Quality of Reporting in *Shang Han Lun* Educational Research: A Systematic Review

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ABSTRACT

Objective: To evaluate the reporting quality of original studies in *Shang Han Lun* education. Methods: Eight English databases relating to medicine and medical education and three Chinese databases were searched using *Shang Han Lun*, Chinese medicine classic literature, education, teaching and learning and their synonyms as keywords. Research reports of educational interventions in *Shang Han Lun* teaching and learning in Chinese medicine programs were included (English and Chinese). Information on reporting structure was extracted and reporting quality was assessed by two independent authors using a pre-defined checklist. Results: 163 papers were identified. Eleven papers in Chinese were included in the data analysis. Their structures were varied and generally unclear. Research reporting was also insufficient, in numerous cases, since essential elements, such as research question, rationale, research design, intervention, evaluation and results, were not provided. Conclusion: Reporting quality of *Shang Han Lun* educational research was generally very poor. Reporting standards should be established and a checklist of reporting criteria is recommended for future study.

KEYWORDS reporting quality, Chinese medicine, Shang Han Lun, education, teaching and learning.

Introduction

Research in the field of medical education matters.[1] It is as important to research the education of new doctors and practitioners as it is to assess a new chemotherapy or herbal medicine.[2] With the introduction of Chinese medicine (CM) to the formal medical education system in China and other countries in the past few decades,[3,4] and with the endorsement of evidence-based practice[5,6] in the recent decade, there is also a need for CM education to move from an opinion-based to an evidence-based footing.[7] This shift could be expected to produce clinically more competent practitioners[8,9] and better patient care.[10]

High quality educational research is crucial to the development of evidence-based educational practice.[11,12] Deficiencies in reporting quality have been identified in previous studies of general education,[13] medical education[14] and other disciplines.[15,16] Although the reporting quality of original studies does not necessarily represent the actual methodological

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quality,[17] it has been agreed that a high quality of reporting is a prerequisite to the understanding of the study methodology and the application of the results of the study.[18] Reporting criteria of educational research can vary according to the study design. Interventional studies, or experimental studies, are considered the gold standard in evaluating the outcomes of instructional interventions in education.[17]

A recent review on published guidelines for reporting interventional studies on medical education[19] summarised the methodological challenges in conducting a systematic review in this field.[7,20-23] The checklist of basic elements to be included in a report that was recommended in this paper included: research question, rationale, objectives, study design, intervention, evaluation and results. However, little is known about the reporting quality of educational research in CM. We have not identified any systematic reviews on CM educational studies or any paper on the evaluation of the reporting quality of educational studies in CM.

Shang Han Lun is a key subject in CM classic literature and is an essential component of the CM curriculum in China,[24] Australia[25] and some other countries.[26] It has long been considered a fundamental clinically-oriented subject for CM practice by ancient[27] and modern[28] CM professionals. The number of clinical studies relating to *Shang Han Lun* formulae is increasing.[29,30] A number of reviews[29-31] have reported on the quantity of papers on *Shang Han Lun* teaching and learning in the past 50 years in mainland China but these have not evaluated the reporting quality or methodological rigour of these papers. As reporting quality may reflect the methodological quality, this review aims to systematically evaluate the reporting quality of original educational research on *Shang Han Lun*, and develop a checklist for the preparation of future CM educational research reports.

Methods

This review followed the methods for conducting systematic reviews on medical education recommended by the Best Evidence Medical Education (BEME) Collaboration.[7,32] We extracted information on the reporting structure based on previous review papers[13,17,33,34] and used a consensus checklist[19] of educational research reporting elements to assess the reporting quality.

SEARCH STRATEGY

A total of eight electronic English databases and three major electronic Chinese databases were searched from their respective inceptions to December 2008, including PubMed, Education Resource Information Centre (ERIC), Web of Science, British Education Index, CINAHL (The Cumulative Index to Nursing and Allied Health Literature), Research and Development Resource Base, Biomed Central, PsycINFO, China National Knowledge Infrastructure (CNKI), CQVIP Information and Wanfang Data.

