Evaluation of midwifery care: results from a survey in rural Guatemala

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Abstract

In an effort to reduce infant and maternal morbidity and mortality in developing countries, the World Health Organization has promoted the training of traditional birth attendants (midwives) and their incorporation into the formal health care system. In this paper, we examine several aspects of the integration of traditional and biomedical maternity care that are likely to reflect the quality of care received by Guatemalan women. Specifically, we examine the extent to which women combine traditional and biomedical pregnancy care, the frequency with which midwives refer women to biomedical providers, the content and quality of care offered by midwives, and the effects of midwife training programs on referral practices and quality of care. The analysis is based on data from the 1995 Guatemalan Survey of Family Health. The results offer a mixed assessment of the efficacy of midwife training programs. For example, although trained midwives are much more likely than other midwives to refer their clients to biomedical providers, most pregnant women do not see a biomedical provider, and the quality of midwife care, as defined and measured in this study, is similar between trained and untrained midwives. © 2002 Elsevier Science Ltd. All rights reserved.

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Introduction

Of the nearly 600,000 women who die each year due to pregnancy-related causes, over 99 percent live in developing countries (WHO & UNICEF, 1996). An additional 50 million women in developing countries experience a pregnancy-related complication each year (NRC, 1997). These numbers reflect huge disparities in maternal morbidity and mortality between developing and industrialized countries, with rates in the former countries reaching values 100 times as large as those in the latter (Walsh, Feifer, Measham, & Gertler, 1993).

About half of births in the developing world are attended by a person with no professional training (WHO, 1997). Moreover, midwives or traditional birth attendants[1] (TBAs) are frequently the primary or sole providers of maternal health care (Levitt & Minden, 1995). Obstetrical care is neither affordable nor accessible to the vast majority of women in these countries. Thus, it is not surprising that governments and international agencies attempting to reduce international disparities in maternal mortality and morbidity have focused many of their efforts on TBAs.

In the early 1970s, the World Health Organization began to promote the training and incorporation of TBAs into formal health care systems to serve as extensions of government-sponsored maternal and child health services (Alma-Ata, 1978; Du Gas, Mangay-Maglacas, Pizurki, & Simon, 1979; Leedam, 1985).

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[1] The label "traditional birth attendant" (TBA) has been criticized as being ethnocentric and medicocentric and imposed by outsiders in a way that devalues local forms of knowledge (Cosminsky, 2001; Pigg, 1995). Although we occasionally use the term TBA, we prefer the term midwife, which is the direct translation of the Guatemalan title "comadrona".

More recently, the Safe Motherhood Initiative was developed in response to the persistence of high rates of maternal mortality and morbidity in the developing world and the concentration of biomedical health services in major urban areas. The underlying premise of this initiative has been that most infant and maternal deaths and disabilities are preventable through high quality care, detection and efficient referral for complications, and effective access to the essential elements of obstetric care if needed (Mahler, 1987; Safe Motherhood IAG, 2000). Although nearly 30 years have passed since the WHO first recommended the incorporation of midwives into the maternal health care system, our knowledge of the extent to which the quality and accessibility of services in poor countries have improved is extremely limited in many developing countries.

In this paper, we examine the content of pregnancy-related care in Guatemala, one of the poorest countries in Latin America and one characterized by some of the highest maternal and infant mortality rates in the region. The most recent estimates indicate a maternal mortality rate of 190 per 100,000 live births and an infant mortality rate of 43 per 1000 (World Bank, 1999). The government of Guatemala has had formal association with midwives for decades, having introduced licensing arrangements for midwives as early as 1935 and having initiated training programs in 1955, although little action was taken for several decades. In the 1980s, the Guatemalan Ministry of Health adopted WHO recommendations toward the formal recognition of midwives and their incorporation into the national health care system (Acevedo & Hurtado, 1997; Du Gas et al., 1979; Leedam, 1985), and, by the late 1980s, about 70 percent of the approximately 20,000 midwives in Guatemala had received training (Putney & Smith, 1989). On the other hand, there is widespread criticism of these training programs, and utilization of biomedical services for pregnancy care remains low relative to other Latin American countries (INE, MSPAS, USAID, UNICEF, & DHS, 1996; WHO, 2001).

Apart from several small-scale evaluation studies,[2] there is little information on the efficacy of the midwife training program. Studies in other parts of the developing world have provided mixed results regarding the success of such training programs (Piper, 1997). Whereas some studies find that training has an impact on knowledge, practices, or referrals (Akpala, 1994; Islam & Malik, 2001; Kumar, Thakur, & Aggarwal, 2000), others find little or no effect (Lynch & Derveeuw,

1994; Smith et al., 2000). Moreover, even when training appears to influence practices, researchers seldom are able to identify a positive effect on maternal outcomes (Goodburn, Chowdhury, Gazi, Marshall, & Graham, 2000; Smith et al., 2000).

