

## LEVELS OF EVIDENCE OF THERAPEUTIC STUDIES PUBLISHED IN THE EAST AFRICAN ORTHOPAEDIC JOURNAL

**K.C. Lakati**, MBChB, MCh Orth, FCS ORTH (ECSA), **T.B.W. Wambugu**, MBChB Student, **L.S. Kiraga**, MBChB Student, Egerton University, Njoro, Kenya and **P.M. Okerio**, MBChB Student, Kisii University, Kenya

**Correspondence to:** Dr. Kevin C. Lakati, Egerton University, Njoro, Kenya. Email: christopher.lakati@egerton.ac.ke

### ABSTRACT

**Background:** The *East African Orthopaedic Journal* has published clinical scientific papers since 2007.

**Objective:** This study aimed to assess the levels of evidence of therapeutic studies published in the journal by using the *Journal of Bone and Joint Surgery-American* (JBJS-Am) level-of-evidence rating system.

**Methods:** All clinical therapeutic studies published in the journal from 2007 to 2023 were reviewed. Historical notes, editorials, cadaveric studies, case reports and literature reviews were excluded. Therapeutic studies were rated according to the JBJS-Am Level of Evidence (LOE) grading system as Level I, II, III, IV, or V.

**Results:** A total of 218 original studies were published in the journal, out of which 65 were therapeutic studies, representing 30% of the published papers. Level IV studies were the most predominant representing 69% of the therapeutic studies and 21% of the studies published. Level II studies represented 20% of the therapeutic studies and 6% of studies published. Levels I and III studies were the least predominant, both accounting for 5% and 6% respectively of the therapeutic studies and 1.4% and 1.8% of all the studies respectively. Level IV studies predominated over the years with little improvement in Level I, II and III studies.

**Conclusion:** Most studies published in the *East African Orthopaedic Journal* are Level IV studies. There has been no significant increase in Level I and II studies since inception of the journal.

**Key words:** Levels of evidence, Therapeutic studies

### INTRODUCTION

The practice of evidence-based medicine has gained traction over the last few decades. This refers to use of the best available medicine to guide clinical decision-making, hopefully resulting in better patient outcomes (1). Quality of evidence has been quantified using various grading systems, with the Centre for Evidence-based Medicine introducing guidelines to determine levels of evidence for therapeutic studies (2). These were later modified and adopted by the *Journal of Bone and Joint Surgery-American* for reporting LOEs in studies published in the journal (3). In this grading system, a Level I study is a randomized controlled trial, Level II is a prospective controlled study with some methodologic deficiencies, and Levels III and IV are retrospective studies, Level III with a control and Level IV case series with no control, while Level V is expert opinion (3). Previous studies have shown

an improvement in the Level I, II and III studies with introduction of this grading system (4). It has also been reported that journals that consistently publish higher level studies tend to have a higher impact factor (5).

The *East African Orthopaedic Journal* has been in existence since 2007, is published biannually, and accepts papers from all over the world, in all specialties of orthopaedic surgery and related basic sciences. This study sought to determine the levels of evidence of therapeutic studies published in the journal since its inception.

This study sought to answer the following questions:

- What proportion of the studies published in the *East African Orthopaedic Journal* are therapeutic studies?
- What is the Level of Evidence (LOE) of these therapeutic studies?

- c) Has the LOE of these therapeutic studies improved over time?

