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## Evaluation of Quality of Pharmacoeconomic Studies in Asia-Pacific Region and Identification of Influencing Variables

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### ABSTRACT

**Objectives:** To assess the quality of pharmacoeconomic studies and identify different variables influencing the quality of these studies conducted in the Asia-Pacific (APAC) region. **Methods:** A systematic literature search was performed with PubMed and Cochrane using different combinations of terms for cost-effectiveness, cost-utility, and cost-minimization analyses. The Quality of Health Economic Studies (QHES) instrument was used for quality assessment of included studies. Logistic regression was performed to determine the association of factors with high-quality studies (QHES score  $\geq 75$ ). **Results:** Of 262 retrieved studies, 128 met the inclusion criteria. The mean QHES score was  $67.4 \pm 1.35$ . The distribution of studies in each quality quartile was as follows: high ( $n = 59$  [46.09%]), fair ( $n = 50$  [39.06%]), and poor ( $n = 19$  [14.83%]). Most of the high-quality studies ( $n = 80$  [62.5%]) were conducted in Japan and Australia. Only 11 high-quality studies (18.64%) were published in specialty journals and 4 (6.78%) in Asian journals.

Primary authors who had advanced training in health economics were associated with a higher number of high-quality studies ( $n = 51$  [86.44%]). Training of primary authors was significantly associated with high-quality studies (odds ratio 7.1; 95% confidence interval 2.9–19.23). Impact factor of journal, per-capita expenditure on health care, and out-of-pocket expense on health did not have a significant association with high-quality scores. **Conclusions:** High-quality pharmacoeconomic research is confined to a few countries of the APAC; it can be improved by advance training of authors in public health or health economics. Also, a greater interest of various stakeholders in funding the research and the introduction of specialty journals in the APAC are warranted.

**Keywords:** Asia-Pacific, pharmacoeconomic, QHES, quality.

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### Introduction

Pharmacoeconomic analysis involves the identification, measurement, valuation, and comparison of costs and outcomes of alternative drug therapies with an aim to provide efficient allocation of scarce resources [1]. Pharmacoeconomic analysis impacts pricing of health technologies, health insurance reimbursement, formulary acceptance of new technologies, and health care policymaking in general [2]. Recently, methods of pharmacoeconomic analysis have gained popularity and formed the basis of data-driven and informed decision making for policymakers. Despite the growing use of pharmacoeconomic evidence, the quality of published data remains questionable [3]. Therefore, it becomes important to assess the validity, methodological quality, generalizability, and potential bias in these studies [3].

Several attempts have been made to assess the quality of health economic analyses and critically appraise these studies with an aim to improve the overall quality of evidence. The British

Medical Journal checklist, [4] the Consolidated Health Economic Evaluation Reporting Standards statement, [5] the *Journal of the American Medical Association* user's guide [6], and the Canadian Guidelines [7] are few of the most common methods used for quality assessment of pharmacoeconomic studies. The Quality of Health Economic Studies (QHES) instrument is a validated quality appraisal instrument containing 16 items that were selected by a panel of economic experts with experience in health economic analysis. Each item carries a weighted point value that was generated from the survey data of a second international panel of health economists [3]. Unlike other instruments, which generally provide checklists or are qualitative in nature, the QHES provides quantitative scores that could be analyzed statistically [3].

The Asia-Pacific (APAC) is culturally, socially, economically, and politically diverse region. This diversity reflects in the health care systems of the countries of this region. In some countries health economic data are mandatory for policymaking; nevertheless, a few of the most populous countries, such as India and

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China, are only in the initial phases of using health economic data for policy setting. Most of the countries in the APAC region have challenge to offer quality health care at reduced cost under resource constrained settings. This makes pharmacoeconomic analysis and thus, the quality assessment of these analyses, imperative for this region to facilitate informed decision making on the basis of high-quality data [8].

Few researchers have identified several factors that can influence the quality of pharmacoeconomic studies [9,10]. The source of study funding, impact factor of source journal, subspecialty of journal, number of authors, and residence and advanced training of primary authors are few of the variables that have been associated with the quality of pharmacoeconomic studies [9,10]. To our knowledge, no study has been conducted to assess the quality of pharmacoeconomic studies in the APAC combined. Therefore, we conducted this study for the quality assessment of studies published in the APAC using the QHES instrument. We also determined the association of a few predictor variables with the quality of these studies.