More generally, there is a dearth of research on the quality of the pregnancy-related care that midwives (or other providers) offer in Guatemala. This limitation reflects a general lack of knowledge about the quality of prenatal care in both the developing and the industrialized world. Most studies of the adequacy of prenatal care are based on measures of the timing and frequency of visits to providers, not on the content of services, although there is no evidence that the amount of care is a major determinant of birth outcomes (Petitti, Hiatt, Chin, & Croughan-Minihane, 1991; Stringer, 1998). The scarcity of research in this area probably results in large part from the absence of uniform criteria with which to assess such care. Guidelines regarding care and practices during pregnancy are often not consistent across countries, even among more developed countries, and frequently reflect "expert opinion" or published standards rather than scientific evidence (Enkin, Keirse, Renfrew, & Neilson, 1995; Haertsch, Campbell, & Sanson-Fisher, 1999; Rooks, 1999). The few studies that have examined content of care are limited not only by the lack of standard evaluation criteria, but also by the inappropriateness of most of these criteria for developing countries where the majority of births occur at home, attended by a midwife with little biomedical training.

The objective of the present analysis is to use a large-scale sample survey—the 1995 *Encuesta Guatemalteca de Salud Familiar* (EGSF), or the Guatemalan Survey of Family Health—to examine four aspects of the integration of traditional and biomedical maternity care that are likely to reflect the quality of care received by Guatemalan women. This study complements an earlier study that used qualitative interviews collected as part of the same project to look at the relationship between traditional and biomedical maternity care (Acevedo & Hurtado, 1997). First, we examine the extent to which women combine traditional and biomedical care during pregnancy and the postpartum period. Second, we estimate the frequency with which midwives refer pregnant women to other types of providers and investigate whether a midwife's training status and other characteristics of the midwife and the community are associated with these referral practices. Third, we analyze the content of pregnancy-related care offered by midwives, with a focus on practices considered either beneficial or harmful according to current scientific evidence. Wherever possible, we compare these estimates with those obtained from ethnographic or small-scale studies in order to infer plausible changes over time in midwifery practice. In the fourth and final part of the

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[2] For example, the Mothercare project implemented a training program for midwives in four departments in the Western Highlands, and subsequently evaluated its effect on such outcomes as the frequency of midwife referrals and midwives' ability to recognize signs of complications (Hurtado & Saenz de Tejada, 2001; O'Rourke, 1995).

analysis, we evaluate the effect of training programs on the quality of midwifery care.

In the next section of the paper, we briefly describe the social context, the nature of the health care system, and the content of midwife training programs in Guatemala. Subsequently, we discuss the detailed objectives of the analysis. Next, we describe the data collected as part of the EGSF, explore the availability of different providers who offer care during pregnancy and the characteristics of midwives, and discuss our analytical procedures. In the final two sections, we present the results and consider the implications of our findings.

Background

Social context in Guatemala

Guatemala is one of the poorest countries in Latin America and one of the most stratified in the world, with the vast majority of the population living below the poverty line. A small elite controls much of the land and the economy and retains political power. A majority of the rural population does not have adequate access to such public services as water, sanitation, and electricity (Steele, 1994).

The population is divided into two ethnic groups of roughly equal size: the indigenous population, who are descendants of Mayan and other pre-conquest groups and may speak only a Mayan language, and ladinos, who are of both indigenous and European origins, speak Spanish, and view themselves as part of the mainstream Guatemalan culture. Ethnicity is closely tied to social class: the indigenous population is, with few exceptions, poor, while ladinos are members of all social classes.

Guatemalan health care system

Health care practices in Guatemala have frequently been characterized as *pluralistic*, because of the coexistence and concurrent use of traditional, biomedical and popular practitioners (Cosminsky & Scrimshaw, 1980; Pebley, Goldman, & Rodríguez, 1996). In recent years, the distinction among these types of providers has become increasingly blurred as traditional practitioners have adopted biomedical practices and Western pharmaceuticals (van der Geest & Whyte, 1988).

Pregnancy-related care in Guatemala is most commonly provided by midwives, who are typically highly respected within their communities. Since pre-Hispanic times, midwives have offered care during pregnancy, delivery and the postpartum period (Hurtado & Saenz de Tejada, 2001). Nevertheless, pregnant women have been increasingly seeking biomedical care—often while continuing to visit the midwife. The most common sources of biomedical pregnancy care are government-supported health centers or posts,[3] which provide care for free or at a nominal cost, and private doctors. The government insurance program (*Instituto Guatemalteco Seguro Social* or IGSS) also operates clinics, but these services are accessible only to those with formal employment and cover only about 15 percent of the population (Martinez & Jones, 2000). Delivery services are available for free at government-run hospitals, whereas private hospitals tend to be very expensive.

There are many more midwives (210 per 100,000 population) than doctors (17 per 100,000) in Guatemala (Hurtado & Saenz de Tejada, 2001), and biomedical health services, especially doctors and hospitals, tend to be concentrated in urban areas. Government investment in health amounts to only about 1.5 percent of GNP (Martinez & Jones, 2000). The coverage of biomedical health services reaches less than 60 percent of the population (PAHO, 1998) and Guatemala has the institutional capacity to provide formal medical services for only 20 percent of birthing women (Schieber & Delgado, 1993). Moreover, government facilities, particularly health centers and posts, often lack critical equipment and medical supplies (INCAP et al., 1997).

Interactions between traditional and biomedical providers are often tense, in part due to social, ethnic, and cultural differences between providers (Hurtado & Saenz de Tejada, 2001). In general, the relationship is an asymmetric one with biomedical providers occupying a privileged position within the formal health care system.