## MATERIALS AND METHODS

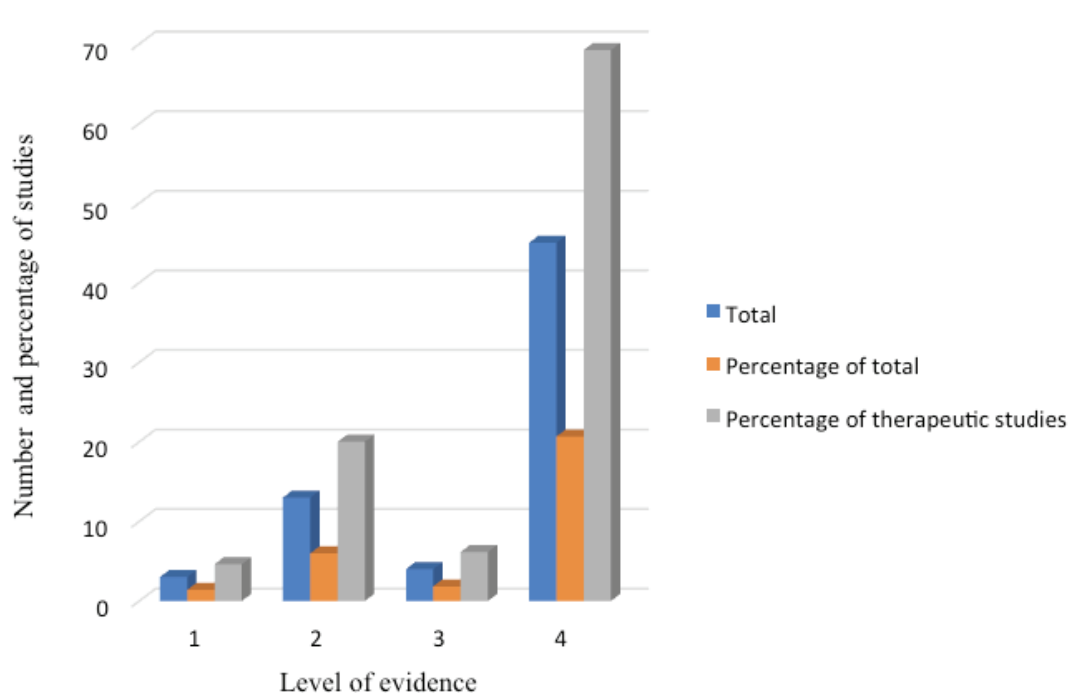
All studies published in the *East African Orthopaedic Journal* since inception to 2023 were reviewed. Included were therapeutic clinical studies while exclusion criteria included literature reviews, historical and editorial notes, studies on cadavers, case reports biomechanical studies and letters to the editor. These studies were excluded because they are not therapeutic studies, even though they can provide information useful to clinical practice. The level of evidence of the included studies was then determined according to the recommendations of the Centre for Evidence Based Medicine (2) and modified by the *JBJS-Am* where therapeutic studies are graded as follows: Level I is a randomized controlled trial, Level II is a prospective controlled study with some methodologic deficiencies, and Levels III and IV are retrospective studies, Level III with a control and Level IV case series with no control. Level V is expert opinion (3). There are slight variations to the LOE definitions for prognostic, diagnostic, and economic analyses, and these were not determined in the current study, which focused only on therapeutic studies. As the journal does not require authors to state the level of evidence

of their respective papers, this was done by the authors reading through the abstracts and full text versions of the included studies. The numbers of the studies per level of evidence was then tabulated per journal issue and the total number of articles in the issue determined. The proportions of each were then determined. This was done for all the years since inception of the journal to the last issue of the year 2023. Data analysis was done using Microsoft<sup>®</sup> Excel<sup>®</sup> for Mac<sup>®</sup>, version 16.77.1.

## RESULTS

During the period under review, a total of 218 original studies were published in the journal. Out of these, 65 were original therapeutic studies, representing 30% of all the published papers. The distribution of these therapeutic papers according to level of evidence was as follows: Level 4 studies were the most predominant, at 45 studies, representing 69% of the therapeutic studies and 21% of all the studies published. Level 2 studies were 13, representing 20% of the therapeutic studies and 6% of all studies published during that period. Levels 1 and 3 studies were the least predominant, both being only 3 and 4 studies respectively, accounting for 5% and 6% respectively of the therapeutic studies and 1.4% and 1.8% of all the studies respectively. This is shown in Figure 1.

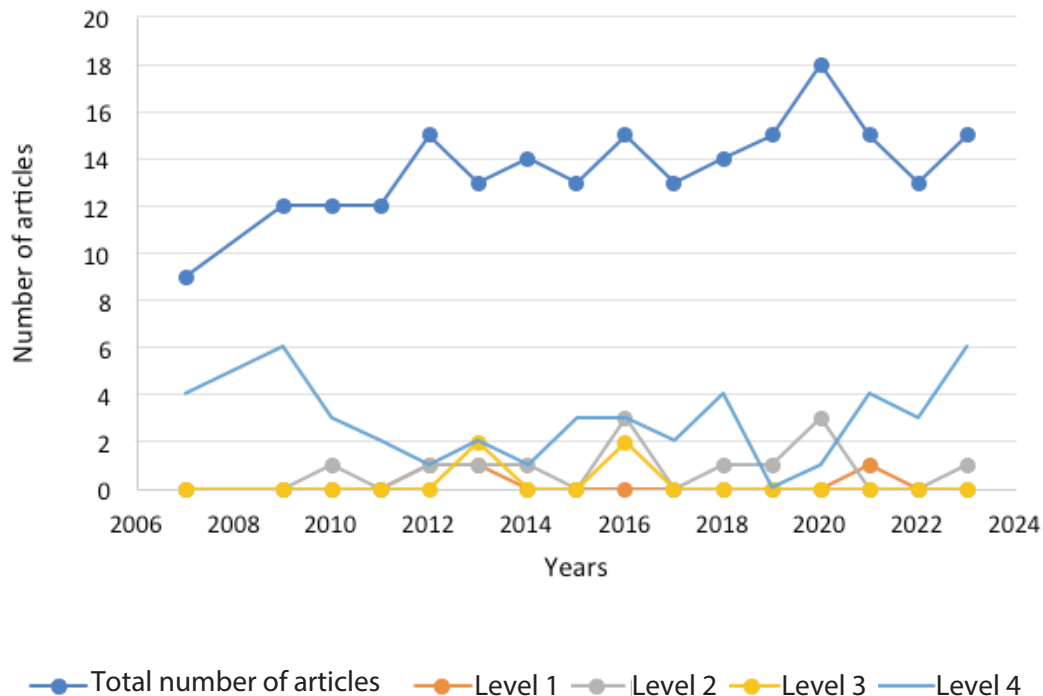
**Figure 1**  
*Level of evidence of therapeutic studies*