Key words used in the search included the combination of *Shang Han Lun* (伤寒论), Chinese medicine classic literature (中医经典), education (教育), teaching and learning (教学), and their synonyms. Reference lists from identified original studies and review articles were screened to identify further original research studies. Hand search was conducted for the following two educational journals in Chinese: *Zhong Yi Jiao Yu* (*Chinese Medicine Education*, 1982–2008) and *Zhong Guo Zhong Yi Yao Xian Dai Yuan Cheng Jiao Yu* (*Chinese Medicine Distance Education*, 1982–2008) to identify any additional relevant papers. Conference proceedings on *Shang Han Lun* were also hand-searched. The experts in the field were contacted for any unpublished studies.

STUDY SELECTION

Any educational intervention used for *Shang Han Lun* with relevant outcome measures and results that were documented as original data was included. The participants involved in the original studies were limited to students enrolled in CM programs. Original research studies on *Shang Han Lun* as an individual course within the context of an undergraduate, postgraduate, continuing education or distance education program in English or in Chinese were considered.

The procedures for selecting studies recommend by the Cochrane Reviewer's Handbook were followed.[35] All titles and abstracts of identified articles were screened independently by two authors (XL and DG). Full-text articles of relevant studies were obtained for further assessment. Any discrepancy between the decisions of the two authors was resolved by a third party (AY).

DATA EXTRACTION AND ASSESSMENT OF REPORTING QUALITY

A pre-defined Excel form based on published literature was designed for data extraction.[13,19,36] The extracted data consisted of the reporting format (abstract presence, format and components, number of references, structure of text), research reporting (research question, rationale, objectives, study design, intervention, evaluation and results), citation information (title, authors, journal, year, and search method), and research information (researchers, research domain and design, location of study, subject level and sample size, and expected outcome). The data were extracted independently by XL and DG. Any disagreement was discussed with a third party (AY).

Reporting quality assessment was conducted from the following two aspects:

1. structural quality: presence/absence of abstract, number of references, structure of text. Assessment was based on

the Uniform Requirements for Manuscripts Submitted to Biomedical Journals (URMSBJ) recommended by International Committee of Medical Journal Editors (ICMJE)[33] and previous review papers with similar purposes.[13,17,18]

2. research reporting quality: quality of reporting research question, rationale, objectives, study design, intervention, evaluation and results. The assessment was based on a consensus checklist of educational research reporting elements.[19]

DATA ANALYSIS

Data were analysed by using Social Sciences Statistical Software version 15.0 for Windows (SPSS Inc, Chicago). Descriptive statistics were applied and data were presented as count and percentage.

Results

A total of 852 potential studies were found. Of these, 163 papers were identified as relevant and their full texts were obtained for further screening. Eleven studies in the Chinese language met the inclusion criteria.[37-47] Figure 1 illustrates the study selection process.