Midwife training programs

Training programs for midwives in Guatemala began in 1955 and have been modified several times since that date. Midwives who have not received formal training are legally prohibited from practicing (Cosminsky, 2001; Greenberg, 1982), although untrained midwives continue to do so (Hurtado & Saenz de Tejada, 2001). Training programs for midwives have been conducted by the Ministry of Health, as well as by non-governmental and international agencies. Unfortunately, there has been little interagency cooperation in the development and implementation of these training initiatives (Putney & Smith, 1989). Moreover, little has been published about the content of programs outside of the Ministry of Health.

The current training program carried out by the Ministry of Health lasts 15 days (8 h per day) and is taught by a nurse with at least one year of nursing education. Although professional nurses are officially

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[3] Health centers located in municipal capitals are typically directed by a doctor, and sometimes have in-patient facilities. In contrast, health posts located in small communities are usually managed by an auxiliary nurse, rural health technician or medical student, and offer fairly limited services.

responsible for training, most training has actually been conducted by auxiliary nurses who have little experience in delivery (Hurtado & Saenz de Tejada, 2001). Training programs are designed to teach midwives about general hygiene and preventive care, to encourage midwives to send all pregnant women to the health center or post for tetanus vaccination, prenatal examinations, and post-partum follow-up, and to instruct midwives to recognize and refer high-risk women and those with complications to a doctor or hospital (Cosminsky, 1977; Putney & Smith, 1989). As part of these efforts, training programs frequently condemn traditional practices (such as use of the sweatbath, massage, and herbal remedies) and may encourage the adoption of biomedical ones in their place (Cosminsky, 1982; Greenberg, 1982; Putney & Smith, 1989). Additional training may be available for midwives who have already received the basic course in the form of monthly meetings at the health center and a 3-day retraining course subject to available funding (Lang & Elkin, 1997).

Many criticisms have been targeted at the midwife training programs (Cosminsky, 1982; Greenberg, 1982; Putney & Smith, 1989; Lang & Elkin, 1997). The programs have been considered didactic, tedious, unnecessarily complicated, and inappropriate for older, frequently illiterate, rural women. In addition, the nurses teaching the material are often considered inadequately trained themselves, are typically unable to speak indigenous languages, and are frequently condescending to the midwives. Observers of these programs also lament the training programs' reliance on Western, urban models of training that (1) use culturally inappropriate teaching methods; (2) advocate the use of procedures that are impractical in the midwives' environment, particularly for home deliveries (e.g., sterilization of scissors via boiling); and (3) discourage, or sometimes condemn, traditional practices that are unlikely to have negative effects and may well have beneficial ones (e.g., delivery in an upright rather than supine position and cauterization of the umbilical cord in lieu of sterilization). The effectiveness of the retraining sessions has also been brought into question (Putney & Smith, 1989).

The practices used by midwives may be changing not only as a consequence of the training process, but also more generally as a result of the increasing biomedicalization of health care in Guatemala. The widespread prevalence and accessibility of Western pharmaceuticals has led to their frequent use among traditional practitioners in Guatemala (Heuveline & Goldman, 2000), sometimes with serious consequences. Some analysts fear that the poor quality of the training programs, combined with the proliferation of Western pharmaceuticals among traditional providers and the replacement of potentially beneficial traditional practices with less favorable ones, may result in worse—rather than improved—reproductive outcomes for Guatemalan children and women (Putney & Smith, 1989).

Data and methods

The 1995 Guatemalan Survey of Family Health (EGSF)

The EGSF was designed to collect information on maternal and child health. In 1995, structured interviews were conducted with 2872 women aged 18–35 in 60 small, rural communities (i.e., between 200 and 10,000 inhabitants) by a staff of trained interviewers. Approximately 50 women were administered questionnaires in 15 communities in each of four departments of Guatemala. One department is primarily ladino (Jalapa), two are predominantly indigenous (Chimaltenango and Totonicapán), and one has a mixed population (Suchitepéquez). These departments represent two of the largest indigenous language groups (K'iche' and Kaqchikel) in Guatemala, comprising over half of the indigenous population (PAHO, 1994). Communities were randomly selected with probability proportional to population size to yield self-weighting samples within departments. Versions of the questionnaire were fielded in Spanish, K'iche', and Kaqchikel. The average length of the individual interview was 74 min and the overall response rate was 89 percent. (For more details regarding the survey design, see Peterson, Goldman, & Pebley, 1997.)

A calendar design was used to collect detailed information on pregnancy-related care and complications (see Goldman, Vaughan, & Pebley, 1998). For each of the last two live births that occurred since January 1990—a total of 3350 births to 2020 women—respondents were asked about complications experienced and persons seen during each month of pregnancy. For each provider mentioned, the respondent was asked why she saw the provider, how many times during pregnancy she visited him or her, and whether the provider checked the baby's position, took the woman's blood pressure, drew blood, gave her an injection, or gave her a prescription, medicine, or remedy. Finally, the respondent was asked where she gave birth, who attended the birth, whether she was given an injection during birth, the purpose of the injection, whether she and the baby saw a provider in the first 40 days after the birth, and various questions concerning her breastfeeding practices during and after the first week of the infant's life.

