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Types of articles published in journals of osteopathy: a quantitative analysis from 2009 to 2013

Claudio Civitillo¹ PT, DO, Massimo Armeni² MFS, DO, Massimo Leggio³ MD, PhD

¹(IMCI) Istituto Medico Chirurgico Italiano -Termoli (CB), Italy

²Dipartimento Ricerca, EDUCAM (C.R.O.M.O.N., S.Os.I., A.I.R.O.P.) - Roma, Italy

³Dipartimento di Medicina e Riabilitazione, Unità Operativa Riabilitazione Cardiologica, Ospedale San Filippo Neri - Roma, Italy

ABSTRACT

Introduction

The purpose of this study was to quantify the types of research articles published in professional journals of Osteopathy with international circulation

Methods

A quantitative analysis was carried out on articles selected from four journals over a period of five years, classified on the basis of the study design. The univariate (ANOVA) analysis was used to investigate the mean differences in terms of number of types of article within the different journals and over the years

Results

A final number of 478 articles were included in the study. In particular, (no. = 17; 3.55%) were Randomized Controlled Trials (RCTs) and (no. = 5; 1.04%) were Controlled Clinical Trials. The articles published more frequently were classified as Clinical practice (no. = 172; 35.98%), followed by Case Reports/Case Series <10 subjects (no. = 68; 14.22%), Narrative Reviews (no. = 61; 12.76%), Cohort Studies (no. = 33; 6.90%), Validation studies (no. = 23; 4.81%), and Clinical Trials >10 subjects (no. = 16; 3.34%). Systematic Reviews were published very rarely (no. = 7; 1.46%), followed by (no. = 1; 0.20%) Case-Control Study. No Meta-Analysis was published. The remaining (no. = 75; 15.69) articles were classified as "Others"

Discussion

This study shows that the methodological quality of journals specifically dealing with Osteopathy is equal to the standards observed in other areas of Medicine

Conclusions

The distribution of the types of articles in the present sample of journals is not similar to that of other scientific journals, with the exception of Observational/descriptive study designs.

Keywords: Osteopathic Medicine; Clinical Research; Evidence-based Practice

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INTRODUCTION

In 1997 the National Library of Medicine (MEDLINE) databank added 'Evidence-Based Medicine' (EBM) in the Medical Subject Headings (MeSH Database)¹. EBM was defined as follows: *'An approach of practicing medicine with the goal to improve and evaluate patient care. It requires the judicious integration of best research evidence with the patient's values to make decisions about medical care. This method is to help physicians make proper diagnosis, devise best testing plan, choose best treatment and methods of disease prevention, as well as develop guidelines for large groups of patients with the same disease'*². The definition of EBM was initially focused on "how to assess biomedical literature", then the focus was shifted towards "how to use biomedical literature to solve clinical problems", thus integrating the Evidence-Based Practice (EBP)³. The prerequisites for EBP are the following:

- Basic element: attitude/need to seek information
- Technical element: practical skills to carry out researches and perform a critical assessment
- Clinical judgment: weighting, assessing and integrating evidences during the decision-making process.

Despite the positive attitude of medical and health professions^{4 5} towards the EBP, studies seem to show that health operators do not refer to professional literature to support the clinical decision-making process⁶. EBP principles are fundamental in terms of medical ethics and are essential for any health care type, including Complementary and Alternative Medicine (CAM)⁷ and Osteopathy. Osteopathy is also known as Osteopathic Medicine, and it is considered as a part of CAM, as recently reported by the World Health Organization⁸. The purpose of this study is to quantify the types of research articles published on international journals of Osteopathy over a period of 5 years.

METHODS

Selection of Journals

The selection of Journals required that at least 2 of the following 4 inclusion criteria were satisfied:

- 1) Articles from indexed journals, currently on MEDLINE, as reported in 'More Resources' section of NLM Catalog "Journal Referenced in the NCBI Databases"⁹;
- 2) Articles referring to this 5-year period: 2009/2013;
- 3) Journals with an explicit reference to Osteopathy in the title;

- 4) Journals that allow free online access, at least for the abstract.

