

IMPLEMENTATION OF LOCAL/ HOSPITAL-BASED HEALTH TECHNOLOGY ASSESSMENT INITIATIVES IN LOW- AND MIDDLE-INCOME COUNTRIES

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Objectives: The objective of this study is to review the implementation of health technology assessment (HTA) at the local and hospital levels in low- and middle-income countries (LMIC). This review will provide a starting point for identifying the conditions for HTA implementation in hospitals in LMIC through the analysis of experiments conducted in these countries.

Methods: A systematic review of the literature was conducted to document the local-/hospital-level HTA experiments performed in LMIC.

Results: This systematic review showed that few experiments of local HTA in LMIC have been published to date, with only five articles found in our survey. These documents report studies of clinical effectiveness and economic evaluation at the local level in certain Asian and Latin American countries. In addition, pharmaceuticals and medical devices were the most common topics covered by HTA at the local level in these countries.

Conclusions: Currently, HTA plays an increasingly important role in healthcare systems in supporting decision making for healthcare policies and practices. This systematic review contributes to identify priorities in the process and methodology of HTA implementation at the local/hospital level in LMIC. The paucity of HTA in LMIC is often assumed to be due to the lack of formally tasked HTA agencies, to politics and to shortage of resources.

Key words: Health technology assessment (HTA), Low- and middle-income countries (LMIC), Hospital/local level, Systematic review

The International Network of Agencies for Health Technology Assessment (INAHTA) defines health technology assessment (HTA) as a multidisciplinary field of policy research (10;22). HTA provides high-quality information about a wide spectrum of issues, from effectiveness to ethics, concerning health technology and health interventions (12;26). HTA is used primarily to support and inform those who make decisions about health policy and purchasing, health services organization and management, and clinical practices (5;16;22;24).

According to Yang (39), resource scarcity in health care is common worldwide. This is mainly due to the growing demand for health care to improve health, the introduction of new medical technologies, better access to health care due to expanded health security systems, and population aging (20). The situation is even worse for low- and middle-income countries (LMIC) where a technology can be generally adopted in the absence of control by any government agency (20). Thus, policy makers and stakeholders in these countries are extremely concerned about the scarcity of healthcare resources (39).

A market gap exists with new medical technologies, and countries often rely on a regulatory system to limit their unnecessary use while keeping up with technological advancements

(39). Hence, the incorporation of HTA can provide information about the state of health care in a given country, as well as its current and future needs. It also ensures the compatibility of the adopted technologies with local healthcare delivery systems (39).

According to Attinger et al. (2), the importance of HTA for developing countries is indisputable. Although LMIC are still plagued by primary health issues, they are forced to import modern medical technologies due to internal and international pressures (2). Conferences held on the improvement of technology management and delivery of health care in these countries, especially in Asian and Latin American countries, have shown that significant attention is paid to HTA (1;6;20;25;32). The latter is in fact regarded as a political tool to support decision makers in their search for the ultimate information on the costs and benefits of investments in health care (11;39).

LMIC often have the highest need for critical evaluation to make appropriate investments in health technology and to provide affordable health care, but they have only a limited basis to make such choices (10). Recognizing the potential of HTA has led to the crucial question of how to promote the development of assessment activities in these countries (2).

According to INAHTA, HTA is increasingly used in low- and high-resource nations to provide findings to inform health-care policies and decisions (19). There are now fifty-two member agencies in the INAHTA representing twenty-six countries

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from all continents except Antarctica. Eight of them are LMIC: Malaysia, Argentina, Thailand, Brazil, North Korea, Mexico, Chile, and Taiwan (19).

Current literature includes many reports describing the implementation and promotion of HTA in health systems in some LMIC such as in Thailand (37), Malaysia (34), Philippines (9), China (6), Romania (7), Mexico (17), Brazil (4), Argentina (32), Lithuania (8), for instance. Some of these countries have effective HTA programs whereas efforts are being made in some others to establish HTA or HTA-related activities without a formal HTA program. Despite these developments, there are still many LMIC in which no experience with HTA has yet been reported.

In addition, there have been useful HTA-related initiatives through the provision of conferences and workshops. Each year, an international group of healthcare researchers, practitioners, and policy makers interested in HTA convene at the Annual Meeting of HTAi to share knowledge and discuss the current state of HTA science.

