Increasing compliance with maternal and child care quality standards in Ecuador

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Abstract

Objective. To determine the effects of hospital quality assurance interventions on compliance with clinical standards, availability of essential drugs, client satisfaction, and utilization.

Design. Quasi-experimental, prospective study with four intervention hospitals and four control hospitals. All eight facilities were purposively selected and of comparable complexity.

Setting. Ministry of Health secondary care facilities in Ecuador.

Interventions. Facility-based quality improvement teams, job clarification, standards communication, refresher training, strengthening hospital pharmacy committees, monthly monitoring of compliance indicators, and formation of users’ committees.

Measures. Compliance with input and process standards, utilization of services, and patient satisfaction were measured monthly in both groups through review of clinical and administrative records, exit interviews, and patient satisfaction surveys.

Results. After 12 months, the quality assurance interventions produced rapid increases in compliance with clinical standards in the intervention hospitals as compared with the control group. These improvements appeared as early as 2 months after the onset of the interventions. No differences were found between intervention and control groups in terms of trends in utilization patterns or client satisfaction.

Conclusion. Quality assurance interventions made a difference in technical quality of care. Patient satisfaction and utilization do not appear to be directly associated with short-term improvements in compliance with clinical standards. Quality improvement interventions may require longer periods and a specific aim at clients’ needs to demonstrate effects on utilization and satisfaction outcome variables.

Keywords: compliance, Integrated Management of Child Illness, maternal care, quality improvement, standards

In late 2000, the Ministry of Health of Ecuador (MOH) introduced a new program to improve maternal and child health care, called ‘Healthy Maternity’. An important feature of this program was to change the mechanism by which hospitals would be funded. Under the new program, instead of traditional annual budgets, the MOH would pay facilities based on the number of services provided monthly, such as prenatal consultations, normal deliveries, caesarean sections, family planning, and consultations for children under 5 years of age. The MOH aimed to increase utilization of targeted services by introducing a financial incentive to provision of services. However, there was some doubt that the introduction of a financial incentive would stimulate utilization to desired levels. A financial incentive to increase provision of services would not necessarily act upon the demand for services. It was the level of quality of those services as perceived by the clients that was seen as a crucial variable in increasing demand.

The Quality Assurance Project (QAP) conducted an operations research study to test the effects of implementing a quality assurance (QA) program in this environment, to determine whether QA teams and interventions would increase compliance with standards, client satisfaction, and service utilization. Quality was measured by the presence of basic inputs (drugs, supplies), compliance with clinical process standards, and outputs/outcomes such as patient satisfaction and utilization of services. This report describes the implementation and results of the QA model over 1 year.

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Methods

Study design

The study used a prospective quasi-experimental design, with four intervention hospitals and a control group of four similar hospitals, all purposively selected. All eight were small county hospitals with around 20–30 beds each, located in highlands provinces, and were selected by the MOH based on their moderate size and location (~200 km from the capital). In each of these provinces, two county hospitals were selected for the study. A MOH/QAP team prepared a list of potential pairs of hospitals in each province, matching them by variables such as number of beds, number of staff, annual number of deliveries, and number of outpatient consultations. If a hospital were considered to have any important special feature, it was not included. Once pairs of hospitals were chosen in each province, intervention or control status was randomly assigned.

During 12 consecutive months, indicators for compliance with clinical standards, patient satisfaction, and services utilization were compared between the intervention hospitals where the quality improvement program was implemented and control hospitals with no quality program. Except for July 2001, when hospital personnel were engaged in strikes, the indicators were measured monthly in each hospital through review of clinical and administrative records, exit interviews, and patient satisfaction surveys.

QA interventions

QA activities at intervention hospitals were organized following the quality triangle proposed by QAP (see Silimperi et al. [1]). QA activities are depicted as three points on a triangle: defining quality, measuring quality, and improving quality.

