



The gap between evidence and practice in maternal healthcare[☆]

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Abstract

The expected improvement in maternal and perinatal health in developing countries has not yet materialized. In addition to the factors related to socioeconomic conditions, we have identified areas where large gaps between evidence and practice are apparent. These gaps are in clinical care, implementation of effective practices and in selecting research priorities. We present examples from our own research and the literature to illustrate these points. © 2001 International Federation of Gynecology and Obstetrics. All rights reserved.

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1. Introduction

The improvement of maternal and perinatal health in developing countries, and the prevention of the leading pregnancy-related conditions worldwide, such as pre-eclampsia, preterm delivery, intrauterine growth retardation and prelabor rupture of membranes, has not materialized as expected, as in other areas of medicine. There could be many reasons for this current disap-

pointing situation. We think a major factor is the continued presence of glaring gaps between our knowledge and practices. Because of these gaps, improved quality of care and expanded coverage of maternal health services to the large underserved population remain limited.

There are three major areas where these gaps can be identified: the gap in implementing evidence-based practices; the gap in the strategies for changing practices and the gap in selecting research priorities. These gaps need to be recognized and addressed according to two important public health principles: only interventions that have been shown to be effective by strong research evidence (non-biased) should be promoted

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and implemented, and, the same evidence of efficacy and safety must be required for both drug and non-drug forms of care, including health policy, health systems and educational interventions.

Examples from research projects conducted by us as well as from the literature will be presented, with the objective of highlighting the obstacles to a better and more humane maternal healthcare.

2. The gap in implementing evidence-based practices

Antenatal care (ANC) is recognized as an essential element for the screening, primary or secondary prevention and treatment of pregnancy complications. Its format, including the timing and its components, has been recognized as areas requiring further evaluation [1]. During the preparation phase of the WHO multicenter randomized controlled trial to evaluate a new model of antenatal care [2], a baseline survey of antenatal practices and procedures was conducted [3]. The survey included a review of medical records of 2913 women randomly selected at 53 antenatal clinics and interviews with all staff providing antenatal care in these clinics participating in the trial. The most striking result was the large differences across sites in the use of several antenatal care practices and procedures, such as routine vaginal examination or formal risk scoring, activities for which there are no evidence of benefit [4]. In two study sites, routine vaginal examination was not used (<1%), whereas in the third site approximately 42% and, in the fourth site, 99% of women had routine vaginal examinations. There were similar but not consistent differences in several other practices. The practice of antenatal care in these clinics seemed to be not-evidence-based and with large variations in locally adapted protocols (Table 1). The question is, how such a widely used form of healthcare can be left to such subjective judgement for its implementation? Even if some practices may not be harmful, their implementation will result in inappropriate use of scarce resources and waste of time and money.

The case of iron supplementation is another example of the gap between the evidence and

Table 1

Proportion of women receiving selected clinical activities in the baseline survey of the WHO Antenatal Care Trial

Antenatal care activities	Study site			
	A (%)	B (%)	C (%)	D (%)
Routine vaginal exam	42.5	99.2	0.7	0.8
Risk score evaluation	0.0	87.6	98.8	0.8
Uterine height chart	2.0	0.0	0.0	0.0
Doppler for fetal heart	0.4	0.0	89.5	31.1

Adapted from Piaggio et al. [3].

practice in antenatal care (ANC). There is compelling evidence that routine iron supplementation reduces iron deficiency anemia during pregnancy, particularly among women with borderline iron stores. Iron supplements were routinely provided in three of the four study sites in the WHO Antenatal Care Trial [2]. In the fourth site there was no such policy and only a small proportion of women received iron supplements [5]. A policy of routine provision of iron supplements was implemented in the trial in the intervention group, which resulted in an increase in the proportion of women with iron supplementation from 20.6% in the control group to 85.5% in the intervention group. This higher proportion of iron intake was associated with a lower rate of severe postpartum anemia (less than 9 g/l), which was 8.8% in the intervention group vs. 13.3% in the control group [5]. It is evident from these data that when modest efforts are made to provide activities proven to be effective, the benefits on biological outcomes could be observed in a short period of time.

Effective interventions during intrapartum and immediate postpartum periods to reduce maternal mortality and severe morbidity have also been identified. These interventions include the availability and capacity to provide parental antibiotics, uterotonics and anticonvulsants (magnesium sulfate), perform manual removal of placenta, conduct assisted vaginal delivery, perform cesarean section when indicated and provide blood transfusions. Unfortunately recent survey found that only approximately half of the services in 49 developing countries were able to provide these effective interventions [6].