In response to the needs of HTAi members for a platform to share experience as well as to initiate and sustain HTA-related activities in developing countries, the HTAi Interest Sub-Group on Developing Countries (HTAi DC ISG) was officially launched at the 2008 HTAi Annual Meeting in Montreal (QC, Canada). As a result of their increased interest in HTA, the latter organization has successfully bid to host, for the first time, the 2011 Annual Meeting of HTAi in Rio de Janeiro (Brazil). The objective of holding this prestigious conference in Brazil was to raise the awareness of HTA and interest therein not only at the national level but also throughout the Brazilian healthcare system as well as in neighboring parts of South America and other LMICs.

HTA AT THE LOCAL/HOSPITAL LEVEL

In 1986, the Canadian Hospital Association issued a policy statement emphasizing the importance of HTA and appealed to a national initiative to adopt this approach (28). In general, the relevance of HTA for a healthcare facility is to present the evidence on which decision making on the selection, acquisition, and management of technologies must be based (28).

According to McGregor and Brophy (27), HTA at the hospital level is internationally recognized as a means to improve the rationality of the decision-making process. Thus, hospital-based HTA can provide the evidence required to inform clinical decisions at the administrative level. Policy makers, hospital managers, clinicians, and other healthcare professionals are asked to integrate timely scientific evidence into clinical practices and organizational processes. In other words, the implementation of hospital-based HTA units may be useful to create a positive organizational context conducive to the use of scientific evidence to support both clinical practices and managerial decision making in hospitals (27).

Hospitals, as mentioned by Tan-Torres (36), are usually evaluated for their technological quality by clients who believe that quality of health care increases with the sophistication level of the equipment. Often, equipment discarded after an upgrade by hospitals in developed countries are purchased by hospitals in developing countries on a second-hand basis (20). Experiments with HTA activities in hospitals have reported a positive impact on resources and costs (27). Thus, HTA at the local level is also essential for hospitals in LMIC because of their need to ensure the best available services with their limited resources and to improve practices (15;27). According to a study carried out by the McGill University Health Centre Technology Assessment Unit in Quebec (Canada), local/hospital HTA might be expected to dramatically increase the ability of hospitals to efficiently use their health resources (14). Making the most of opportunities and gains depends on both having resources and making efficient and effective use of them in each healthcare organization (14).

The adoption of a HTA rationale at the hospital level is considered as a strategy that can support knowledge transfer and thus enable a culture of evaluation in the hospital, improve the relevance and timeliness of HTA recommendations and, ultimately, facilitate their uptake. Therefore, its role is to assist the managerial team to develop policy responses to local questions using a process that is transparent, fair and consistent (27). However, in addition to presenting the scientific evidence related to a given technology, local HTA units also formulate evidence-based policy recommendations that are proper to local circumstances and that reflect community values. These HTA activities guide executives in selecting and recommending sensible health technologies based on the analysis of existing data, thus providing a positive impact on the quality of care and health services (27).

With the above considerations in mind, the objective of the current study is to review the actual application of HTA at the local/hospital level in LMIC. This review will provide a starting point for identifying the conditions for HTA implementation in LMIC-based hospitals through the analysis of experiments conducted in these countries.

MATERIALS AND METHOD

A systematic review of the literature was conducted to document the experience of LMIC with HTA at the hospital level. An information specialist developed a standardized search strategy and a bibliographic search was performed in the PubMed and Embase databases, in scientific journals specialized in HTA (the *International Journal of Technology Assessment in Healthcare* and *Health Technology Assessment*), and the INAHTA and HTAi Web sites.

The search strategies were developed according to three categories of keywords: (i) health technology assessment or HTA, (ii) developing countries, and (iii) hospital-based HTA.

We compiled articles published in all languages as long as they had an abstract in English, French, Spanish, Italian, Portuguese, or Arabic. We limited our search to articles published between 1980 and 2011 and presenting an empirical report of any experiment with local/hospital HTA in LMIC.

We extracted the following information from the selected publications: country, year of publication, authors and affiliations, type of HTA experiment/activity, type of healthcare system, type of technology assessed, type of intervention, type of study and methodological approach, and barriers and facilitators to HTA experiment/activity (Table 1).

The search led to a total of 692 references (duplicates removed) published between 1980 and 2011 that were screened by reviewing their titles and abstracts (Figure 1). Of these, 639 references were excluded, as they do not refer specifically to HTA and/or HTA experiments at the local/hospital level in LMIC. We therefore selected 53 references according to the above-defined inclusion criteria, and a full-text copy was therefrom obtained, which then underwent a detailed evaluation by two reviewers independently. Following that second selection, a total of five articles were considered relevant and retained for analysis.

