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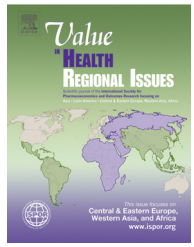

Systematic Review of Economic Evaluation Literature in Ghana: Is Health Technology Assessment the Future?

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ABSTRACT

Objectives: In many countries, such as Ghana, there is an increasing impetus to use economic evaluation to allow more explicit and transparent health care priority setting. An important question for policymakers in low-income countries, however, is whether it is possible to introduce economic evaluation data into health care priority-setting decisions. **Methods:** This article systematically reviewed the literature on economic evaluation on medical devices and pharmaceuticals in Ghana published between 1997 and 2012. Its aim was to analyze the quantity, quality, and targeting of economic evaluation studies that relate to medical devices and pharmaceuticals and provide a framework for those conducting similar health technology assessment reviews in similar contexts. **Results:** The review revealed that the number of publications reporting economic evaluations was minimal with regard to medical devices and pharmaceuticals. **Conclusions:** With the introduction of the National Health Insurance Scheme since 2004 policymakers are confronted with the challenge of allocating scarce resources rationally. Priority setting therefore has to be guided by a sound knowledge of the costs of providing health services. The need for economic evaluation is thus important. More costing studies were found; there were very few cost-effectiveness analysis studies. If economic evaluation is useful for policymakers only when performed correctly and reported accurately, these findings depict barriers to using economic evaluation to assist decision-making processes in Ghana; hence, there is a need for an independent health technology assessment unit.

Keywords: economic evaluation, Ghana, medical devices, pharmaceuticals.

Background

Modern health care is cost and technology intensive and expects value for money, creating demand for evidence-based practice and health technology assessment (HTA). In high-income countries, HTA is often done in specialized HTA institutions. In developing countries, however, HTA is often lacking, despite the apparent need. Therefore, health care decisions are often subjective. Improved understanding of the practice of evidence-based medicine (EBM) in many developing countries, and organizations such as the Cochrane Collaboration, now facilitate evidence-informed decisions [5].

HTA is the scientific process of evaluating health technologies (pharmaceuticals, vaccines, surgical procedures, medical equipment and devices, etc.) to facilitate informed decisions by stakeholders: health care providers, payers, consumers, regulators, policymakers, and so on [1]. In high-income countries, HTA is a formal discipline undertaken by trained professionals to guide stakeholders, including governments, to make decisions on the basis of sound scientific principles. Most resource-poor settings lack formal HTA mechanisms; in such settings, health care decisions are often based on no evidence and are more subjective. A recent survey [9] evaluating the use of key HTA principles [2] reported that even in the few developing countries in which HTA is being used, although the principles were considered relevant by HTA producers and users, the level of application was uniformly low.

Although resource allocation for health and demand for new health technologies have increased in many low-income countries, robust decision-making mechanisms have not developed in parallel. Decisions are often driven by experience, thrust of donor agencies, and lobbying pressure [6]. For example, a report from Peru noted that decisions on the human papilloma virus vaccine at the local level were mainly driven by local political pressure rather than scientific evidence [11]. In Rwanda, the government had allocated a disproportionately large amount of funds for HIV/AIDS than for malaria and other greater perceived needs, because donor grants were specifically allocated for HIV/AIDS [22]. Likewise in India, sustained single-point focus on poliomyelitis eradication using supplementary immunization (owing to World Health Organization and global pressure) has critically weakened the routine immunization program with other childhood vaccines [20].

Commercial pressure is also a major force skewing the decision-making process in developing countries; this is especially relevant for newer vaccines, expensive drugs, devices, and equipment [24]. For example, current immunization recommendations of the Indian Academy of Pediatrics were produced by expert consensus at a meeting sponsored by a multinational company.

Conflicts of interest: The author has indicated that he has no conflicts of interest with regard to the content of this article.

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Not surprisingly, the stated objective of the recommendations was to produce guidance for three products recently marketed by the company in India [15].

Although poorer countries should be more careful in spending money, the opposite often happens in most instances. Health care systems sometimes successfully negotiate lower pricing for pharmaceuticals, but public health programs end up paying more than the negotiated prices [16]. Such observations corroborate the argument of Chalkidou et al. [6] that in many developing countries, "health services and technologies purchased with public funds are selected through idiosyncratic processes that often have little to do with systematic analysis of their potential health benefit or value for money." In many developing countries, "expert-based" guidance is used as a surrogate for robust methods, perhaps in good faith [12]. A group of "experts" prepares a "consensus" statement on a given health technology. The procedure for selecting the experts and the processes used to reach consensus are seldom described [15]. In developing countries, physicians often base their "advice" on nonscientific considerations, particularly the influence of the pharmaceutical industry [21]. Material provided by pharmaceutical manufacturers is reported as the most frequently used resource by many physicians, with prescribing decisions influenced by training activities sponsored by pharmaceutical companies and visits by sales representatives [21].