In addition to these interviews with individual women, community informants and health care providers (hereafter generally referred to as "providers") were interviewed in each community. Three community informants (the mayor, a woman in a leadership position, and another person not in a leadership position

but who knew the community well) provided information about the community and a listing of health providers and facilities within a 20-km radius of the community. These listings were consolidated to construct a census of providers and facilities for each community (see Peterson et al., 1997 for details). Subsequently, five types of providers were randomly selected from each community and interviewed: the person in charge of the health center or post nearest the community, a private doctor, a midwife, and two other providers, including traditional practitioners, such as curers, herbalists, spiritists, and others. As part of the provider survey, 66 midwives were interviewed about their facilities, clients, payment practices, referral procedures, and provision of specific treatments and types of advice. The community informant and provider questionnaires were administered only in Spanish.

A description of availability and content of care

Data obtained from the census of providers and provider interviews permit us to estimate the availability and cost of pregnancy-related health services, based on the 60 communities included in the EGSF. As shown in Table 1, all communities have a midwife nearby and virtually all have one within the community itself. On the other hand, biomedical services are far less accessible: for example, only about 40 percent of communities have a center or post and about one-fifth have a private physician that serves pregnant women. Hospitals are even more inaccessible. Overall, nearly half of the communities do not even have a single biomedical provider or facility (excluding pharmacies). In addition, costs vary enormously by type of care, with charges for several prenatal visits and delivery care being about ten times as high for doctors as compared with midwives (Table 2). These charges may seem moderate by developed countries' standards—e.g., 350 quetzals or about $70 (at 1995 exchange rates) for a delivery performed by a doctor. However, they need to be considered in terms of the very low incomes of rural Guatemalans—e.g., average monthly household consumption of about 146 quetzals or $29, as estimated from detailed consumption and expenditure information in the EGSF. Given the difficulty that many families have in obtaining cash at short notice, it is important to recognize that more than three-quarters of midwives accept payment in kind for patients who do not have money and more than half of private doctors do not charge these patients.

Table 3 presents a summary of characteristics of the midwives interviewed in the EGSF provider survey. The estimates indicate that about three-fourths of the midwives in these communities have attended a training course related to midwifery, pregnancy, or birth; these training courses may include those conducted by the

Table 1
Availability of health care services

	In the community (%)	Within one hour[a] (%)
Providers		
Midwife	96.7	100.0
Private nurse that serves pregnant women	6.7	8.3
Private doctor that serves pregnant women	21.7	53.3
Facilities		
Health center or post	41.7	88.3
IGSS[b] clinic	1.7	28.3
Private clinic	26.7	55.0
Government hospital	0.0	25.0
Private hospital	5.0	21.7
Any biomedical services	51.7	91.7
Total number of communities	60	

[a] Travel time was determined by selecting the least expensive mode of transport reported by the key informants, and averaging the responses regarding travel time for that mode of transport.

[b] IGSS stands for *Instituto Guatemalteco de Seguridad Social* (Guatemalan Institute of Social Security). IGSS generally serves industrial or plantation workers and is paid for by the national government and employers.

Source: Census of providers and facilities provided by key informants in the EGSF (1995).

Ministry of Health or other non-governmental agencies. As noted elsewhere (e.g., Cosminsky, 2001; Lang & Elkin, 1997; Putney & Smith, 1989), relatively few of these midwives came to their position by formal training and most have not had any schooling; rather, the majority of these women became midwives by experience (e.g., having performed these services when necessary) or by divine calling. The estimates in Table 3 also confirm findings in earlier ethnographic studies (Cosminsky & Scrimshaw, 1980; Cosminsky, 2001) that midwives frequently occupy multiple provider roles. Nonetheless, the midwife's work is generally not full-time; for example, during the week prior to the survey, midwives spent about 10 h on average treating pregnant women or sick patients.

Analytical strategy

The estimates presented in the remainder of the paper are derived from interviews with mothers and midwives. Measures of patterns of care during pregnancy, delivery and the postpartum period are derived from interviews with mothers and are based on the 3350 infants born

Table 2
Cost of health care services during pregnancy and delivery

Midwives	(n = 66)
Average (SD) charged for pregnancy and delivery[a,b]	Q40 (30)
If patient has no money	
Accepts payment in kind (%)	77.3
Does not charge (%)	4.5
Private doctors	(n = 26)
Average (SD) charge for prenatal exam[a,c]	Q16 (10)
Average charge for delivery[a,d]	Q350
If patient has no money	
Accepts payment in kind (%)	19.2
Does not charge (%)	57.7

[a] At the time of the survey, one *quetzal* (Q) was worth about 20 cents US.

[b] Two midwives report the charge per visit and are excluded from the calculation of charges for pregnancy and delivery.

[c] One doctor did not report charges for prenatal exams and is excluded from the descriptive statistics.

[d] Only 12 doctors offer delivery care. Average charges are based on these 12 providers.

Source: Provider interviews in the EGSF (1995).

SD: standard deviation.