Table 2
Interventions introduced to medical practice without strong unbiased evidence

Intervention	Outcome	Effect
Routine electronic fetal monitoring	Perinatal mortality	Limited [23]
Routine ultrasound	Perinatal mortality	Limited [24]
Routine episiotomy	Vaginal laceration	No protection [25]
High number of routine ANC visits	Low birth weight, maternal morbidity	Limited [1]

Conversely, a survey conducted in a hospital in China in 1999 showed that intrapartum activities that should be eliminated from clinical practice (i.e. pubic shaving, rectal examination during labor, supine position during labor and delivery) and recommended not to be used routinely (electronic fetal monitoring, episiotomy) were widely used (Garner P. personal communication, 2000). This situation in Chinese hospitals is not unique. Table 2 presents a list of interventions that have limited beneficial effects on substantive perinatal outcomes according to systematic reviews of randomized controlled trials, which are still largely implemented in both developed and developing countries. Table 3, as a dramatic contrast, presents examples of interventions of known effectiveness that are implemented only on a limited basis.

The attitudes of health service providers clearly play a major role in the implementation of policies. For example, there is a consistent and unnecessary increase in the cesarean section rate in many developed and developing countries. When we explored associated factors in an urban area in Latin America, it was not possible to explain the differences in cesarean section rates in a group of obstetricians by women’s socioeconomic and

obstetrics risk factors, their age, obstetricians’ income and years of training, by method or by amount of payment. We concluded that there is a very strong influence of the obstetrician’s attitudes to clinical practice over the cesarean section rate in this population [7].

The ‘attitude’ of obstetricians to cesarean section has been studied in more detail in England and the USA. In London, 31% of female and 8% of male obstetricians preferred cesarean section for themselves or their partners, as the mode of delivery of uncomplicated, singleton pregnancy in cephalic presentation at term [8]. Similarly, in another recent survey, 56% of male and 33% of female North American obstetricians would personally prefer to be delivered by cesarean section [9].

These unnecessary surgical interventions are applied to populations with low or medium risk of pregnancy complications, while, at the same time, large numbers of women in the poorest regions of the world, who are at high risk of obstructed labor, do not have access to surgical facilities.

The gap between evidence and practice is also evident among those who are traditionally considered to be closer to the interests of women’s needs. A recent survey found that most women

Table 3
Effective interventions with limited implementation

Intervention	Effect	Implementation
Maternal corticosteroids in preterm labor	Effective [26]	Limited?
Antibiotics for asymptomatic bacteriuria	Effective [27]	Limited
Cesarean section for obstructed labor	Effective	Unavailable where needed/ overused in low risk populations
Magnesium sulfate for eclampsia	Effective [28]	Limited/not available in some countries
Social support in labor	Effective [29]	Infrequent
External cephalic version	Effective [30]	Infrequent

chose to be described by staff in antenatal care clinics in a rural area in the UK as ‘patient’ (39%), the second choice was ‘pregnant women’ and the less favored were ‘client’, ‘consumer’ or ‘customer’ [10]!

3. The gap in strategies for changing practices

Clinicians need information to update their practice with effective forms of care, but most textbooks, especially those translated, are out of date for treatments and journals are in excessive numbers to be followed by individuals. As a result, the knowledge and performance of physicians deteriorate and new practices are introduced without proper knowledge (Fig. 1).

Two strategies are commonly used to influence practice with new evidence: continued medical education and printed materials of extracts or reviews of the medical literature. An overview of 51 reviews of Continuing Medical Education

(CME), guidelines and specific interventions aimed at changing practices found that passive dissemination of written educational materials and didactic educational sessions, the most widely spread forms of CME, are largely ineffective strategies to improve medical practices [11]. Interventions considered more effective in these reviews were reminders of a specific procedure or practice, educational outreach for prescribing, interactive educational workshops and multifaceted interventions, mostly not used in standard medical institutions.

A study reporting the time doctors spend reading per week in an U.K. academic institution found that the proportion of physicians not reading ‘at all’ ranged from 70% for house officers to 15% for senior registrars. The median number of minutes per week among those that did read ranged from 90 min among medical students to 20 min among house officers and senior house officers (Centre for Evidence Based Medicine web site (<http://163.1.212.5/docs/teachingre->