Defining quality of care

Setting standards. A technical expert group from the MOH and QAP developed quality standards for inputs, processes, and outcomes of care for mothers and children under 5 years of age, based on the national norms of the MOH. Seven standards were developed for maternal care and four for the Integrated Management of Childhood Illness (IMCI) program, an adaptation for the Ecuadorian health care system of the integrated approach to child health developed by the World Health Organization, focusing on the well-being of the whole child. The main criteria for defining standards were concordance with MOH national norms, group consensus on the importance of the standard as a determinant of quality, and feasibility of collecting data to measure compliance from regular information sources, such as clinical records. Table 1 shows the list of standards developed.

Communicating standards. Standards were communicated to personnel in the intervention hospitals through sessions where a project facilitator presented the standards and conducted a discussion on each one. The objective was to achieve understanding of the standards and agreement on the importance of complying with them.

Measuring quality of care

Establishing indicators. Indicators were developed to measure compliance with the standards. The indicators were each expressed as a percentage, having in the numerator the number of times the provider complied with the standard, and in the denominator the total number of clinical sessions or opportunities to comply with the standard.

Monitoring indicators. Quality improvement teams were formed in each intervention hospital. These teams measured the indicators in each hospital on a monthly basis. One person from the MOH Provincial Directorate in which the hospital was located was trained to coach quality teams in data collection and analysis. A QAP supervisor regularly verified the quality of the data and re-measured approximately 10–15% of the clinical records. The QAP team, together with the provincial facilitator, obtained the measurements for control hospitals. Data sources included clinical records for most process standards, hospital registers for production of services, client interviews for patient satisfaction, exit interviews with mothers, and checklists for availability of drugs, supplies, and equipment.

In order to assess client satisfaction, exit interviews were administered each month to mothers after consultation. An interviewer who was not a member of the hospital staff administered the survey in a location as far away as possible from the physical hospital wards. On the day of the week with the highest demand for services (usually the market day), the interviewer administered the survey to the first 25 women who had a maternal care or sick child consultation.

Monthly meetings were held with hospital teams to permit identification and discussion of potential difficulties in data collection and handling. Data were cleaned monthly and entered into an Excel spreadsheet. Aggregate measures and graphs for each indicator were produced for each hospital.

Improving quality of care

QAP uses a spectrum of quality improvement approaches whose complexity and implementation time varies according to the problem to be addressed [3]. In this study, we mainly used a rapid team problem solving approach, while simultaneously teaching and encouraging the use of individual problem solving whenever possible. At each intervention hospital, the quality improvement team received training in the use of QA tools for problem identification, cause analysis, development of interventions, and monitoring. A study facilitator met monthly with each team to analyse the performance of the indicators, detect and analyse gaps, and identify and plan interventions.

There were two areas the QA teams needed to address through interventions: one was the technical quality of clinical processes, and the other was patient satisfaction. Through monitoring of indicators and cause/effect analysis, it was evident that flaws in quality in these two areas responded to...
### Table 1 | Quality standards for maternal and child care