In Ghana, a National Health Insurance Scheme (NHIS) was established in 2004, and the Ghana Diagnostic Related Group provider payment mechanism has been fully implemented, and although there are a number of challenges, the payment system is functioning well and generally accepted by providers. It has not, however, succeeded in containing costs, particularly for outpatient services, with outpatient claims now accounting for 70% of total NHIS claims and 30% of total costs of the NHIS. Furthermore, between 2007 and 2009, the average outpatient cost per claim increased by nearly 50% from US$3.47 to US$5.06. Without a control of the rapid rise in service delivery costs of the NHIS, in addition to mobilization of more revenue, the scheme will not be sustainable [29].

Meanwhile, to date there is no institution that does cost -effectiveness analysis of the pharmaceuticals that are part of the benefit package. There is no evidence base guiding the drugs that are part of the benefit package.

Clearly, health care decisions by all stakeholders in Ghana are often highly subjective. There is an urgent need to bring in objectivity, reproducibility, and transparency. HTA as a scientific process of evaluating health technologies (pharmaceuticals, vaccines, surgical procedures, medical equipment and devices, etc.) to facilitate informed decisions by stakeholders—health care providers, payers, consumers, regulators, policymakers, and so on—can address this need. Hence, the need of this systematic review to critically evaluate the evidence base of cost-effectiveness analysis of medical devices, vaccines, pharmaceuticals, and surgical procedures.

Methods

Literature searches were carried out in November 2012 by using the following keywords: "Ghana" and "economic evaluation" or "cost-minimisation" or "cost-effectiveness" or "cost-utility" or "cost-benefit." The search was performed by using the following databases: PubMed, EMBASE (Ovid), and Academic Search Elite (EbscoH). It included all published and unpublished literature available between January 1, 1997, and October 31, 2012. Inclusion criteria were all economic evaluations on medical devices and pharmaceuticals including vaccines.

All identified abstracts were reviewed by the first author. Studies were excluded if they did not present both the costs and the outcomes of a study, or if they were an editorial or methodological article. Studies were also rejected if they were not applied to a Ghanaian context and all other economic evaluations apart from medical devices, vaccines, and pharmaceuticals. All remaining articles were reviewed by using their full-text formats and classified according to: 1) the type of evaluation, 2) the type of intervention, and (3) the body system affected by the particular health problem.

Published articles were grouped by type of evaluation, and were considered to be: 1) a partial economic evaluation if only either the costs or the outcomes of a single intervention were compared; 2) a cost-minimization analysis if costs of different interventions were compared with evidence of equal ease burden in terms of disability-adjusted life-years; 3) a cost-effectiveness analysis if health outcomes were presented in intermediate terms, for example, disease prevented; (4) a cost-utility analysis if health outcomes were expressed in terms of quality-adjusted life-years or disability-adjusted life-years; and 5) a cost-benefit analysis if health outcomes were measured in monetary units. Only those studies that did economic evaluation in relation to medical devices, pharmaceuticals, and vaccines were considered.

The quality of studies was measured in two different ways. First, studies were appraised on their adherence to specific methodological and reporting practices based on published recommendations [7,8]. These included: 1) clearly indicating the study perspective; 2) description of comparator(s); 3) use of discounting methods if the costs and/or outcomes were from a study period of more than 1 year; 4) reporting the incremental cost-effectiveness ratio (ICER) rather than the average cost-effectiveness ratio; 5) performing uncertainty analysis on the results; and 6) disclosing funding sources.

Results

A total of 50 abstracts were identified from the search of both published and unpublished material (Fig. 1).

Of these, 45 abstracts were initially excluded because costs and outcomes were not mentioned simultaneously and because they disclosed funding sources. Seven articles were reviewed in full-text format. From the review of seven full-text articles, four articles were found not to be relevant because they were not economic evaluations of medical devices and pharmaceuticals including vaccines. The culmination of this was three economic evaluations, one looked at vaccines and two on malaria management.

In terms of where they were published, international peer review was the source and an international person was the principal author for two of them, with a Ghanaian author as the principal author for one of them. All three economic evaluations were cost- effectiveness analysis. Two of them used an ICER.

International standards recommend that economic evaluation studies should extend (through modeling) over a time period that is long enough to capture the full costs and consequences of an intervention. The funding sources were all from international nonprofit organizations.