RESULTS

Over the past few years, HTA programs have been introduced with a strong commitment in many LMIC settings (3), particularly in Asian (e.g. China, Thailand) and Latin American countries (e.g. Argentina), as shown in the reviewed articles. Among the five articles retrieved, three report on experiments conducted in Asia, namely in China (6), Thailand (25), and the pan-Asiatic region (20). The two others report on HTA experiments in Latin America, that is, Argentina (32) and South America as a whole (1).

The five articles found were all published after 2001. Table 1 presents an overview of the experiments that were retrieved in this systematic review.

An analysis of the five articles thus retained shows that the scope of local/hospital-based HTA in LMIC is limited to the effectiveness of healthcare interventions. Clinical effectiveness represents the parameter of greatest practical interest and cost-effectiveness analysis is an ideal tool for decision making (2).

In the five experiments reported, the impact of the adoption of specific technologies on the healthcare system and the financial implications thereof, as well as the efficiency in resource allocation are the main centers of interest. The Asian Health Technology Assessment Network, the Thai Health Intervention and Technology Assessment Program (HITAP), the Latin American HTA programs, the Argentinian Institute of Clinical Effectiveness and Health Policy, and the Chinese HTA unit all proceed to assess the costs and clinical effectiveness of drugs, screening technologies, surgical procedures, and medical devices at the hospital and national levels.

Table 1. Information Extracted from the Included Studies

Author / year of publication	Country of study	Type of study	Research method	Participants	Type of intervention	Type of healthcare system	Type of technology assessed	Type of HTA experiment	Barriers
Hutubessy, et al. (2002)	Asia (South Korea, Malaysia, Indonesia, Philippine)	Descriptive retrospective study	Qualitative	Policy makers	Organizational National	Hospital level	MRI	Clinical effectiveness and economic evaluation	Economics, absence of formally tasked HTA agency
Rubinstein et al. (2009)	Argentina	Discussion/review	Qualitative	Policy makers/ Stakeholders	Organizational National	Hospital/ systemic level	Review of HTA activities	Economic evaluation	Politics
Chen et al. (2004)	China	Cross-sectional surveys	Mixed	Policy makers	Organizational	Hospital	Prenatal diagnosis technology	Clinical effectiveness and economic evaluation	Absence of HTA-based guidelines
Lertpitakpong et al. (2008)	Thailand	Action research method	Qualitative	Managers/ stakeholders	Organizational National	Hospital/ systemic level	Pharmaceutical and medical devices	Clinical effectiveness and economic evaluation	Shortage of resources for health research
Arellano et al. (2009)	Latin America	Exploratory study	Mixed	Policy makers/ Stakeholders	Organizational National	Hospital/ systemic level	Drugs, medical devices	Clinical effectiveness and economic evaluation	Absence of an integrated conceptual framework