On the basis of these inclusion criteria, MeSH Terms ("Osteopathic Medicine"), ("Osteopathy"), ("Osteopathic"), ("Journal/s") were combined with the Boolean indicators "AND/OR". A total number of 14 journals were selected from the Journals NCBI Databases, (10; 71.42%) of which were excluded. Therefore, four (no. = 4; 28.57%) journals were included in the study: the Journal of the American Osteopathic Association (JAOA) that fully met the 4 inclusion criteria. With reference to the remaining (3; 23%) journals, the International Journal of Osteopathic Medicine (IJOM) satisfied all criteria with the exception of the first; another journal did not satisfy the first and the third criteria, because in January 2011 it changed its title from "Chiropractic & Osteopathy" to "Chiropractic & Manual Therapies" (C&MT). However, it was included due to the title it had up to 2011. Another journal, Osteopathic Medicine and Primary Care (OMPC), did not satisfy the first and the second criteria because it ended publications in 2011, and it was included because of the explicit title and the free online access. Two independent assessors examined the articles selected from these journals from January 2009 to December 2013. In case of different points of view, the two assessors tried to reach an agreement. The 2009/2013 time period under examination was chosen in order to focus on recent literature. The Research and Review articles analyzed were written in English. Studies on animals, cadavers, editorials, conference proceedings, expert opinions and letters to the Editor were excluded from this study. Clinical practice guidelines were included. The selection and the assessment of articles were based on the analysis of abstracts. Selected research articles were classified on the basis of the study design, as classified by the modified Centre for Evidence-Based Medicine¹⁰. Studies on historical controls were included within the Controlled Clinical Testing (CCT) category. Non-controlled studies with more than 10 subjects were classified as clinical studies; similar studies with a number of subjects equal or lower than 10 were classified as Case report series. Cross-sectional studies, Case-control studies and Cohort studies were included in the category of Observational /descriptive studies. During a second phase, studies were grouped and classified according to the Sackett system on the basis of the levels of evidence¹¹: Randomized control trials (RCTs level I) and Non-randomized controlled trials (non-RCTs level II) in the upper section, Observational studies in the central section (level III) and Uncontrolled studies in the lower section (level IV). Further article categories were Validation Studies and Literature Reviews. Validation Studies were about the psychometric features of measure instruments, including reliability, diagnostic accuracy and validity. Reviews were

divided into three categories: Meta-analysis, Systematic reviews and Narrative reviews. Systematic reviews and meta-analyses were considered such only when it was explicitly stated in the title and the study design of the abstract. Otherwise, they were classified as Narrative reviews. Student's surveys, and studies in the field of education and economics were classified as "Others". (Table 1.) provides a summary of the abovementioned classifications.

Group	No. of articles (%)	Types articles	No. of articles (%)
Clinical trials			
Level I	17 (3,55%)	1. Randomized controlled trials	17 (3,55%)
Level II	5 (1,04%)	2. Controlled clinical trials	5 (1,04%)
Observational analytic studies			
Level III	34 (7,11%)	3. Cohort studies	33 (6,90%)
		4. Case-control studies	1 (0,20%)
Observational descriptive studies			
Level IV	84 (17,57%)	5. Non controlled clinical trials (>10 subjects)	16 (3,34%)
		6. Case report/case series (<10 subjects)	68 (14,22%)
Reviews	68 (14,22)	7. Meta-analysis	0 (0%)
		8. Systematic reviews	7 (1,46%)
		9. Narrative reviews	61 (12,76%)
Validation studies	23 (4,81%)	10. Validation studies	23 (4,81%)
Clinical practice	172 (35,98%)	11. Clinical practice	172 (35,98%)
Others	75 (15,69%)	12. Others	75 (15,69%)
Total			478

Table N1. Articles' classification

Statistical analysis

Since there was a high variability among journals in terms of issues per year, which for one journal also varied among years, the mean number of each type of article per issue was analyzed, instead of the absolute number. The univariate analysis of variance (ANOVA) was used to compare differences in the mean number of each type of article among the journals and over the years, using an Excel worksheet.