Table 3
Characteristics of midwives

Formal training	
Attended course for midwives or related to pregnancy/delivery (%)	75.8
Attended some other course[a] (%)	15.2
Has not attended any course (%)	9.1
How learned to attend pregnant women	
Experience/necessity (%)	37.9
Divine calling (%)	36.4
Course or practicum (%)	15.1
Apprenticeship (%)	9.1
Formal education	
Any formal schooling (%)	30.3
Mean (SD) number years schooling among those with any schooling	3.6 (1.9)
Ethnicity and language ability	
Ladino/speaks Spanish (%)	35.4
Indigenous/speaks both Spanish and Mayan language (%)	38.5
Indigenous/speaks only Mayan (%)	15.4
Indigenous/speaks only Spanish (%)	10.8
Provider roles	
Midwife only (%)	65.2
Midwife/curer (%)	18.2
Midwife/curer/other[b](%)	7.6
Midwife/other[b](%)	9.1
Majority of clients are	
Relatives (%)	1.5
Not relatives (%)	86.4
Half and half (%)	12.1
Mean (SD) hours spent treating pregnant women and sick people in past 7 days	10.2 (16.7)
Mean (SD) number of deliveries in past 2 weeks	2.2 (2.9)
Number of midwives	66

[a] Other courses include: postpartum baby care, maternal and child health courses, APROFAM (family planning) courses, auxiliary nursing, health promoter, dehydration and prevention of illness, community health, and personal hygiene and importance of vaccination.

[b] Other roles include herbalist, bonesetter, masseuse, injectionist, nurse, and health promoter.

Source: Midwife interviews in the EGSF (1995).

SD: Standard deviation.

between January 1990 and the time of interview; one mother may contribute two births to this sample. Results pertaining to midwife practices are derived primarily from the 66 interviews with midwives, but also from interviews with mothers. Finally, estimates related to referrals and measures of the quality of care are derived only from the interviews with midwives. Because the sampling plan is not representative of the national population (but rather the rural population in each of the departments), we have not weighted the estimates by department; however, we have included a set of dummy variables to represent the four departments in each of the statistical models (Peterson et al., 1997).

Standard multivariate techniques are used to assess the impact of the training status of midwives on two outcome variables: (1) whether the midwife (frequently or always) refers women to a biomedical provider; and (2) a measure of the quality of midwife care (discussed below). In the case of the former dichotomous variable, logistic models are estimated, whereas for the latter variable (which assumes values between 0 and 10), ordinary linear regression models are used. Given the limited sample size (66), the models include only a small set of explanatory variables. In addition to variables denoting the departments, these variables include several characteristics of the midwife, as well as several characteristics of the community that pertain to its socioeconomic level, remoteness, and access to biomedical care.

Our measure of quality of care is derived from an assessment of the potential benefit or harm of each of the practices and forms of advice reported by midwives in the EGSF (see Table 8 for a list of these practices). The assessments were based on scientific evidence of the potential effects of these practices as well as their appropriateness given midwives' training and the circumstances under which they practice in rural Guatemala. Because of the emphasis of scientific studies on physiological effects, our measure does not reflect the potential social and psychological benefits associated

with some of the procedures used by midwives. More generally, our measure gives considerably less weight to traditional as compared with biomedical practices.

A number of midwife practices described in the EGSF were excluded from our measure because of lack of relevant data. In several instances, we were unable to classify procedures as either harmful or beneficial because we lacked sufficiently detailed information from the EGSF regarding the practice. For example, whereas one might classify the practice of midwives giving women advice about food as beneficial, we have no information as to the content of the advice—e.g., whether it comprises recommendations to eat nutritious types of food or whether it consists of proscriptions based on the hot–cold etiology.[4] Similarly, although one might consider the taking of blood pressure as an essential component of care in developed countries (e.g., to detect preeclampsia or eclampsia), we have no information from the survey to indicate whether midwives know how to take a blood pressure reading or to evaluate the result.[5] We also were unable to classify several procedures because of lack of scientific data regarding the practice. For example, there is inconclusive or insufficient information in the scientific literature regarding the potential benefits or harm associated with herbal remedies, massage, sweatbath, or binding the woman's stomach after delivery (Cosminsky, 1977, 1982; Enkin et al., 1995; Putney & Smith, 1989).

In total, we identified 10 practices that are likely to be harmful or beneficial.[6] Six of these we classify as potentially harmful: (1) ever giving an injection to speed delivery;[7] (2) ever giving antibiotics during pregnancy or delivery;[8] (3) ever putting powder or ointment on the umbilical cord; (4) normally pushing on the stomach at the beginning of delivery; (5) normally performing a vaginal examination during pregnancy; and (6) normally telling the mother to give the baby sugar water or tea in the first week of life (Bartlett, Bocaletti, & de Bocaletti, 1993; Bartlett & Paz de Bocaletti, 1991; Goer, 1995; Liskin, 1992; Okeke, Lamikanra, & Edelman, 1999; Safe Motherhood, 1998; WHO, 1994; WHO, 1996; Williams & Heymann, 1998). We consider the remaining four items as beneficial: (1) normally keeping the baby warm after birth; (2) normally encouraging breastfeeding; (3) normally encouraging immunization; and (4) normally checking the mother and baby during the postpartum period (Enkin et al., 1995; Safe Motherhood, 1998; WHO, 1994; WHO, 1996).

