EDITORIAL

Level of Evidence in the Archives of Bone and Joint Surgery Journal

Ali Parsa, MD; Mohammad H. Ebrahimzadeh, MD

Department of Orthopedic Surgery, Mashhad University of Medical Sciences, Mashhad, Iran

Need for Enlightening

From the first issue of the Archive of Bone and Joint Surgery (ABJS) journal on December 2013, we have tried to have a steady improvement and promotion in both quantity and quality of published articles. We made a big effort to be visible as an international research media and to achieve diversity in terms of submissions, readers and Editorials.

Now this journal is five years old and we have passed many primary goals, we are included in PubMed, PMC, ISI, Scopus and many other data bases. To assess this observation in a scientific manner we evaluated all articles that published in ABJS from the beginning to the current issue in terms of Level of Evidence (LOE).

The common classification system that widely accepted among orthopedic societies including American Academy of Orthopedic Surgeons (AAOS), North American Spine Society (NASS) and Pediatric Orthopedic Society of North America (POSNA) is based on a scale from I to V, which Level I indicates the highest quality and level V shows the lowest quality of evidence [Table 1].

In other word, LOE is an acceptable method for quantifying the strength of clinical studies and identifies potential sources of bias (1). In the field of orthopedic surgery, highly impact journals like Journal of Bone and Surgery (JBJS-Am) and Clinical orthopedics and Related Research (CORR) are being published with LOE for each manuscript. JBJS-Am started to publish the level of evidence (LOE) for all manuscripts since 2003 (2).

Evaluation

Two independent orthopedic surgeons reviewed all published manuscript in the ABJS between December 2013 and to November 2017. Basic Science studies, cadaver studies, animal studies and letters to the editor, were excluded from our analysis. The geographic sources of articles were defined as five origins: Iran, USA, Europe, South east of Asia and Middle East/ west of Asia. Unfortunately we did not find any publication from Africa, Australia in this period. Each article was independently assigned a LOE by observers with the above- mentioned guideline. These two observers had an agreement in each manuscript.

Findings

310 articles were reviewed. Country of origin for these, were twelve different countries including Iran. International articles consistently increased from 23 % of all published articles in 2013 to 47% in 2016 and 42 % in 2017. Overall one- third of articles came from United States and Europe in this period and at the last year, this proportion exceeds 41 % [Table 2]. United States with total 66 articles was the most common source of our international papers and south east of Asia with 2 articles was the least region. In 2015 there was a decline in articles published from European countries.

In terms of LOE, the most common type was Level III following by Level IV and Level II [Table 3]. In 2016 about two third of articles had LOE I, II or III. These results also showed 38 % decrease in the rate of published articles with a lower level of evidence on this year (IV, V). Table 4 shows the high- level articles breakdown by country of origin.

Acceptance rate was high (86%) in the first year [Table 1] and just 5 submitted manuscript were rejected. This rate decreased dramatically, so in recent two years, acceptance rate was less than 40%.

Future perspective

Publishing LOE and the study type helps the reader

Corresponding Author: Ali Parsa, Rothman Institute at Thomas Jefferson University, Philadelphia, USA
Orthopedic Research Center, Department of Orthopedic Surgery, Mashhad University of Medical Sciences, Mashhad, Iran
Email: Parsaa@mums.ac.ir

AB&JS THE ONLINE VERSION OF THIS ARTICLE ABJS.MUMS.AC.IR

Table 1. Levels of Evidence For clinical research (As Adopted by the North American Spine Society January 2005)

	Types of Studies			
	Therapeutic Studies	**Prognostic Studies**	**Diagnostic Studies**	**Economic and Decision Analyses**
Level I	• High quality randomized trial with statistically significant difference or no statistically significant difference but narrow confidence intervals • Systematic Review of Level I RCTs and study results were homogenous	• High quality prospective study (all patients were enrolled at the same point in their disease with ≥ 80% follow-up of enrolled patients) • Systematic review of Level I studies	• Testing of previously Developed diagnostic criteria on consecutive patients • Systematic review of Level I studies	• Sensible costs and alternatives; values obtained from many studies; with multi way sensitivity analyses • Systematic review of Level I studies
Level II	• Lesser quality RCTs • Prospective comparative study • Systematic review of Level II studies or Level I studies with inconsistent results	• Retrospective study • Lesser quality prospective study (e.g. patients enrolled at different points in their disease) • Systematic review of Level II studies	• Development of diagnostic criteria on consecutive patients (with universally applied reference "gold" standard) • Systematic review 2 of Level II studies	• Sensible costs and alternatives; values obtained from limited studies; with multiway sensitivity analyses • Systematic review 2 of Level II studies
Level III	Case control study 7 • Retrospective 6 comparative study 5 • Systematic review 2 of Level III studies	Case control study	• Study of nonconsecutive patients; without consistently applied reference "gold" standard • Systematic review 2 of Level III studies	• Analyses based on limited alternatives and costs; and poor estimates • Systematic review 2 of Level III studies
Level IV	Case Series	Case Series	Case Series Poor reference standard	Analyses with no sensitivity analyses
Level V	Expert Opinion	Expert Opinion	Expert Opinion	Expert Opinion