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| Maternal care, inputs | 1. Essential equipment, as per a standardized list, must be present in the delivery room  
2. A standardized list of essential drugs must be present in the delivery room  
Oxytocin; Ringer’s Lactate or Saline IV solution; Magnesium Sulfate or IV Diazepam; Hydralazine, Alphamethyldopa or Nifedipine; Phenobarbital or Diphenylhydantoin  
Child care, inputs | 3. The hospital pharmacy must have in stock the standardized list of essential IMCI drugs, every day  
Acetaminophen, Cotrimoxazole or Amoxicillin, Mebendazole or Albendazole, Ampicillin and oral rehydration salts  
Maternal care, processes | 4. A standardized perinatal clinical record (PCR) must be filled in for every antenatal control consultation  
The standardized PCR was developed by the Latin American Center for Perinatal Health and adopted by most Ministries of Health in Latin America. Completing a PCR is considered paramount to the quality of maternal care [2].  
Clinical history taken; weight measured; height measured; blood pressure measured; nutritional status assessed; breast exam done; gestational age assessed (weeks of pregnancy); uterine height measured; foetal heart rate measured; foetal movements assessed; laboratory tests ordered (blood type, Rh factor, syphilis, glucose, haemoglobin, basic urine); tetanus vaccine administered  
5. The provider must complete a list of 12 standardized activities in every antenatal control consultation  
6. For every woman in labour, the provider must check foetal heart rate, blood pressure and uterine activity every hour  
7. For every delivery, a partograph must be adequately completed  
Partograph is an instrument widely used in Latin America for monitoring labour, early detection of complications and support in decision making [6]. It is a graphic instrument completed by the birth attendant. It gives a visual display of foetal condition, labour progress, and maternal condition, and can immediately alert the attendant to abnormal developments. The partograph acts as an early warning system for the detection of insufficient uterine action and cephalo-pelvic disproportion. It has contributed to reduction of prolonged labour and its consequences through earlier referral [7,8].  
Child care, processes | 8. The provider will follow the IMCI algorithm for assessing the status of a sick child in every outpatient consultation  
9. All children with a diagnosis of pneumonia will be treated with Amoxicillin or Cotrimoxazole, in accordance with IMCI norms  
Child care, outputs | 10. Every mother of a sick child will be able, after consultation, to name three out of eight general danger signs, in accordance with IMCI norms  
(Child cannot drink, looks very weak, cannot breast feed, has difficulty breathing, breathing is agitated or noisy, has diarrhoea with blood, looks ‘dry’ or dehydrated, has high fever)  
Maternal care, outputs | 11. Patients who leave outpatient care facilities should be satisfied with the maternal care received  
A composite rating for patient satisfaction was developed, based on a survey questionnaire that explored the following quality dimensions: satisfaction with access (hours of operation of the facility); satisfaction with waiting times; satisfaction with cleanliness of bathrooms, spaces, and wards; general comfort; satisfaction with the interpersonal interaction with the provider (physician, nurse, midwife, other); information received; satisfaction with perceived technical competence of the provider; satisfaction with pharmacy services.  
IMCI, Integrated Management of Childhood Illness Program.
different causes and therefore required different types of interventions. Although the quality improvement teams committed themselves to implementing interventions in both of these areas, in practice most of the efforts went into interventions oriented to the clinical quality. The resulting efforts to improve patient satisfaction were much weaker, mainly because most of the capacity of these small teams was consumed by the effort of improving and maintaining clinical quality.

The main QA interventions thus implemented may be summarized as follows:

1. Hospital leadership was strengthened through sessions with hospital directors, administrators and chief nurses. Data related to quality of care were reviewed with them, and activities of quality improvement teams were discussed. The study facilitator also met regularly with officials of the corresponding MOH Provincial Directorate to ensure their support for the hospital leadership team.

2. Users’ committees were formed at intervention hospitals. These committees met, although not regularly, to analyze hospital difficulties and to put support activities into practice.

3. Some hospitals were lacking key personnel, such as resident physicians, obstetricians, or paediatricians. Interventions were implemented to gather political support from the Provincial Directorate and central MOH to obtain budget allocations for these posts to be filled.

4. Clarification of job descriptions was also an important intervention. In some areas (e.g. labour monitoring), there was uncertainty as to who should do what. It was not clear if the resident physician or the professional midwife should monitor labour or write down data on the clinical record. Clarifying this type of problem in the quality improvement team meetings was critical to ensuring compliance with standards.

5. On-the-job refresher training was offered to hospital staff on topics identified by the quality improvement team. The most frequent topics were maternal care and IMCI.

6. Monthly discussion of compliance with standards and posting of results may itself be considered an intervention. The monthly discussion of results was actually a type of ‘collective self-supervision’, where trends in compliance were examined and causes for problems and potential interventions discussed, thereby creating an atmosphere of heightened awareness among staff that contributed to improvements. Posters with run chart graphs depicting monthly compliance with standards were placed on hospital billboards, where staff and clients could see them.