There was no significant relationship between the source of funding and the quality of the report (using chi-square and Fisher's exact tests, where appropriate). See Table 1.

Discussion

HTA is the scientific process of evaluating health technologies (pharmaceuticals, vaccines, surgical procedures, medical equipment and devices, etc.) to facilitate informed decisions by stakeholders: health care providers, payers, consumers, regulators,

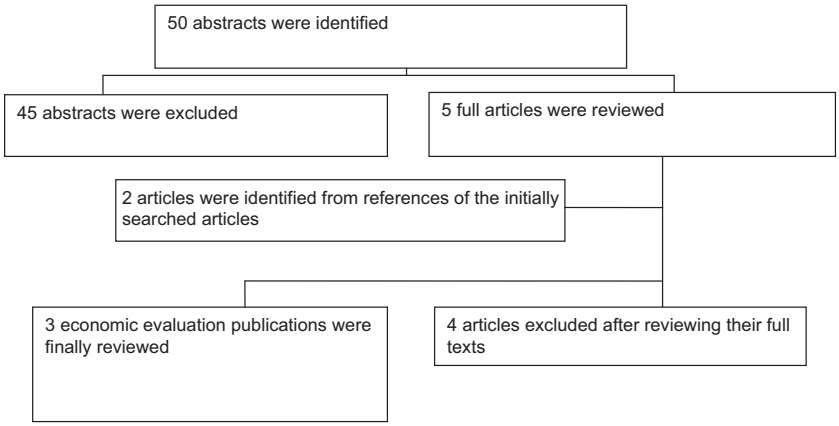

Fig. 1 – Flow diagram of systematic review.

policymakers, and so on [1]. A medical device is a product used for medical purposes in patients, diagnosis, therapy, or surgery. Pharmaceutical products achieve their principal action by pharmacological, metabolic, or immunological means. However, medical devices act by other means such as physical, mechanical, thermal, physicochemical, or chemical [28]. A survey of experts, conducted by Daar et al. [29], clearly showed the greatest need of new technology for affordable, simple diagnosis of infectious diseases in developing countries.

From the systematic review it is evidently clear that very scanty technology assessment has been done for medical devices and pharmaceuticals. In Ghana, currently with the NHIS the cost of medicines is a major cost driver, but evaluation of medicines as part of the benefit package is done without a robust evidence base. In this age in which there are multiple solutions and generally a wide spectrum of possibilities and strategies for most health care problems, the need for the evaluation of the technology and of the relevant alternative technologies available has never been greater. Second, as the health sector has limited budgets, HTA becomes one of the most important tools used to contain the increasing cost of health care without compromising safety. HTA should form the basis for health technology policies [2]. Prioritizing resource allocation and the need for new medical technologies are also increasing in developing countries [3]. Health insurance programs are emerging and expanding in sub-Saharan Africa [6]. Besides, health insurance programs are emerging and expanding more and more in this region [27]. But decisions can easily be influenced by experience, thrust of donor agencies, and lobbying pressure for new technologies, for example, from commercial organizations. This can lead to inappropriate use of technologies, which do not address health needs, and inefficient use of resources. Pichon-Riviere et al.'s [9] survey about the usage of HTA methods in a resource-poor setting suggested that principles of HTA were seen as relevant, but there was a lack of application. South Africa, as a middle-income country, however, has planned strategies for HTA. Yet, the implementation of such a national HTA framework has been slow. The lack of skills related to HTA is also a critical problem. Although there is a growing base of skills in the running of clinical trials, there are very few health economists trained in applying HTA methodologies. In Ghana, there was some training on pharmacoeconomics organized by the Ministry of Health, but the follow-up activities have not been sustained.

The emergence and spread of EBM was expected to address relevant needs, through building local capacity for using systematic reviews and influencing policymakers to make evidence-based decisions. However, EBM has major limitations in that it focuses on generating evidence of efficacy alone. In addition, it fails to factor in local needs and contexts for transferability of evidence generated in different health care settings [5]. The development process of HTA is usually expensive and time consuming [6], which poses problems in many resource-poor settings. In Ghana, as in other low- and middle-income African countries, policymakers have in recent years come under increasing pressure to justify resource allocation decisions in the health sector [26]. The number of economic evaluation studies in Ghana is quite low, however, especially in the area of medical devices, vaccines, and pharmaceuticals, in contrast to Canada, the United Kingdom, or The Netherlands [17] where economic evaluation has been formally accepted for use in policy decision making. In addition, this review found that the majority of economic evaluation studies performed in Ghana between January 1, 1997, and October 31, 2012, were vulnerable to bias because of the quality of the evidence used. Poor reporting quality limits the usefulness of economic assessment in the making of policy decisions.