In order to derive a measure of the quality of care, these 10 practices were scored so that higher values reflect a greater number of harmful practices: i.e., a midwife received a point for each harmful practice in which she engages and a point for each beneficial item that she fails to practice. The scores were summed to create a summary score or an index of quality of care, with a potential range from 0 to 10. We also explored some alternative procedures for the creation of an index—e.g., weighting "more dangerous" procedures more heavily—and found that our results were robust to these alternative specifications.

Results

Patterns of care

Table 4 presents distributions of care pertaining to pregnancy, delivery and the postpartum period. The data reveal that in almost all pregnancies (96 percent), women obtain some form of prenatal care. As suggested by earlier research, the midwife is the most frequently sought provider at all stages of a pregnancy and birth and most deliveries occur at home. In about 28 percent of pregnancies, women rely on both the midwife and a biomedical provider during pregnancy—most commonly a government health center or post—and in about 11 percent of pregnancies, they use only a

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[4] Other data from this project, including a set of qualitative interviews, suggest that the advice is more likely to relate to eating well rather than to food proscriptions (Acevedo & Hurtado, 1997). For example, midwives in the EGSF were asked an open-ended question regarding the most important thing that should be done in taking care of a women during pregnancy and delivery. The most common response was that the mother should eat well—e.g., consume products with sufficient vitamins and nutrients.

[5] Midwives are not taught to take blood pressure readings, nor are they given blood pressure cuffs. Two other procedures in this category are examining the position of the baby and trying to change the position (e.g., by external cephalic version). The former procedure can enable the midwife to detect malpresentation, while the latter, if done successfully at term (37 weeks or more), may avoid the need for a cesarean delivery (Jordan, 1993; Goer, 1995; Enkin et al., 1995).

[6] Practices considered to be beneficial were coded as such if the midwife reported that she *normally* performs them. Practices considered harmful under any circumstance were coded as such if the midwife reported that she *ever* uses them. Practices that may be appropriate under certain circumstances but harmful in others (e.g., vaginal exam, pushing on the stomach and supplemental feeding) were classified as harmful only if the midwife reported that she performs them *normally*.

[7] In medical settings, intravenous administration of parenteral oxytocin (known in the US by the brand name Pitocin) to accelerate contractions may be justified in some circumstances, but intramuscular administration of oxytocin during labor is considered dangerous regardless of the provider or setting because the dose cannot be adapted (WHO, 1996).

[8] We consider the use of antibiotics by midwives harmful because these drugs should not be administered by persons without medical training.

Table 4
Care during pregnancy, delivery, and the postpartum period

	Percent
Providers seen during pregnancy	
None/other[a]	4.2
Traditional only	
Midwife	56.3
Combined care	
Midwife & HCP	18.6
Midwife & doctor/nurse	7.8
Midwife, HCP, and doctor/nurse	1.7
Biomedical only	
HCP	5.3
Doctor/nurse and HCP	0.6
Doctor/nurse	5.5
Place of delivery	
Home[b]	85.4
Hospital/clinic/HCP[c]	14.3
Other	0.3
Birth attendant	
Midwife	80.9
Doctor	11.1
Nurse	3.5
HCP staff	0.9
Other/no attendant	3.6
Providers mother saw during postpartum period	
None/other[a]	28.9
Traditional only	
Midwife	59.3
Combined care	
Midwife & HCP	0.6
Midwife & doctor/nurse	0.6
Biomedical only	
HCP	1.9
Doctor/nurse and HCP	0.0
Doctor/nurse	8.7
Providers baby saw during postpartum period	
None/other[a]	28.4
Traditional only	
Midwife	55.1
Combined care	
Midwife & HCP	1.2
Midwife & doctor/nurse	0.7
Biomedical only	
HCP	4.5
Doctor/nurse and HCP	0.1
Doctor/nurse	10.1
Number of births	3350

[a] Others include: family members, curers, injectionists, pharmacists, and neighbors.
[b] 97 percent of home births occurred in the respondent's home.
[c] 83 percent of births in a medical facility occurred in the hospital, 14 percent in a clinic, and 3 percent in an HCP.
Source: Mother interviews in the EGSF (1995).
HCP: health center or post.
Doctor/nurse: private providers including those working at clinics run by non-governmental organizations.

biomedical provider. Thus, although women are more likely to seek biomedical care along with a midwife rather than on its own, most women who see a midwife do not seek biomedical care either because the midwife did not recommend it or because they failed to heed the recommendation when offered. During the postpartum period, virtually no women combine care from a midwife and a biomedical provider, and in a substantial percentage of births (29 percent), women do not see any provider at all.

The estimates in Table 5 refute earlier research indicating that women who visit a government facility or a doctor during pregnancy in addition to a midwife typically do so only once (Acevedo & Hurtado, 1997). For example, our results demonstrate that, for pregnancies in which women combine care from a midwife and a health center or post, women visit the latter 4.5 times on average—a value below the 6.4 visits made on average to the midwife but considerably higher than commonly assumed. It also appears that women who seek biomedical health care in addition to care from the midwife (1) visit the latter about as often (six times on average) as women who see only the midwife; (2) visit the biomedical provider only slightly less frequently than those who see only the biomedical provider; and (3) make more visits in total than those who see only one type of provider. On average, women who see a provider during pregnancy make eight visits.