## Methods

### Literature Search

An electronic literature search was conducted with PubMed and Cochrane in April 2016 to identify published pharmacoeconomic studies conducted in APAC countries. Appropriate combinations of “cost-effectiveness,” “cost-utility,” “cost-minimization,” and APAC countries’ terms were used for the systematic search. The search was restricted to English-language articles and for a duration between January 2006 to April 2016. In addition, the references of included studies were screened to identify additional relevant studies that could have been missed during the systematic search.

### Eligibility Criteria

The QHES is a validated instrument for quality appraisal of cost-effectiveness, cost-utility, or cost-minimization studies [3]. Therefore, original, full-text, English-language articles, reporting cost-effectiveness, cost-utility, or cost-minimization analyses that were conducted in the APAC region and published during January 2006 to April 2016, were included. Countries taken into account included Afghanistan, American Samoa, Australia, Bangladesh, Bhutan, Brunei, Cambodia, China, Fiji, French Polynesia, Guam, Hong Kong, India, Indonesia, Japan, Kiribati, Korea, Laos, Macao, Malaysia, Maldives, Marshall Islands, Micronesia, Mongolia, Myanmar, Nepal, New Caledonia, New Zealand, Northern Mariana Islands, Pakistan, Palau, Papua New Guinea, Philippines, Samoa, Singapore, Solomon Islands, Sri Lanka, Thailand, Timor-Leste, Tonga, Tuvalu, Vanuatu, and Vietnam.

### Screening of Studies

Two reviewers independently screened the studies on the basis of titles and abstracts first and then the full texts. Any disagreements were resolved by a third reviewer.

### Quality Assessment

The QHES instrument (Table 1) was used for the assessment of the quality of studies by authors who were appropriately trained in the use of the QHES instrument. The QHES scores are grouped into ordinal quality quartiles: 1) extremely poor quality (QHES score 0–24), 2) poor quality (QHES score 25–49), 3) fair quality (QHES score 50–74), and 4) high quality (QHES score 75–100). Two

**Table 1 – The QHES instrument.**

No.	Criterion	Score
1	Was the study objective presented in a clear, specific, and measurable manner?	7
2	Were the perspective of the analysis (societal, third-party payer, etc.) and reasons for its selection stated?	4
3	Were variable estimates used in the analysis from the best available source (i.e., randomized controlled trial—best; expert opinion—worst)?	8
4	If estimates came from a subgroup analysis, were the groups prespecified at the beginning of the study?	1
5	Was uncertainty handled by 1) statistical analysis to address random events and 2) sensitivity analysis to cover a range of assumptions?	9
6	Was incremental analysis performed between alternatives for resources and costs?	6
7	Was the methodology for data abstraction (including the value of health states and other benefits) stated?	5
8	Did the analytic horizon allow time for all relevant and important outcomes and were costs that went beyond 1 y discounted (3%–5%) and justification given for the discount rate?	7
9	Was the measurement of costs appropriate and the methodology for the estimation of quantities and unit costs clearly described?	8
10	Was the primary outcome measure(s) for the economic evaluation clearly stated and were the major short-term, long-term, and negative outcomes included?	6
11	Were the health outcomes measures/scales valid and reliable? If reliable measures were not available, was justification given for the measures/scales used?	7
12	Were the economic model (including structure), study methods, and analysis described, and the components of the numerator and denominator displayed in a clear, transparent manner?	8
13	Were the choices of economic model, main assumptions, and limitations of the study stated and justified?	7
14	Did the author(s) explicitly discuss direction and magnitude of potential biases?	6
15	Were the conclusions/recommendations of the study justified and based on the study results?	8
16	Was there a statement disclosing the source of funding for the study?	3
Total		100

QHES, Quality of Health Economic Studies.

reviewers, trained in the use of the QHES instrument, independently assessed the quality of the included studies. The reviewers were blinded to the authors, institution, and source journal. Any discrepancies between them were resolved by discussion with a third reviewer.

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