RESULTS

Journals

Two journals (C&MT and JAOA) published 12 issues per year; one journal (IJOM) published 4 issues per year, and the last journal (OMPC), in the 2 years under examination, published 12 issues per year, but we only had the opportunity to access and analyze 8 issues in 2009 and 4 issues in 2010. The indicators SCImago Journal & Country Rank (SJR) vs Cites per Doc (2Y) (C/Doc) were examined¹² during the whole period under examination. IJOM showed a slight decrease of SJR vs C/Doc over the period 2009-2010, followed by an increase over the period 2011-2013. JAOA showed a global decrease of SJR vs C/Doc from 2009 to

2013, with an increase of SJR only in 2012. C&MT showed a progressive increase of SJR vs C/Doc over the period 2009-2012, followed by a decrease over the period 2012-2013. OMPC showed an increase of SJR vs C/Doc in the period 2009-2010 (the only 2 active years). Features of each journal are summarized in (Table 2.).

Journal	I/Y	ML	2009		2010		2011		2012		2013	
			SJR	C/Doc	SJR	C/Doc	SJR	C/Doc	SJR	C/Doc	SJR	C/Doc
IJOM	4	Not	0,201	0,63	0,197	0,581	0,254	0,387	0,248	0,871	0,316	1,033
JAOA	12	Yes	0,419	1,264	0,297	1,185	0,312	1,087	0,343	0,876	0,303	0,884
C&MT	12	Not	0,377	1,514	0,561	1,633	0,583	1,905	0,776	2,404	0,614	1,534
OMPC	6*	Not	0,178	1,5	0,328	1,412	/	/	/	/	/	/

Key to symbols: I/Y= Issue/Year; ML= Medline; * = mean number of articles

Table 2. Journals' description

Articles

A total number of (1269) articles were analyzed over a period of 5 years. 830 (65.40%) articles were excluded because they were not suited for the analysis. A final number of 478 (37.66%) articles were included in the study. JAOA published the highest number of articles (no. = 332), followed by IJOM (no. =110) and C&MT (no. =26). OMPC published only (no.=10) eligible articles. The frequency of each type of article is summarized in (Table 1.). A total number of (no. = 17; 3.55%) studies were Randomized Controlled Trials, (no. = 5; 1.04%) were Controlled Clinical Trials. The articles published with the highest frequency were classified as Clinical Practice (no. = 172; 35.98%), followed by Case reports/Case series <10 subjects (no. = 68; 14.22%), Narrative reviews (no. = 61; 12.76%), Cohort studies (no. = 33; 6.90%), Validation studies (no. = 23; 4.81%), and Clinical trials >10 subjects (no. =16; 3.34%). Systematic reviews were published very rarely (no. = 7; 1.46%), followed by a Case-control study (no. = 1; 0.20%) and no Meta Analysis. The articles classified as 'Others' amounted to (no. = 75; 15.69%). The highest number of admissible articles was published in 2013 (no. = 131; 27.40%). The differences in the mean number of articles among years were not significant for any type of article; a steady increase of Reviews was observed over the whole period under examination. Moreover, the mean number of articles referring to clinical practice guidelines showed a growing trend; data are reported in (Table 3.). Significant differences can be observed among the means of the types of article within the four journals, at level IV in particular (F = 46,51, P=0,00) and Clinical Practice (F = 15,57, P=0,00). The highest mean number of all levels of types of article and further categories was obtained by JAOA, with the exception of level II and SR, which were published more frequently by C&MT. Data are summarized in (Table 4.).

	level I	level II	level III	level IV	SR	Review	Val. S.	Clin.P.	Other
2009	0,75±0,43	0±0	3±1,58	2,5±3,28	0±0	1,25±0,83	2±2,45	3,75±3,77	12,75±20,39
2010	0,75±0,83	0,25±0,43	1,75±1,09	4,75±7,12	0±0	3±2,34	0,75±0,83	6,75±9,44	9,25±0,43
2011	0±0	0,25±0,43	0,5±0,5	4,75±6,53	0±0	3±4,12	1±0,71	9,25±15,45	0,75±0,83
2012	1,25±1,30	0,5±0,87	1,5±2,60	4±4,90	1±1,22	3,25±3,42	0,75±1,30	9±12,37	0,5±0,87
2013	0,5±0,87	0,25±0,43	2±2,91	5±7,03	0,25±0,43	4,75±5,54	1,25±1,64	14,25±13,10	4,5±7,79
<i>F</i>	0,933962	0,357143	0,635179	0,088142	1,666667	0,353194	0,348649	0,334364	0,889332
<i>P</i>	0,470745	0,835106	0,645233	0,984785	0,209782	0,837798	0,840889	0,85055	0,494083