7. Drugs and supplies: the MOH mandates that each hospital establish a pharmacy committee. Many hospitals have never formed this committee. While some hospitals have committees, they never meet or contribute little. Pharmacy committees at intervention hospitals were strengthened. These committees developed methods to monitor inventories and distribution of basic drugs and supplies, many of which were in the warehouse but were not distributed.

**Results**

**Input standards**

1. Essential equipment, as per a standardized list, must be present in the delivery room. Intervention hospitals started at a high level of compliance of 86%, and immediately after the interventions reached full compliance of 100% for the rest of the period. Control hospitals started at 58% and ended at 83%. The mean percent compliance for intervention hospitals was 97.6%, and for controls it was 74.6% (P < 0.0001). An analysis of run charts showed that the run of compliance over the 14 points for the intervention hospitals was also significant compared with that of the control hospitals. However, it is important that the analysis of the run chart of compliance for the control hospitals showed a significant month-to-month increase from 66% to 81% from June to August 2001. We do not know the reasons for this increase. We also do not know why the intervention hospitals started at a higher baseline level.

2. A standardized list of essential drugs must be present in the delivery room. Intervention hospitals started at a level of compliance of 55%, and 3 months later the interventions reached 95%. They stayed at those high levels for the following 10 months. Control hospitals started at 30% and increased to 70% 6 months after the interventions. They ended at 75%. The average percent compliance for intervention hospitals was 87.1%, and for controls it was 53.6% (P < 0.0001). The analysis of run charts again shows that the run for the intervention hospitals was significantly higher than the controls. Again, the controls show a significant increase from June to August 2001 for unknown reasons, and the intervention hospitals start at a higher baseline for reasons that are also unknown.

3. The hospital pharmacy must have in stock the standardized list of essential IMCI drugs every day. Availability of IMCI drugs was initially high in intervention hospitals (75%); nevertheless, this group rapidly improved compliance with this standard to 100%. The control group started at 23% compliance and continued at a low level until the fifth month, when compliance increased to 53%. It then dropped, however, only to recover later, finishing at 100%. The analysis of run charts showed that the intervention run was significantly higher than the control group. The control group showed a significant increase from August 2001 through March 2002, again for unknown reasons. The average percent compliance for intervention hospitals was 94.8%, and for controls it was 50.6% (P < 0.0001).
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Figure 1 Proportion of prenatal consultations in which 12 standardized tasks were completed by the provider.

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4. A standardized perinatal clinical record (PCR) must be completed for every antenatal consultation. Prior to the QA interventions, the PCR was completed in <20% of prenatal consultations. While control hospitals continued at those low levels, the intervention group achieved compliance in 70% of the consultations 3 months after the interventions and ended at 84%. The control hospitals, starting at 18%, showed modest increases after 8–9 months and ended at 32%. The average percent compliance for intervention hospitals was 62.7%, and for controls it was 22.6% ($P < 0.0001$). The analysis of run charts showed that the run for the intervention hospitals was significantly higher than the control hospitals. Moreover, there was a significant monthly increase in the first intervention month from February to March 2001.

5. The provider must perform at least 12 standardized activities for every antenatal control. There has been considerable debate on the effectiveness of antenatal care in the reduction of maternal mortality and morbidity [2]. However, it is widely accepted that quality antenatal care improves perinatal health, especially if it is linked to quality care during delivery [3]. The ‘Mother-Baby Package’ promoted by the Safe Motherhood Program of the World Health Organization lists at least four antenatal care sessions, of at least 20 minutes duration, among the recommended basic maternal care services [4]. In this study, compliance with this standard at intervention hospitals at start was zero, while control hospitals began at 7%. In order for a session to be considered compliant with the standard, all 12 tasks had to be completed. As seen in Figure 1, immediately after interventions hospitals began to show improvements, ending at a level of 84%. Control hospitals only began to show modest increments after 8 months and ended at 38%. The average percent compliance for intervention hospitals was 54.6%, while for controls it was 14.5% ($P < 0.0001$). The analysis of run charts shows that the intervention run was significantly higher than the control run. There was a large increase in the intervention group in the first 2 months of the intervention. Again, there was a significant month-to-month increase in the control hospitals from September to October 2001 for unknown reasons.