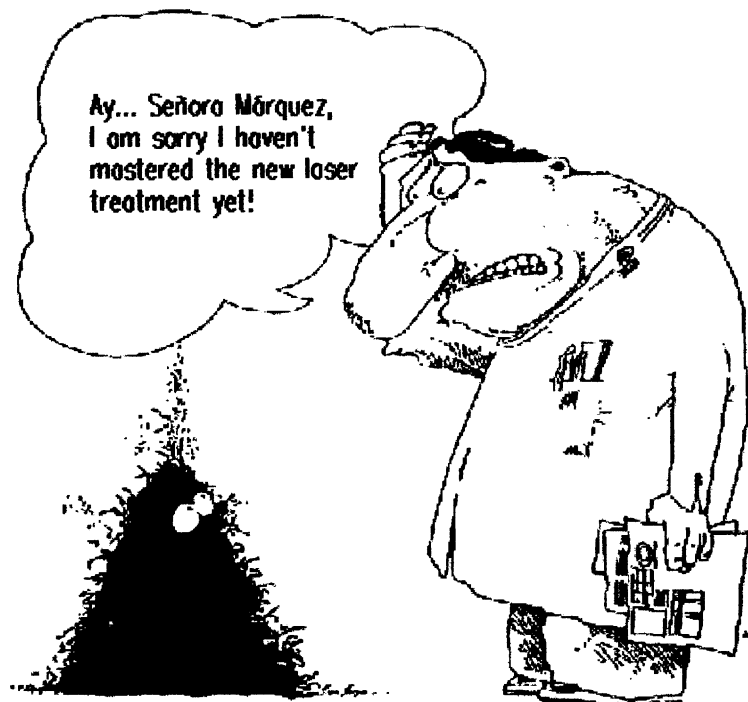


Fig. 1. Cartoon published in a newspaper of wide circulation illustrating the public concern about the introduction of new technologies without proper evaluation or training.

sources.html) — last accessed on 4 April 2001). There is a pattern of inverse correlation between years since graduation and medical knowledge of the current best care which is called the ‘slippery slope’ (the more years since graduation, the less knowledge; $r = -0.54$ $P < 0.001$).

International agencies and professional organizations can play an important role in providing up to date access and reliable information to health workers by using strategies to systematically summarize the large body of information. Although several initiatives are currently in place, most are aimed at developed country practitioners. One initiative to address this gap, focusing on developing countries, is *The WHO Reproductive Health Library (RHL)* [12], a joint effort between the World Health Organization and the Cochrane Collaboration. RHL provides access to Cochrane systematic reviews in some of the most important reproductive health areas on a free-subscription basis for developing countries. Each of the reviews is accompanied by a commentary bringing in an under-resourced setting perspective and a practical guide on how to implement the recommended practices. Twenty thousand copies of RHL are published in English and Spanish and updated annually. Currently, we are evaluating a multifaceted strategy to implement RHL recommendations in 40 hospitals in Mexico and Thailand, in a cluster randomized controlled trial. The main question is: ‘can we change practices by

improving knowledge, using a proactive dissemination strategy?’ It is possible that institutional barriers and provider attitudes could be difficult to overcome. Nevertheless, it is important and necessary to rigorously evaluate promising strategies to implement effective practices.

4. The gap in selecting research priorities

The selection of relevant research topics and their implementation, including the availability of resources and funding, are key elements in the production of research results that are relevant to practice. We distinguish three dichotomies in research on maternal health, relevant to the conditions most prevalent in developing countries: (1) research to advance curative vs. preventive care; (2) priorities in the “north” vs. the priorities in the “south”; and (3) potentially biased vs. unbiased research methods.

4.1. Research to advance curative vs. preventive care

It is now well-recognized that most of the health gains in the industrialized world in the last century are attributable to public health efforts to prevent illness and not just to heroic measures to treat diseases [13]. Yet, effective preventive strategies for the leading pregnancy specific causes of maternal and perinatal morbidity and mortality

Table 4
Current state of knowledge about pregnancy specific conditions

	Biology	Prevention	Treatment	Emergency management
Pre-eclampsia/eclampsia	No	No	No	Yes
Preterm delivery	No	No	No	Yes
Preterm prelabor rupture of membranes	No	No	No	Yes
Postpartum hemorrhage	?	*	Yes	Yes
Small for age	No	No	No	Yes
Postpartum depression	No	No	Yes?	Yes
Spontaneous abortion	No	No	No	Yes
Obstructed labor	Yes?	Yes?	Yes	Yes
Rh(–) isoimmunization	Yes	Yes	Yes	Yes
Iron deficiency anemia	Yes	Yes	Yes	Yes

* Even using recommended preventive strategies about 4% of women will have postpartum haemorrhage of ≥ 1000 ml of blood.

are mostly lacking (pre-eclampsia/eclampsia, postpartum hemorrhage, prelabor rupture of membranes, preterm delivery, small for gestational age). The biology, prevention and treatment for these conditions are largely unknown (Table 4). There are other pregnancy-specific conditions such as Rh(–) isoimmunization, abortion or anemia for which the biology, prevention, and treatment are known, but the challenge to make them available to all women remains (Table 4). Conversely, for most of the infectious diseases affecting pregnant women, such knowledge is mostly available, but the implementation of preventive programs has proven to be a difficult task for the health sector.