Evidence-based policy according to scientific methods can reduce costs and improve the outcome for patients. Such analysis thus provides an ethical way of evaluating new health technologies. Therefore, the participation of health care authorities in Ghana is crucial. There is an urgent need to bring in objectivity, reproducibility, and transparency for local health policy makers in Ghana.

The review indicates that cost-effectiveness analysis was the only study type for economic evaluations performed in a Ghanaian setting for the study period. This is comparable to findings in other settings [13,14], probably because the approach is relatively straightforward. It compares costs with outcomes measured in natural units, such as per life saved, per case detected, and per pain- or symptom-free day.

This is in contrast to cost-utility analyses (which require more assumptions on health-state preferences [18]) and cost-benefit approaches (which face difficulties and controversy in applying a monetary value to human life [19]).

Cost-effectiveness analysis can be very useful when different health care interventions are not expected to produce the same outcomes. This type of study alone, however, cannot handle questions of efficiency of resource allocation when such decisions have to be made across different health problems [23].

In both technical and resource-allocation terms, there is a need to encourage and support the undertaking of cost-utility or cost-benefit analyses by academics and health researchers because these evaluation types are better able to assist decision makers in judgments about the allocation of resources across health care programs.

In addition, this review highlights that serious attention needs to be given to the quality of the reporting and information used in

Table 1 – Type of economic evaluation and their characteristics.

Type of evaluation by year of publication	Type of uncertainity analysis	Use of ICER	Discount rate used	Funding source
Cost-effectiveness analysis published in 2010	Probabilistic sensitivity analysis	ICER used	3%	International funding agency
Cost-effectiveness analysis published in 2012	One-way and multiway sensitivity analysis	ICER used	3%	International funding agency
Cost-effectiveness analysis published in 2012	One-way and multiway sensitivity analysis	ICER not used	3%	International funding agency

ICER, incremental cost-effectiveness ratio.

economic analyses performed in Ghanaian settings. The advantages of using systematic reviews of clinical effects are twofold [4]. First, a more precise estimate can be obtained from combining outcome data from a number of studies. Second, by using results from studies carried out in a range of settings (assuming that these studies are sufficiently homogenous to be comparable), the estimate can be applied to a more general patient population with different baseline risks, rather than specifically to the narrow population selected for individual economic evaluations as was observed in the studies trial.

It is noteworthy that there were two serious methodological pitfalls that were commonly found in the Ghanaian economic evaluations. The first was the lack of calculation of an ICER in one of the studies. This study reported an average cost-effectiveness ratio, that is, total cost divided by total effect for the interventions being compared. The report of an average ratio may lead to dangerously flawed conclusions and may limit attempts to make direct comparisons between interventions because an average ratio implies the comparison of each alternative with an intervention that incurs no costs and no effects [10]. Without calculating and presenting ICERs, it is possible for readers to be misguided by the results and to conclude that the new technique was simply fourfold more expensive than the standard test.

Combined with the use of poor-quality evidence for estimating clinical effects, this could seriously undermine confidence in the findings of these economic evaluations and their ability to inform health care resource-allocation decisions.

Among the studies that applied discounting, the review also found that the discount rate used was 3%. There is still no international agreement, however, on how to deal with future costs and benefits.

Major debate continues about whether it is justified to discount health benefits, and if so, what discount rate should be used and whether it should be different from that used for monetary costs [3]. Nevertheless, this review of the literature on economic evaluations performed in Ghanaian settings has shown limited evidence of economic evaluation publications with regard to medical devices and pharmaceuticals.

It is important to point out the limitations of this study. There is no national database for health care publications in Ghana. This study searched the literature in international databases and only included literature published in English and also unpublished literature in some of the university campuses. The use of these databases also meant that abstracts, conference proceedings, Ghanaian publications, masters and doctorate theses, and articles presented at symposia or seminars were not included in the search results. The number of publications available, however, can be used as a proxy to reflect the research capacity in this field in Ghana, and this review has shown that the quantity, quality, and targeting of economic evaluation studies is not yet adequate to meet the needs and concerns of decision makers in Ghana. Current studies support the establishment of HTA institutions in low- and middle-income countries [25].

Conclusions

This review demonstrates an urgent need for a comprehensive and systematic method for conducting economic evaluations for medical devices and pharmaceuticals, especially in an era of increasing cost in the Ghanaian health care system and also dwindling donor support to the health sector. HTA of medical devices and pharmaceuticals seems the most viable option to ensure cost-containment, which is the main agenda of the NHIS, and ultimately save the health care system.

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