6. For every woman in labour, the provider must check the foetal heart rate, maternal blood pressure, and uterine activity every hour. Most maternal deaths occur during or after delivery. Hence, routine checking of vital signs and uterine status may detect potentially life-threatening complications in a timely way and is an important standard of quality of care. Three standard tasks were considered essential for monitoring labour: blood pressure being taken, count of the foetal heart rate, and assessment
Figure 2 shows how intervention hospitals, which began at 8% compliance, rose rapidly to 56% and ended at 82%. Control hospitals started at a better level of 23% but did not show improvement, ending after 12 months at 17%. The average percent compliance for intervention hospitals was 50.4% and for controls it was 17.6% \((P<0.0001)\). Run chart analysis showed that the intervention hospital run was significantly higher than the control run, with the biggest increase in the first 3 months of the intervention.

![Figure 2](image-url)
9. All children with a diagnosis of pneumonia will be treated with Amoxicillin or Cotrimoxazole, in accordance with IMCI norms. Both intervention and control hospitals started with acceptable levels of compliance: 85% for the intervention group and 65% for the controls. Both hospital groups increased their compliance: intervention hospitals ended at 100%, while controls ended at 75%. The average percent compliances for intervention hospitals and controls were 83.7% and 82.2%, respectively ($P = 0.653$). The analysis of run charts also show that there was no significant difference between the intervention and control group for this indicator. The intervention group showed a steady increase in the first 6 months of the intervention.

### Output standards

10. Every mother of a sick child will be able, after consultation, to name three out of eight general danger signs. The MOH has established in its IMCI norms that clinical providers must counsel the mothers on several aspects of home management of a sick child, including how to recognize danger signs [9]. One immediate expected outcome is that the mother should be able to describe danger signs that would alert her to the potential development of pneumonia or another severe disease in her child. If a mother, after a hospital consultation with a sick child, could name three of eight danger signs without prompting, the standard was considered satisfied. Intervention hospitals started at 33% and increased to 97% after 12 months, while control hospitals, starting at a similar 31%, increased at a slower rate but ended at 98% compliance. The average percent compliance for intervention hospitals was 76.7% and for controls it was 71.2% (no significant difference). The analysis of run charts also showed no significant difference.

11. Client satisfaction: patients who leave outpatient care facilities should be satisfied with the maternal care received. The study found similar levels of satisfaction among patients at intervention and control hospitals (Figure 5). Both groups started at levels around 70% and ended at 82–84%. This lack of difference contrasts sharply with the previously shown differences in compliance with clinical standards. The survey items that obtained lower satisfaction rates and that are subject to improvement are waiting times, cleanliness, general comfort, and pharmacy services. Other areas, such as interpersonal interaction or perceived technical competence, were not rated particularly low by patients.
Utilization

This variable was assessed through three indicators: (1) monthly number of outpatient antenatal consultations; (2) monthly number of outpatient consultations for sick children less than 1 year of age; and (3) monthly number of in-patient hospital deliveries. Antenatal consultations increased by 18.5% in intervention hospitals (from 590 to 699 consultations) and 11.2% in control hospitals (from 481 to 535). Outpatient consultations for sick children present a similar pattern for both groups: intervention hospitals started at 274 consultations and ended at 332 (21.2% increase), while control hospitals started at 151 and ended at 203 (34.4% increase). There was no evidence of increase for either group in terms of utilization of the hospital by mothers for delivering their babies.