Key to symbols: SR= Systematic review; Val.S.= Validation Studies; Clin. P.= Clinical Practice

Table 3. Mean (± SD) number of articles within years of each type of article

	level I	level II	level III	level IV	SR	Review	Val. S.	Clin.P.	Other
JAOA	2±0,89	0±0	4,2±2,48	14±3,52	0±0	8,2±3,92	1,8±2,23	26±9,01	0,75±18,91
IJOM	0,6±0,49	1±0,63	1,4±1,50	2,2±1,33	0±0	3±1,26	1,6±0,8	0,2±8,06	4,8±6,67
C & MT	0,4±0,8	0±0	1,2±0,75	0,2±0,4	1,2±1,17	0,6±0,8	1,2±1,6	0,6±1,2	0±0
OMPC	0,4±0,49	0±0	0,2±0,4	0,4±0,8	0±0	0,4±0,49	0±0	0,6±0,8	0±0
<i>F</i>	4,972222	10	5,163743	46,51693	4,235294	11,82362	1,27451	15,56826767	0,938954
<i>P</i>	0,009727	0,000309	0,008335	0,00000	0,018002	0,000113	0,310124	0,00	0,440368

Key to symbols: SR= Systematic review; Val.S.= Validation Studies; Clin. P.= Clinical Practice

Table 4. Mean (± SD) number of articles within journals of each type of article

DISCUSSION

The journals reviewed in this study are a group of well-established international journals in the field of Osteopathy, with large circulation. Two of them are the official journals of professional associations: JAOA is the official journal of the American Osteopathic Association (AOA) and IJOM is the official journal of six international associations, officially recognized by the Association of the Osteopathie Schule Deutschland (VOSD), the Commission for Osteopathic Research, the Practice and Promotion (CORPP), the German Academy of Osteopathy, and officially supported by the Osteopathic European Academic Network (OsEAN). OMPC is an independent open access journal, managed by BioMed Central. It stopped publications in 2011; all the published articles are filed, with fully researchable abstracts. C&MT was formerly known as Chiropractic & Osteopathy (C&O), which in turn was formerly known as Australasian Chiropractic & Osteopathy (ACO), previously published by the Chiropractic & Osteopathic College of Australasia (COCA), the official journal of the European Academy of Chiropractic (EAC), and the Royal College of Chiropractors (RCC). The Journal changed its name in January 2011 from C&O to C&MT. The SJR and the C/Doc 2Y indicators of the four selected journals cannot be compared to those of other international journals in the medical field from an objective point of view. SJR is a measure of scientific influence of the mean number of articles of a journal. C/Doc 2Y is a measure of the scientific impact of the mean number of articles published by the journal. It is calculated using the same algorithm used for the Impact Factor (IF), so both methods are broadly accepted to assess the quality of journals. However, such assessments shall be used and interpreted with due caution¹³. At the top of the hierarchy of scientific evidences, EBM classifies RCTs as studies that are able to minimize bias with comparison to other study designs; this leads to high internal validity, which is equal to methodological quality¹⁴. Therefore, they are considered as