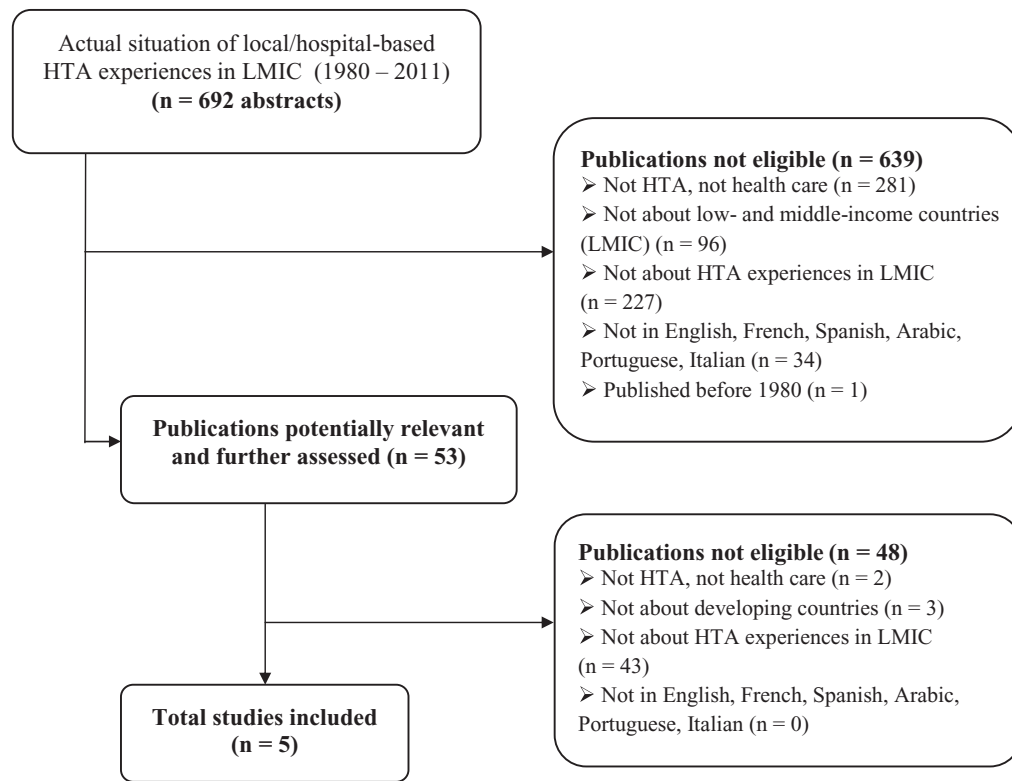


Figure 1. Flow diagram of the study selection process.

These experiments report the use of local/hospital-based HTA in LMIC with the aim to inform decision makers of the most appropriate indications (1;25;32) and to advise the various healthcare stakeholders on the resource allocation process (1;25;32). In addition, two reports describe experiments aimed at incorporating HTA tools into policy making at the hospital level (6;20).

Our analysis revealed that the financial, political, and educational factors are likely the most important barriers that might influence a successful implementation of local/hospital-based HTA in LMIC (1;6;20;25;31). Indeed, local/hospital-based HTA in LMIC included the limited availability of financial resources, and a reduction in government resources or an increase in nonmedical expenditure was reported to inhibit the short-term prospects for founding a HTA unit. This review also noted the following findings as additional barriers to HTA experiments: (a) the lack of experts trained in HTA, (b) either limited political interest and/or understanding and (c) absence of criteria of best practice for the decision-making process for implementing HTA (7;32).

Another important barrier that limits the use of HTA information in decision making at the hospital level is their limited impact on policy if they are not available early enough in the decision-making process. For this reason, it is recommended that HTA should be planned and used in a systematic manner rather than on an ad hoc basis (23).

DISCUSSION

Currently, HTA plays an increasingly important role in healthcare systems in supporting decision making for healthcare policy and practice. Although HTA is most advanced in industrialized countries, there is nonetheless a growing community worldwide that is interested in developing and using HTA in developed and developing countries (4). Thus, local/hospital-based HTA in LMIC is still in its infancy, and the dissemination of HTA evidence and its embedding into practice has yet to become a normal part of healthcare management in these regions. This was clearly demonstrated in this systematic review, especially upon analysis of the five selected articles. These articles discuss experiments that may be considered as precursors of the problems now faced by developing countries as the latter are switching to an increasing number of complex technologies. The HTA documents therein reported addressed studies of clinical effectiveness and economic evaluation at the local level in Asian and Latin American countries. This is consistent with the observation made by Leys (26) that the practice of HTA has developed in a mostly pragmatic manner, focusing largely on solving problems through the use of economic methods rather than an integrated approach.

Increasing levels of healthcare expenditure and the demand for new technologies are now giving a strong incentive to HTA in LMIC. However, HTA is developing with uneven speed at the local/hospital level in LMIC as some of these countries are

building on experience and evidence from developed countries. Hence, only few experiments of local/hospital-based HTA in LMIC have been reported. One possible explanation for the limited number of articles retained in this systematic review is that reports on HTA at the hospital level in LMIC have not been published. The lack of HTA in LMIC is often assumed to be due to the absence of formally tasked HTA agencies (20;31), to politics (25) and to shortage of financial and technical resources (7;20).

How could HTA be further developed in LMIC, and particularly at the local/hospital level? The main conclusion from HTA experiments in LMIC is that despite a few original initiatives, considerable development at the hospital level is still necessary (4). At first, promoting the concept of HTA could be achieved by the sharing of expertise and experience. Although HTA is a relatively new discipline, the implementation of a HTA structure at the healthcare system level as well as the use of HTA as a policy tool have developed quickly in Thailand in the past 5 years (38). The HTA program known as HITAP carried out cost-effectiveness analysis and other economic approaches of a wide range of health products, medical procedures, and public health initiatives (37). The rapid expansion of HTA in Thailand has been facilitated by the strong emphasis given by the national authorities to the existing needs and demands of new technologies. According to Teerawattananon (38), it is anticipated that the experience gained from the creation of the HITAP among academics, health officials, and civil society organizations will be used in the future as a basis for improving formal HTA systems in Thailand and other LMIC.