4.2. Priorities in the north vs. priorities of the south

The area of maternal health research has been strongly influenced, as in others areas of medicine, by the priorities of funding agencies and academic institutions in developed countries. To evaluate the extent of this bias we reviewed all 9014 trials included in the Pregnancy and Childbirth Module of the Cochrane Library 2000. Only 45 trials (0.5%) concerned postpartum hemorrhage, 156 trials (1.7%) pre-eclampsia/eclampsia, and 111 (1.2%) intrauterine growth retardation/small for gestational age, three of the leading maternal and perinatal conditions in developing countries. Conversely, preterm delivery, the component of low birthweight most prevalent in developed populations [14] was studied as an outcome in 1203 trials (13.3%). A recent evaluation of funding patterns of National Institute of Health, USA, also showed the lower priority given to perinatal conditions for support from developed country funds [15].

4.3. Potentially biased vs. unbiased research method

Randomized controlled trials (RCT) are the less biased study design option to select the most effective interventions and to stop the transfer of ineffective forms of care [16]. This was acknowledged by developed country health authorities, and implemented decades ago when major public health achievements were made (i.e. polio vaccine, tuberculosis treatment).

However, strong resistance is often encountered among funding agencies, health workers and academic circles in the implementation of such randomized controlled trials. For example, it is often said that we cannot wait for the results of large trials, and action must be taken ‘now.’ However, the introduction of forms of care that are not supported by evidence of their effectiveness is more detrimental to healthcare, as it is almost impossible to abandon an ineffective and generally costly treatment, once it has been implemented (Table 2). Large, collaborative, simple trials can be completed in short period of time in developing countries, as has been demonstrated recently for major health conditions (Table 5). The WHO evaluation of misoprostol for the prevention of severe postpartum hemorrhage recruited 18 500 women in less than 2.5 years [17].

Another argument against large RCTs is that they are too costly for developing countries and that a simpler, ‘quick and dirty research’ is more appropriate. In contrast, large resources are used in developing countries in the implementation of ineffective and sometimes harmful forms of care, while large trials conducted in developing coun-

Table 5
Interventions evaluated during 2000 by international collaborative efforts

	Centers/ countries	Women	Status
Antenatal care	5	24 678	Publication [5]
Postpartum hemorrhage	9	18 000	Publication [7]
Cesarean section reduction	5	149 206	For publication
Treatment of pre-eclampsia	31	10 000	Ongoing
Reproductive health library	2	80 000	Ongoing
Prevention of pre-eclampsia	6	8 500	Ongoing

tries are of low cost by any developed country standard. Conducting large-scale, cutting-edge health service research in developing countries, (Table 5) particularly the trials evaluating non-drug forms of care, [18] and the development of appropriate research methodology in parallel, is a formidable but achievable challenge [19].

Furthermore, it is usually argued that for many health services practices, trials are not needed because ‘common sense’ indicates that they are ‘logically’ effective and harmless. A relevant example of such misconception is the case of bed rest during pregnancy for prevention of adverse outcomes such as preterm birth, impaired fetal growth and preeclampsia. A review of 15 trials investigating bed rest as a primary treatment for different medical conditions did not find an improvement in any outcome, and additionally in nine trials there was evidence of significant worsening of some conditions such as preeclampsia [20]. There is also the misconception that RCTs are inappropriate for evaluating social interventions. Such study design was popular among social scientists during the 1980s, but became less popular as policy makers reacted negatively to the evidence of ‘near zero’ effects from several trials [21].

5. Conclusion

We have presented examples to support the concept there are systematic gaps between evidence of effectiveness, patients’ preferences, research priorities and what is actually practiced. Changing or updating clinical practice is not a new challenge. W. Osler in 1906 recognized the risks of not updating our practices by saying ‘from our teachers and associates, from our reading, from the social atmosphere about us, we catch the beliefs of the day and they become ingrained-part of our nature’ [22]. Efforts should concentrate at earlier stages of the clinical training to prepare the practitioners to a continuous process of learning of how to break the ‘force of habit.’ Researchers are usually not effective in the dissemination of their findings to practitioners. We are content with publishing in a scientific,

peer-reviewed journal, which is not aimed at dissemination for changing practice, but rather to allow the scientific community to scrutinize the work and challenge or accept the results. This is a central point and should never be neglected. Therefore, further planned strategies are necessary for dissemination of research results at service level and to promote their implementation.

There is a big gap between research funding and magnitude of disease burden in maternal healthcare in developing countries. Most pregnancy-specific conditions have poorly understood etiology, pathogenesis and consequently, there are no readily available specific prevention, the backbone of public health. A significant change in research funding to improve our understanding of the etiology and pathogenesis of these disorders and to evaluate promising preventive strategies is urgently needed.

Finally, it could be argued that all of these considerations do not apply to the large section of the pregnant population who do not have access to services. We think that these underserved populations comprise two groups: those who make an initial contact, but because of the poor quality of the services do not come back; and those who genuinely have no access to services. We believe that the first step in the humanization of maternal healthcare is to make services ‘effective’ and accessible to all women.

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