Referrals

Results pertaining to referrals by midwives are presented in Table 6. Overall, 80 percent of midwives interviewed indicate that they do—at least on occasion—make referrals to another provider for prenatal care or for problems during pregnancy; one-third of midwives make referrals on a regular basis (i.e., frequently or always). During the prenatal period, midwives most often refer to the health center or post, whereas for problems at the time of birth, they refer most frequently to the hospital. Referrals to other midwives are rare.

Midwives who received training are more likely to make regular referrals than untrained midwives:[9] Thirty eight percent versus 12 percent ($p < 0.06$, data not shown). Below, we explore whether these results persist in a simple logistic regression model, once we control for other characteristics hypothesized to affect the likelihood that the midwife makes referrals. In addition to

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[9] The few midwives (5 percent) who refer women to other midwives also refer women to at least one type of biomedical provider or facility. Thus, for simplicity, we assume that midwives who report that they *frequently* or *always* make referrals to other providers do so with regard to a biomedical provider.

Table 5
Mean number of visits to providers during pregnancy, by combination of providers seen

Among those who saw a provider during pregnancy		Traditional	Combined care			Biomedical		
	Total	Midwife only	Midwife & HCP	Midwife & HCP & doctor/nurse	Midwife & doctor/nurse	HCP only	Doctor/ Nurse & HCP	Doctor/ nurse only
Mean number of visits to								
Midwife	5.7	6.6	6.4	5.8	6.0	NA	NA	NA
HCP	1.3	NA	4.5	3.8	NA	5.4	4.2	NA
Doctor/nurse	0.8	NA	NA	3.9	4.0	NA	4.2	6.3
All providers[a]	7.8	6.7	10.9	13.6	10.0	5.4	8.5	6.3
Number of births	3165	1855	616	56	257	178	21	182

[a] Includes visits to other providers.
Source: Mother interviews in the EGSF (1995).
HCP: health center or post.
NA: not applicable.

Table 6
Referrals by midwives to other providers during pregnancy and delivery

	Percent
How often refers to another provider	
Always	24
Frequently	8
Sometimes	42
Almost never	6
Never	20
For problems during pregnancy, ever refers women to	
Any provider	80
Health center or post	64
Private doctor	24
Hospital	27
Another midwife	5
For problems during delivery, ever refers women to	
Any provider	77
Health center or post	26
Private doctor	9
Hospital	53
Number of midwives	66

Source: Midwife interviews in the EGSF (1995).

dummy variables for the department of residence, the model of referrals includes three explanatory variables denoting characteristics of the midwife: (1) whether she attended a training course for midwives; (2) whether she received any formal education; and (3) her ethnicity (indigenous or ladino). The midwife's education may affect her overall exposure to and comfort with biomedical beliefs and providers, beyond her experiences in the short training program. Indigenous midwives may be less likely to make referrals than ladinas because of differences in health beliefs, cultural practices, and socioeconomic status, and because of discrimination towards indigenous patients and midwives at public health facilities (Cosminsky, 1982; Hurtado & Esquivel, 1986; Rosenthal, 1987; Schieber & Delgado, 1993).

Three additional variables reflect characteristics of the community: (1) whether a biomedical provider (e.g., health center or post, private doctor or nurse, or private clinic) is present within the community; (2) whether the community has regular bus transportation; and (3) the average household consumption per capita of the respondents living in the community—a proxy measure for the income level of the community.[10] The first of these variables encompasses women's access to biomedical providers and reflects the degree to which midwives may have been exposed to and influenced by biomedical beliefs and practices. Thus, the presence of a doctor or health center or post in the community should increase the likelihood that midwives make referrals. Midwives should also be more likely to make referrals in

[10] The transportation variable denotes whether bus service was available during the 5 years prior to the survey and the principal road was open during the past year. The measure of per capita monthly household consumption is derived from women's reports regarding household consumption of 40 staples and food products bought, harvested, produced, or gathered in the week preceding the survey; it does not include less frequent expenses such as cosmetics, transportation, clothing, medical costs, and celebrations (Peterson et al., 1997). Consumption is a better indicator of overall resources than income because it is less subject to short-term fluctuations and is likely to be more accurate, especially in agricultural communities where food may be produced and consumed within the household (Deaton, 1989; Montgomery, Gragnolati, Burke, & Paredes, 2000).

Table 7
Odds ratios from logit regression model[a] predicting likelihood that midwife frequently or always refers clients to a biomedical provider

Variable	Odds ratio	P value
Trained midwife	23.33*	0.01
Any formal education	1.01	0.99
Indigenous	0.06*	0.03
Any biomedical services in the community	1.60	0.54
Average per capita household consumption in the community	0.91	0.21
Bus transportation available and principal road open year-round	3.79	0.13
Number of midwives	66	

*$p < 0.05$.
[a] Model includes set of dummy variables for department of residence.

communities with adequate transportation systems in light of the remoteness of many of the biomedical providers and facilities (especially hospitals). Finally, the average income in the community may affect referrals to the extent that higher income serves as a proxy for contact with urban areas and exposure to and acceptability of Western ideas among the women and the midwife.