A year-on-year analysis shows that whereas the total number of papers published has increased with time, Level 4 articles have predominated

throughout the years, with Levels 1, 2 and 3 studies remaining low, even as the journal matured. This is shown in Figure 2.

**Figure 2**  
Studies and LOE overt time



## DISCUSSION

This study found that of all the therapeutic studies published in the study period, most were Level IV studies, at almost 70%. A study on three high impact orthopaedic journals (*Journal of Orthopaedic Trauma, Journal of Bone and Joint Surgery-American and Clinical Orthopaedics and Related Research*) by Luksameearunothai *et al.* (6) found that Level III studies predominated, constituting 39% closely followed by Level IV studies, at 36%. In the same study, trauma literature had a higher percentage of Level IV studies (6). A previous study has found that publications on adult trauma constituted the majority of articles published in the *East African Orthopaedic Journal* (7), and this could explain the preponderance to Level IV studies. This seems to be the case in most African and other low-income countries. Graham *et al.* (8) in a bibliometric study reported that 31.4% of studies from these countries focused on trauma (8). By its nature, orthopaedic trauma is also almost always treated on an emergency basis, thus making it hard to design proper randomized trials. Cost implications could

also be the contributing factor to the generally low LOE in the studies published in the journal, as higher LOE studies frequently require significant funding to carry out. The study by Lakati *et al.* (7) found that only 1.1% of the studies published in the *East African Orthopaedic Journal* mentioned being funded (7). This differed from the finding by Holzer *et al.* (9) who reported that almost half (47.15%) of the studies in the *JBJS-Am* had at least one source of funding (9).

The findings of the current study however differ from the finding that trauma papers had a higher LOE compared to non-trauma papers in the *JBJS-Am*, with the journal generally publishing more Level I and II studies compared to the *Journal of Orthopaedic Trauma and Clinical Orthopaedics and Related Research* (6). This could be due to the fact that the journal generally tended to accept more Level I and II studies, compared to Level III and IV studies, as shown by Okike *et al.* (10).

Another significant finding of the current study is that there has been no significant increase in the Level I and II studies since journal inception.

Level IV studies have more or less predominated. Scheschuk *et al.* (11), in an analysis of papers published in three orthopaedic journals over 15 years found that Levels I and II studies increased over time, with Level III and IV studies decreasing. A similar finding was also reported by Cunningham *et al.* (12). The findings of the current study reinforce the findings by Graham *et al.* (8) that most studies from African countries tended to be of low LOE, with 74.4% being Level IV studies (8). This was also reported by Wu *et al.* (13), who found that only 10% of orthopaedic studies from LMICS were of Levels I and II. There is thus a need for more high quality prospective studies to be carried out (14). An area to be explored is collaboration between local authors and their counterparts in higher income countries, as this has been shown to be associated with higher levels of evidence and more prospective controlled studies (13,15). Although Level IV studies are not necessarily without value, higher quality studies are better at isolating confounders, removing bias and providing best evidence to answer clinical questions and guiding practice (12).

The strength of this study lies in the fact that it analysed all the issues of the journal since inception, thus minimizing selection bias. It is also the first study that has looked at LOE in the papers published in the journal. As the journal does not expressly require that authors state the level of evidence in their publication, this was done by the authors and this could potentially be a source of weakness in the study, although the authors made every effort to properly place each study where it belonged. This study also looked at only therapeutic studies, and it is possible that other types of studies could have presented different levels of evidence.

## CONCLUSION

Most studies published in the *East African Orthopaedic Journal* are Level IV studies. There has been no significant increase in Level I and II studies since inception of the journal.

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