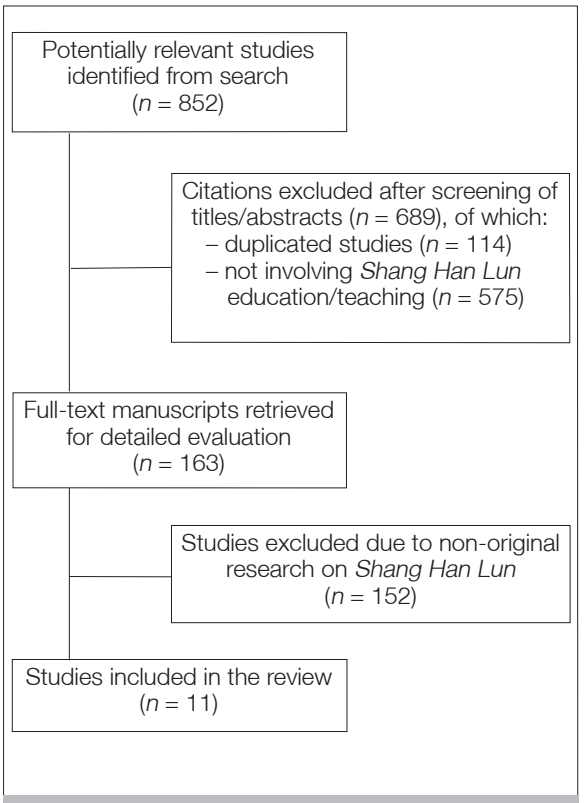

FIGURE 1 Trial flow chart of study selection process

CHARACTERISTICS OF INCLUDED STUDIES

The characteristics of included studies are summarised in Table 1 (next page).

AUTHOR CHARACTERISTICS

Seven (63.6%) papers[39-42,44-46] reported the identity and research experience of the first author. All were university/college teachers and senior researchers in terms of research experience. All included studies came from teaching-oriented universities/colleges in China. Six studies[39,40,42,44-46] (54.5%) were conducted in Guangdong province, two in Jiangxi province,[37,43] and one each in Shanghai city,[47] Qinghai province[38] and Liaoning province[41] respectively.

RESEARCH INFORMATION

The studies focused on three domains: five (45.5%)[40,42,44-46] on teaching pedagogy/methods; four (36.4%)[37,39,43,47] on educational technology and two (18.2%)[38,41] on educational reform.

Of the 11 included studies, six[37,39,42,44,46,47] were described by the authors as descriptive (what is done); four[38,41,43,45] investigated the justification for the educational interventions (is it working), and one[40] provided clarification on the intervention (how does it work) with qualitative data.

Of 11 studies, only one study[40] used a comparison group with a non-randomised controlled trial design for assessing educational interventions. Seven studies[38,39,41,43-45] were of a single-static group using post-test design while two studies[37,42] used a cross-sectional survey and one study[46] used a qualitative study design.

Most studies[38-42,45-47] focused on undergraduate students, one study involved postgraduate students only[44] and two studies[37,43] investigated both. Four studies[37,42,46,47] did not report the actual sample size. The sample size of the other seven studies[38-41,43-45] ranged between 16 and 742 with a mean of 130.

Six studies used student attitude as the outcome measure,[37-39,43,46,47] four measured both attitude and cognitive knowledge changes,[40,42,44,45] and one tested student knowledge once at the end of the study.[41]

REPORTING QUALITY OF INCLUDED STUDIES

STRUCTURAL QUALITY

Of the 11 included studies, six (54.5%) did not provide abstracts[37-41,43] and eight (72.7%) did not cite any references.[37,39,40,42-46] Of the five studies with abstracts,[42,44-47] none provided complete information on the following aspects: background of the study, the study objective, methods, results and conclusions.

TABLE 1 Characteristics of included studies

No.	Author	Researcher identity	Location	Study purposes	Topic	Study design
1	Diao 1998[37]	Not reported	Jiangxi	Description	Educational technology	Case study cross-sectional post-test survey
2	Wang 1999[38]	Not reported	Qinghai	Justification	Educational reform: multiple approaches	Single-static group post-test survey
3	Xiong 2000[39]	Teacher/senior researcher	Guangzhou	Description	Educational technology	Single-static group post-test survey
4	Li 2004[40]	Teacher/senior researcher	Guangzhou	Clarification	Teaching pedagogy	Non-randomised controlled trial
5	Gu 2005[41]	Teacher/senior researcher	Liaoning	Justification	Educational reform, standardised test	Single-static group post-test
6	Li 2005[42]	Teacher/senior researcher	Guangzhou	Description	Teaching pedagogy	Case study cross-sectional survey and post-test
7	Lu 2006[43]	Not reported	Jiangxi	Justification	Educational technology	Single static group post-test survey
8	Li 2008[44]	Teacher/senior researcher	Guangzhou	Description	Teaching pedagogy	Single static group post-test mixed with qualitative data collection
9	Li 2008[45]	Teacher/senior researcher	Guangzhou	Justification	Teaching pedagogy	Single static group post-test mixed with qualitative data collection
10	Li 2008[46]	Teacher/senior researcher	Guangzhou	Description	Teaching pedagogy	Qualitative study
11	Yue 2008[47]	Not reported	Shanghai	Description	Educational technology	Single-static group post test and/or survey