the gold standards to assess treatment benefits. The main weakness of EBM is the limited applicability of trial results, which are often carried out in extremely selected and homogeneous populations (explanatory trials), in ideal care setting (limited external validity and limited applicability). Therefore, during the assessment of the clinical applicability of a trial, verifying how its explanatory attitude may affect its external validity is extremely important, because this may lead to inapplicable results in a real care setting. Even if RCTs are still considered the gold standard, useful information in terms of EBP may be also provided by observational studies¹⁵. However, the present study did not include a methodological analysis of each type of study. Level IV Observational/descriptive studies (Clinical trials >10 subjects; Case report/case series <10 subjects) are reported as study designs that are useful to face specific clinical questions, providing valuable information in terms of treatment¹⁶. However, Observational/descriptive studies are classified at the bottom of the EBM pyramid; the higher number of these studies in comparison to RCTs confirms the need that osteopaths have to provide practical applications to the Evidence Based Osteopathic Practice (EBOP). In addition, these data show the attention that the selected journals gave to this topic over the 5 year-period under examination. The lack of funding in the field of CAM might contribute to the difficulty to plan RCTs¹⁷. Validation Studies are an important category in the field of Osteopathy, specifically for the osteopathic approach to the diagnosis of Somatic Dysfunctions (SDs) and their treatment. A SD is defined as an impaired or altered function of related components of the somatic (body framework) system: skeletal, arthrodial, and myofascial structures, and related vascular, lymphatic, and neural elements¹⁸. The significant differences detected among the means of types of articles within the four journals, with specific attention to level IV and Clinical Practice, might be a result of the editorial policies of these journals, which are willing to publish level IV/Clinical practice studies. Moreover, the highest mean number of all levels of types of articles and further categories reported by JAOA shows that when countries regulate the osteopathic profession, governments are more interested and involved in sponsoring research in this specific sector¹⁹, focusing on OMT mechanisms of action and its clinical effectiveness for the public health. The strength of this study is the considerable number of reviewed articles (1269) selected from journals with an explicit reference to Osteopathy in their title. However, this study also had some weaknesses: the classification of levels based on the title and the abstract may have produced some biases because the study design is not always described in details in these items. Unfortunately, not all abstracts included the study design, even if this is an extremely useful section for

readers. Moreover, reviewers were not blinded to the journal, and this might have caused another bias. Also, in some cases, the distinction between reviews and clinical practice guidelines was not clear; doubtful cases were classified as “Others”, leading to some decisional uncertainties. For this reason, a third reviewer might have been useful. This study proves that the methodological quality of the reviewed journals of Osteopathy is similar to the standards of other sectors of Medicine, such as Observational/descriptive studies, which are the most commonly published study design in sport journals²⁰. The percentage of RCTs found in this analysis is not comparable to that observed in other clinical sectors²¹, showing that RCTs and Meta-Analyses published by journals of Osteopathy do not reach yet a considerable number, even if their number has been growing over the years. However, scientific articles in the field of Osteopathy can be found also in scientific journals with no explicit reference to Osteopathy in their title. For example, in the ClinicalTrials.gov database (the registry and results database of clinical studies), 118 unpublished studies have been found in January 2015 using “Osteopathic Medicine” only, and these articles will be published by different biomedical journals. Also, in January 2015, in the PubMed databank, Clinical Queries section, 28 Clinical Studies and 8 Systematic Reviews were found using Clinical Study and Systematic Review with the string (“Osteopathic Medicine”) AND (“low back pain”). This proves the growing scientific interest in the biomedical field for osteopathic research. The present analysis highlights a significant low number of RCTs in the field of Osteopathy, in comparison to RCTs in the field of allopathic medicine. Even if the number of studies in the field of Osteopathy is lower in comparison to conventional medicine, we shall not ignore the attitude adopted by osteopaths who need to seek information in order to increase the use of the EBOP, integrating the available evidences in the clinical decision-making process. Moreover, further studies might be useful to review the number and the editorial characteristics of biomedical journals in the field of Complementary and Alternative Medicine.

CONCLUSIONS

The distribution of the types of articles in the present sample of journals is not similar to that of other scientific journals, with the exception of Observational/descriptive study designs. Moreover, the frequency of RCTs is too low to provide enough Systematic Reviews and Meta-Analyses. Data suggest us to investigate also in other scientific journals

with a multidisciplinary readership; this might lead to the discovery of a higher distribution of articles, capable of better supporting the EBOP.

Author contributions

Claudio Civitillo contributed to conception, design, and acquisition; drafted the manuscript; critically revised the manuscript; gave final approval. **Massimo Armeni** drafted the manuscript; critically revised the manuscript; gave final approval. **Massimo Leggio** critically revised the manuscript; gave final approval.

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