESULTS

TABLE 1: AGE DISTRIBUTION

Age in years	opd	telemedicine	total
18-30	4	3	7
31-45	10	11	21
46-60	11	11	22
Total	25	25	50

TABLE 2: GENDER DISTRIBUTION

Gender	opd	telemedicine	total
Male	20	20	40
female	5	5	10
Total	25	25	50

TABLE 3: FRACTURE CLASSIFICATION

Type of fracture	opd	telemedicine	total
1	1	1	2
2	4	4	8
3	5	5	10
4	7	8	15
5	5	5	10
6	3	2	5
total	25	25	50

TABLE 4: Preoperative pain score and patient satisfaction score

Preoperative			
pain score	opd	telemedicine	total
Mild	-	-	-
Moderate	-	-	-
Severe	25	25	50
Total	25	25	50
patient satisfaction score			
Satisfactory	-	-	-
Dissatisfactory	-	-	-
Neutral	-	-	-
Satisfactory	-	-	-
Very satisfactory	25	25	50
Total	25	25	50

TABLE 5: Postoperative pain score and patient satisfaction score

Postoperative			
pain score	opd	telemedicine	total
Mild	17	16	33
Moderate	8	9	17
Severe	-	-	-
Total	25	25	50
patient satisfaction score			
Satisfactory	-	-	-
Dissatisfactory	-	-	-
Neutral	-	-	-
Satisfactory	-	-	-
Very satisfactory	25	25	50
Total	25	25	50

DISCUSSION

The emergence of COVID-19 has shifted the focus of the entire healthcare system towards reducing and preventing the spread, morbidity, and mortality associated with the virus. As a result, medical resources have been diverted, leading to compromises in routine outpatient department services and limiting routine medical care, particularly through in-person visits. To address this challenge, many hospitals worldwide have turned to telemedicine services, even in developing countries like India where government-issued guidelines have facilitated telemedicine adoption. However, challenges such as lack of awareness and scarcity of literature make telemedicine practice more challenging for both healthcare providers and patients [6-8].

Loeb et al. examined the experience of introducing telemedicine during the COVID-19 crisis and estimated that their hospital maintained 50% of clinical volume through telemedicine services. Similarly, in our study, surgeons in both groups conducted thorough assessments, including inquiries about surgical findings, post-operative recovery period, degree of pain, and physical examinations. During telemedicine follow-up, surgeons relied on visual assessments of factors like wound healing, discharge, and swelling around the knee [9-12].

Buvik et al. found that visual consultations were less impactful compared to normal consultations, with no significant difference in the number of surgically treated patients across groups. In an orthopedic randomized controlled trial, Haukipuro et al. observed equivalent patient satisfaction rates in telemedicine and conventional outpatient department follow-up groups [13,14].

However, the advantages of orthopedic telemedicine come with significant drawbacks, primarily due to patient awareness issues regarding telemedicine options. A survey by J.D. Power found that 29% of patients who had never used telemedicine cited its unavailability, while 37% lacked awareness that telemedicine was offered by their healthcare provider. Additionally, orthopedic surgeons have concerns about the inability to perform physical examinations fully during virtual consultations, as many maneuvers

are impossible to execute remotely [15,16]. Moreover, a survey by the American Orthopaedic Association revealed that only 20% of orthopedic surgeons believed in the usefulness of telemedicine for postoperative follow-up, with 42% indicating that most of their peers would be disinterested in providing telephonic consultations [17].

In our study, satisfaction ratings between the two groups were statistically insignificant. The mean patient satisfaction scores (on a 10-point scale) were 9.77 in the inpatient visit-based follow-up and 9.79 in telemedicine follow-up. The satisfaction score of 100% among post-operative patients in our study is comparable to other studies focusing on orthopedic patients.

Studies by Couturier et al. (1998), Aarnio et al. (1999), and Williams et al. (2008) reported satisfaction rates of 80%, 87%, and 93%, respectively, using video-conference and telephone services. More recent studies by Buvik et al. (2019) and Coronado et al. (2020) reported satisfaction rates of 99% and 100%, respectively, indicating increasing acceptability of telemedicine technologies among both patients and healthcare providers. Similarly, Kumar et al. (2020) reported a 92% satisfaction rate with telemedicine in orthopedic practice in India [8,13,18-21].

Telemedicine's role in postoperative care has been emphasized in Western literature, with studies like those by Marsh et al. and Thomas et al. highlighting its economic and time-saving benefits. Eichler et al. demonstrated better functional outcomes, reduced pain, and enhanced quality of life through telemedicine interventions [22-24].

LIMITATIONS

Our study is preliminary and limited by a small sample size, detailed questionnaire-based follow-up, and lack of information on participants' educational status. However, it represents a progressive step towards improving patient outcomes using telemedicine. Larger studies with larger sample sizes and longer follow-ups are warranted for a better understanding of telemedicine's impact.

CONCLUSION

Telemedicine's growth and adoption, accelerated by the COVID-19 pandemic, have made virtual orthopedic assessments a significant component of patient care. With evolving guidelines, enhanced cost-effectiveness, and increasing awareness, healthcare providers can further elevate the quality and efficiency of virtual visits in orthopedics.

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