Second, there is a strong need for a transfer of HTA knowledge among professionals, policy makers, academia, industry, the health insurance sector, patients, consumer organizations, and the general population in LMIC and between developing and developed countries. The role of HTAi, especially through its Interest Sub-Group on Developing Countries, appears as crucial but would benefit from various forms of support, formalized tools and activities, and an evaluation of its realizations.

Another priority is capacity building. Most countries lack the capacity for trained and experienced personnel to carry out, interpret, and use the results of HTA. Also, the use of guidelines for HTA can facilitate transparency of the process. As an example, the HITAP internal guidelines on HTA management were developed in Thailand in 2006, based on lessons learned from leading HTA institutes in some developed countries (37). Hence, further steps are essential to foster the adaptation of HTA at the local/hospital level. Recently, the Catalan Agency for Health Information, Assessment and Quality has published a handbook guiding and supporting the establishment of HTA activities, especially in countries with limited HTA capacity (31).

In the UK, the National Center for Health and Clinical Excellence (NICE) has developed a great expertise in using evidence to inform clinical and public health practice. In 2008,

NICE decided to use its expertise to assist countries facing challenges with their healthcare systems, and so established NICE International. For example, NICE International has supported the development of clinical guidelines in Bosnia. Moreover, countries such as Azerbaijan, Brazil, and Serbia regularly adapt NICE guidance into their own systems (30).

Transparency of both the process and methods used in HTA are of great importance for stakeholders and may enhance the effective use of HTA information in decision making (35). In addition, the job training of personnel from countries with limited or absent HTA activity by HTA agencies abroad is important for capacity building in the field (29). Finally, a political will may be important for promoting more initiatives of local/hospital-based HTA that advance regulations on the adoption of new health technologies in LMIC to improve not only technical or allocative efficiency, but also health equity (32).

Assessing the overall impact of local/hospital-based HTA on the different levels of healthcare delivery is difficult to achieve, largely due to the recent character of these experiments and to the scarcity of data. Further research is needed to explore the conditions under which local/hospital-based HTA results and recommendations can have an impact on hospital policies, clinical decisions and quality of patient care (14).

First, the regulatory structure relative to HTA is relatively weak. Therefore, HTA must have an effect on the ideas and practice of many practitioners and managers, which is always a difficult challenge (4). According to a study by Gagnon *et al.*, the intention of physicians to use HTA recommendations in their practice might be influenced by various psychosocial factors, depending on the specific context (13). Moreover, the changes suggested through the development of HTA encounter resistance from many people in the health system (4). Therefore, further work should address the readiness of the different stakeholders (health professional, managers, patients) to face the changes resulting from the implementation of HTA at the hospital level in LMIC. Another example of a potential barrier is knowledge produced by HTA is not always used directly to make informed decisions in hospitals (18). According to Gagnon *et al.*, knowledge generated by HTA is still not yet incorporated into political, organizational and clinical decisions (13). Health authorities should participate more actively in educating decision makers at the hospital level regarding HTA.

As Banta stated (33), “technology assessment by itself cannot solve problems; the major challenge is to develop a policy structure that can control technology.” In LMIC, despite resource constraints to create a separate body for health technology, a national program for health technology could be established according to the personnel and material resources existing in government and private institutions (33). Such a program might thus yield information about the usefulness of technologies, their compatibility with the healthcare delivery system and the future demands and needs of health care.

CONCLUSION

The objective of this study was to systematically review the application of HTA at the local/hospital level in LMIC. This review provides a starting point for identifying the conditions for HTA implementation in hospitals of LMIC through the analysis of experiments conducted in these countries. The results showed a very limited use of HTA in the latter context. The lack of HTA in LMIC at the hospital level is often assumed to be due to the absence of formally tasked HTA agencies, to politics and shortage of resources, and can thus be traced back to the national level.

Although HTA is now well established in most developed countries, it has not yet found solid foundations in many developing countries. The rationing of healthcare delivery in LMIC is unavoidable and has led to accept HTA as a policy tool at the national and hospital level.

In conclusion, developing countries must develop their own capacity to perform HTA at the hospital level, taking into account the particularities in the infrastructure and organization of their health services. Even after the establishment of HTA, it is important that continuing efforts be made to stimulate the policy, and that decision makers participate more actively in HTA. Therefore, a particular attention should be paid to the creation of national coordinating agencies for HTA in LMIC. The latter is an area where the experience of more developed countries might be of considerable help for LMIC, taking into account their specific demands and needs.

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CONFLICTS OF INTEREST

The authors report they have no conflicts of interest.

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