Table 2. Geographic pattern of article published in ABJS(December 2013 to November 2017)

Geographic location/Year	2013	2014	2015	2016	2017	Total
Iran	23 (77%)	46 (73%)	35 (60%)	42 (53%)	46(58%)	192 (62%)
USA	3 (10%)	6 (10%)	14 (24%)	18 (23%)	25(31%)	66(22%)
Europe	4 (13%)	7 (11%)	4 (7%)	14 (18%)	8(10%)	35(11%)
Middle east and West Asia	0 (0%)	2 (3%)	5 (9%)	5 (6%)	1(1%)	13(4%)
South east of Asia	0 (0%)	2 (3%)	0 (0%)	0 (0%)	0(0%)	2(1%)
Total	30	63	58	79	80	310

to imagine the estimated quality of the research presented before starting to read (3). The aim of this note was to determine the level of contribution of international researchers and also to report our progress in LOE of publications over the past five years in ABJS. But why this evaluation is important? ABJS is going to achieve impact factor; it has been shown that percentage of Level I and Level II studies are in direct correlation with impact factor (3). The prototype of Level I studies is a well-designed RCT, but in clinical practice, especially in developing countries with less developed medical databases, it is difficult to conduct

Table 3. Level of evidence for published articles (December 2013 to November 2017)

	2013	2014	2015	2016	2017	Total
Level-I	0 (0%)	0 (0%)	3 (5%)	4 (5%)	0(0%)	7 (2%)
Level-II	1 (3%)	10 (16%)	10 (17%)	13 (16%)	8(10%)	42(14%)
Level-III	13 (44%)	27 (43%)	20 (35%)	31(39%)	33(41%)	124(40%)
Level-IV	12 (40%)	20 (32%)	19 (33%)	20 (25%)	29(37%)	100(32%)
Level-V	4 (13%)	5 (8%)	4 (7%)	6 (8%)	9(11%)	28(9%)
Basic science study	0 (0%)	1 (1%)	2 (3%)	5 (7%)	1(1%)	9(3%)
Total	30	63	58	79	80	310

Table 4. Diversity of high level studies (Level-1 and Level-2) by region and year of publication (December 2013 to November 2017)

	2013	2014	2015	2016	2017	Total
Iran	1	9	8	7	4	29(59%)
Europe	0	1	2	5	1	9(18%)
USA	0	0	1	4	3	8(17%)
India	0	0	2	1	0	3(6%)
Total	1	10	13	17	8	49

Table 5. Acceptance status

	2013	2014	2015	2016	2017	Total
Submitted manuscript	35	120	170	216	187	728
Accepted	30	63	58	79	80	310
Percent	86%	53%	34%	37%	42%	43%

RCTs (4-6). Interestingly it would be easy to upgrade a systematic review from Level III to Level I by limiting the search to high- level studies; also it is possible to upgrade a case series (Level IV) to a level III by adding a control group.

It seems that publishing the Level of evidence will be helpful for the reader of ABJS in 2018.

Acceptance policy can be changed to encourage the investigators to submit higher level manuscript, and to improve the situation of ABJS among other ISI/PubMed indexed orthopedic journals.

Ali Parsa MD
Rothman Institute at Thomas Jefferson University, Philadelphia, USA
Orthopedic Research Center, Department of Orthopedic Surgery, Mashhad University of Medical Sciences, Mashhad, Iran

Mohammd H. Ebrahimzadeh MD
Orthopedic Research Center, Department of Orthopedic Surgery, Mashhad University of Medical Sciences, Mashhad, Iran

References

1. Nguyen A, Mahabir RC. An update on the level of evidence for plastic surgery research published in plastic and reconstructive surgery. Plast Reconstr Surg Glob Open. 2016; 4(7):e798.

2. Reich MS, Shaw J, Barrett I, Goldberg VM, Schnaser E. Level of evidence trends in the Journal of Bone and Joint Surgery, 1980-2010. Iowa Orthop J. 2014; 34(1):197-203.
3. Obremskey WT, Pappas N, Attallah-Wasif E, Tornetta P 3rd, Bhandari M. Level of evidence in orthopaedic journals. J Bone Joint Surg Am. 2005; 87(12):2632-8.
4. Solomon MJ, McLeod RS. Should we be performing more randomized controlled trials evaluating surgical operations? Surgery. 1995; 118(3):459-67.
5. Parvizi J. Knowledge has no borders. Arch Bone Jt Surg. 2013; 1(2):44.
6. Moradi A, Ebrahimzadeh MH. Case reports: stories worth telling in today's bone and joint literature. Arch Bone Jt Surg. 2017; 5(2):72-3.