Seven studies implied an Introduction, Methods, Results and Discussion (IMRAD[33]) structure in the text,[37-39,41,43,44,46] but only four (36.4%) clearly stated these in the headings.[40,42,45,47]

RESEARCH REPORTING QUALITY

Table 2 provides the summary of the research reporting quality for the included studies. Research questions were not explicitly reported in nine (81.8%) of the 11 original studies.[37-39,41-44,46-47] None of the studies provided a study rationale. The objectives were implied in 10 (90.9%) studies;[37-43,45-47] however, half of them seemed barely congruent with the intervention and evaluation.[37-39,41-43]

Research questions were not stated explicitly in most of the studies, so it was not possible to determine whether they were appropriate. Ten (90.9%) did not incorporate a comparison design in their studies.[37-39,41-47] All studies except one[40] did not report the details of the study design. No studies reported the measures for controlling for confounding variables or provided an estimation of the sample size.

Seven studies (63.6%) did not report the educational intervention in sufficient details to allow replication[39,40,42,44-47] and none of them described the characteristics of the learners. No studies reported the validation of the measurement instruments. Data collection methods also appeared unclear in these studies. Only one study clearly stated the statistical method and reported the *p* value for the significance in the results.[40]

In ten studies (90.9%) the conclusions were not fully supported by the results and the study limitations were not discussed.[37-39,41-47] Only one study stated how the study would contribute to the existing literature.[37]

TABLE 1 (continued) Characteristics of included studies

No.	Subjects	Sample size	Outcome measured	Findings
1	Undergraduate enrolled in 1995, postgraduate and experts	Not reported	Attitude survey	85% survey participants reported the designed software significant for learning
2	Undergraduate (years 1, 2 and 3)	80	Attitude survey	75% reported the reforms beneficial to their study
3	Undergraduate in 7-year program enrolled in 1994	16	Attitude survey	Satisfaction in video media (83.3%), diagram/picture (57.1%), and PowerPoint (31.1%)
4	Undergraduate enrolled in 2000 (local and international students)	40	Attitude survey and achievement test	Student achievement significantly correlates with time spent in clinical clerkship ($p < 0.01$); significant correlation between self-reported interest and time spent in clinical clerkship ($p < 0.01$); Student written feedback provides qualitative data of their opinion
5	All students at college	742	Achievement test	63% overall pass rate with differences among majors
6	Not reported	N/A.	Attitude survey and achievement test	Students rate teaching 99.5 with a pass rate of 98%
7	Undergraduate and postgraduate	62	Attitude survey	58 students (94.5%) were very satisfied
8	PhD candidate	80	Achievement by essay assessment and attitude feedback	100% pass with 26.3% highly distinguished, 66.2% distinguished; student written feedback provided qualitative data
9	Undergraduate	30	Attitude survey and achievement test	(1) 83% considered teaching beneficial to learning. Student written feedback provided qualitative data (2) average score of 85 in case analysis test
10	Undergraduate enrolled in 2003	Not reported	Open-ended feedback	Content analysis of student written feedback provided qualitative data
11	Undergraduate enrolled in 2004; experts	Not reported	Attitude survey	Participants generally thought the software helped their study

Discussion

This review located 11 original studies on *Shang Han Lun* education published in the Chinese language. The reporting quality (the structure and research reporting) of these studies was generally below the level required for scientific reporting.[13,19,36]

More than half of the *Shang Han Lun* educational research studies (54.5%) did not provide an abstract and more than two thirds (72.7%) did not cite any references. For those with abstracts, none sufficiently covered the information required by ICMJE.[33] A structured text with informative abstract and adequate citation are generally considered important elements of academic publications in medicine.[48,49]

As for the research reporting quality, only one study provided adequate information. Detailed appraisal of the papers generally revealed very low quality of reporting from the description of the research questions to the justification of the conclusion (Table 2). It is crucial for CM educators and researchers to develop standards to promote the overall quality of educational research in CM.