Discussion and Conclusions

Effect of the QA interventions on compliance with clinical standards

The initial markedly low level of compliance with clinical standards in both hospital groups is striking, although earlier studies have documented this as a widespread problem in health systems in developing countries [10]. There is clear evidence of a positive effect of the QA interventions which, for most indicators, produced rapid increases in compliance with clinical standards in the intervention hospitals compared with the controls. These improvements appeared as early as 2 months after the onset of the interventions.

The final level of compliance attained was higher for input standards than for process standards: while compliance with input standards reached nearly 100% in intervention hospitals, most process standards increased to a level of around 80%. Also, input standards reached high levels of compliance faster than process standards. The quality improvement teams found, in general, that input standards were easier to improve than process standards. Input standards reflect the presence of an input, while process standards require changes in provider behaviour, which in this experience appears to be relatively more difficult to achieve. For a number of the input standards, the intervention hospitals started at a higher baseline for unknown reasons.

For input standards, intervention and control hospitals increased compliance in similar magnitudes and to similarly high levels. This may suggest that, for this type of standards, the monitoring of the indicator itself could have been an
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For process standards, however, the data show a different picture. While intervention hospitals showed important increases in compliance starting 1–2 months after the interventions, control hospitals improved very little or not at all. Large improvements in compliance with most process standards at intervention hospitals occurred incrementally during the first 4–5 months, but then further increases proved hard to attain.

Compliance with maternal process standards appeared to be easier to improve than compliance with standards for IMCI, in particular compliance with the IMCI algorithm, which did not surpass 50%. Treatment of pneumonia had better initial rates of compliance in both groups. The effects of the QA interventions were positive in the intervention group, both in the use of the appropriate antibiotic in children with pneumonia, as well as in not using an antibiotic in children with non-pneumonia respiratory infections.

One important aspect to highlight is that the QA interventions did not include providing funds to the hospitals to implement improvements. With the exception of the study field coordinator who provided periodic technical assistance visits, and one person from the provincial MOH office who had been previously trained in QA methods, all of the remaining interventions were carried out by the hospital quality improvement teams and the users’ committees. Resources mobilized were those of the hospital and/or the community.

**Effect of the QA program on patient satisfaction**

Although it was initially planned that the quality improvement teams would address both clinical technical quality and quality as perceived by clients, this in fact proved difficult to achieve. The team in each of these small hospitals did not have enough time or strength to address both areas simultaneously and therefore concentrated their efforts mostly on improving compliance with clinical standards.

The teams did implement some interventions aimed at increasing patient satisfaction, but these were rather weak and lacked continuity. For example, changes in daily schedules for personnel were implemented in order to reduce patient waiting times; however, staff later tended to go back to their original arrangements, weakening the effect being sought. At the end of the study period, some of the teams decided they would split and have two groups, each one addressing one area, but this was something they could not have done at the beginning of the experience.
It is difficult to know if the increased technical quality had any effect on clients’ satisfaction, since the exit survey asked about clients’ perception of other areas rather than clinical care, such as waiting times, interpersonal relations, comfort, cleanliness, and pharmacy services. While the areas clients felt most dissatisfaction about were waiting times, cleanliness, and difficulties with the paperwork, these aspects were not strongly addressed by the interventions and achieved only modest gains in satisfaction. The lack of relevance of the quality improvement interventions to patient concerns may explain the lack of difference in the levels of satisfaction achieved in the control and intervention hospitals.

**Effect of the QA program on utilization**

Utilization of services, as measured through the indicators of this study, seems not to be clearly associated with improvements in compliance with clinical standards. It will be most interesting in follow-up studies to determine if and to what extent increases in patient satisfaction are associated with corresponding increases in the utilization of services.

These issues are important to explore as they relate directly to the goals and objectives of many international development organizations, which propose that better population health status will be achieved if higher appropriate utilization of high quality services can be attained.

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