The results of this review could be used by CM educators and researchers as a reference to develop formal reporting standards which would further assist in improving research rigour and scientific validity.

This review only targeted educational research on *Shang Han Lun*, a specific classic literature course in CM. Therefore the findings from this study do not cover the overall reporting

TABLE 2 Assessment of reporting quality of included studies

Research/ Reporting	Assessment questions	Number of papers: Stated	Implied	Hardly reported	N/A
Question	Is study purpose easily identified?		2[40,45]	9[37-39,41-44,46-47]	
Rationale	Has rationale been established on basis of literature review?			11[37-47]	
Objectives	Are objectives clearly stated?		10[37-43,45-47]	1[44]	
	Are objectives congruent with rationale, intervention, and evaluation?		5[40,44-47]	6[37-39,41-43]	
Study design	Is study design appropriate for question?	1[39]	2[39,41]		8[36,37,41-46]
	Is there a similar comparison group?			10[37-39,41-47]	
	Is there selection bias in group assignment?		1[40]		10[36-38,40-46]
	Are raters blinded to group assignment?				11[36-46]
	Is study design described in sufficient detail to be replicated?		1[40]		10[36-38,40-46]

quality of all educational research in the CM field. Nevertheless, *Shang Han Lun* is highly valued by CM professionals and is also an essential course in CM programs. The results summarised in this paper could, to some extent, reflect the reporting quality of educational research in the CM field in general.

A larger review should be implemented to gather more information on the overall reporting quality of CM educational research globally. Meanwhile, as educational research involves human subjects, ethical consideration should be another important factor for future reviews.

It is important to point out that low reporting quality of educational research does not imply poor teaching practice. The lack of guidelines for educational research reporting is probably the most important reason contributing to the poor reporting quality found in this study. Therefore, standards should be established in order to promote improved reporting quality and ensure the scientific validity of the evidence derived from educational studies. This would constitute an important step towards the development of evidence-based CM education which would be expected to result in improved educational outcomes and consequently better educated practitioners who can provide better health care to the public. The items in the Appendix are recommended to be incorporated into future CM educational research reports.[7,13,19,21,33,36,50]

Clinical Commentary

Quality of education is an increasing priority for medical and health care professionals. Another concern is sustainable evidence-based practice and the improvement of patient care. For CM clinicians who are undertaking teaching responsibilities, it is time to look for evidence regarding approaches to the provision of more effective instruction for students. For CM teachers and educators, it is critical the reporting quality of educational research be improved so that it can offer high quality evidence that can be used with confidence by educators to improve the teaching quality of CM programs.

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APPENDIX Checklist of items to be included in a Chinese medicine educational research report[7,13,19,21,33,36,50]

Item	Item No.	Description	Yes (Page No.)	No
Title/Abstract	1	How participants are treated (intervention or observation)?		
		Is study purpose stated in the abstract?		
Authors	2	What are the positions of the researchers?		
		Is corresponding author contact offered?		
Introduction/ Background	3	What is the scientific background of the study?		
		Has rationale been established on basis of literature review?		
		Are objectives/research questions clearly stated?		
		Are ethical concerns expressed?		
Methods/ Study design	4	Is study design clearly stated?		
		Is study design described in sufficient detail to be replicated?		
		Is there a similar comparison group?		
		Is there selection bias in group assignment?		
		Are confounding variables controlled for by design or analysis?		
		Are raters blinded to group assignment?		
		Are long and short term effects assessed?		
		Has power analysis been conducted to determine sample size?		
Methods/Participants	5	What is the setting and location of the study?		
		Are there any inclusion criteria of participants?		
		What is the sample size?		
Methods/Educational interventions	6	Are teaching methods and content described in enough detail to replicate?		
		Are learner characteristics (e.g. level of training, profession, age) described?		