The odds ratios from the logistic model shown in Table 7 reveal that, in the presence of control variables, midwife training has a large and significant effect on referral practices: the odds of referring a pregnancy to a biomedical provider are 23 times as high for a trained as compared with an untrained midwife. Surprisingly, the midwife's education has virtually no impact on the likelihood that she refers patients elsewhere. As hypothesized, indigenous midwives are (significantly) less likely to refer pregnant women. Although not significantly related to referral status, the effect of access to bus transportation is substantial. Neither the presence of a biomedical provider nor the income level of the community is significantly related to referral practices.

Midwife practices

Table 8a displays the distributions of responses by *midwives* to questions in the EGSF pertaining to the content of their practice. Table 8b, which is based on the sample of recent births for which women saw a midwife, considers *women's* responses to several questions pertaining to the content of the midwife's care.

During the prenatal period, nearly all midwives routinely examine the position of the fetus and give advice about foods that the mother should or should not eat during pregnancy (Table 8a). Most midwives, at least on occasion, try to change the position of the baby and administer herbal remedies. Surprisingly, the traditional practice of massage is far from universally practiced, even though many ethnographic studies have stressed the importance and pervasiveness of this practice among midwives (Acevedo & Hurtado, 1997; Cosminsky, 1982; Greenberg, 1982; Lang & Elkin, 1997).[11]

The data also indicate that more than 60 percent of midwives have ever performed a vaginal exam and almost 40 percent do so routinely, a practice that is considered potentially harmful because of the risk of infection. Although very high, this estimate is lower than that obtained in a study in Santa María de Jesús in the Department of Sacatepéquez in the mid-1980s, in which three-quarters of women reported that midwives performed vaginal exams (Bartlett & Paz de Bocaletti, 1991). As shown in Table 8a, about 30 percent of midwives have taken a woman's blood pressure or pulse, or given injections of vitamins. Other biomedical treatments and practices—drawing blood (reported by the women), giving antibiotics, tetanus immunizations, or injections of medicine, and administering injections at the time of delivery—appear to be considerably less common among midwives.

Estimates for injections to speed delivery (presumably oxytocin) suggest a prevalence of 12–15 percent, based on the sample of midwives (Table 8a) and the sample of births (Table 8b) respectively. These values are noteworthy given the potential dangers to the infant and mother associated with this practice. Intramuscular injection of oxytocin during labor has been shown to be associated with increased risks of fetal and neonatal deaths and maternal complications (Bartlett et al., 1993; Bartlett & Paz de Bocaletti, 1991; WHO, 1996). This estimate of 15 percent of deliveries (reported by mothers) encompasses enormous variability across communities, ranging from 19 communities with a prevalence below 5 percent, to 10 communities with a prevalence of at least 30 percent. Such extensive variation in the use of oxytocin is consistent with findings reported by Bartlett et al. (1993) from 20 communities in three areas of Guatemala (western highlands, south coast, east).

Several potentially harmful treatments pertaining to the time of delivery or shortly thereafter continue to be common. For example, almost a quarter of midwives routinely push on the abdominal area at the beginning of delivery and half of midwives normally put powder or ointments on the umbilical cord. Both of these

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[11] It is possible that midwives may have underreported the practice of massage in the EGSF because the questionnaire used the word "*masaje*" rather than the more commonly used verb "*sobar*".

Table 8
Treatments and practices provided by midwives

	Percent distribution			
	Normally	Once in a while	When needed[a]	Never
(a) Midwife reports				
Do you provide this service normally, only once in a while, or never?				
Examine position of the baby	94	4	0	2
Give advice about food	97	0	0	3
Give abdominal massage during pregnancy	51	4	17	27
Give other massage during pregnancy	17	9	17	58
Try to change the position of the baby	20	9	42	29
Take woman's pulse or blood pressure	26	3	0	71
Do a vaginal exam	38	8	18	36
Say a special prayer for the mother's health	85	2	0	14
Conduct religious/spiritual ceremony	21	6	3	70
Push on the stomach at the beginning of birth	23	3	12	62
Clean the baby after birth	100	0	0	0
Keep the baby warm after birth	89	2	2	8
Tell mother not to breastfeed 1st few days	3	0	2	95
Tell mother to immediately breastfeed	97	2	0	2
Put powders/ointments on the umbilical cord	50	0	4	46
Prepare steambath after birth	35	0	5	60
Bind the mother's stomach	85	6	5	4
Tell mother to give baby sugar water 1st week	65	9	5	21
Tell mother to give chicory/anise tea 1st week	51	6	11	32
Recommend immunize children	98	0	0	2
Recommend not immunize children	4	0	0	96
Check on the woman in the 40 days after birth	71	3	6	20
Check on the baby in the 40 days after birth	74	2	3	21

	Almost always	Generally	Sometimes	Never
How often do you give the following to pregnant women or to women during delivery?				
Herbs or herb teas	21	29	21	29
Vitamins	20	21	11	48
Injections of vitamins	11	12	6	71
Aspirin	2	2	3	94
Antibiotics	0	0	4	96
Injections of medicine	2	3	6	89
Injections against tetanus	4	5	0	91
Injections to alleviate delivery pains	4	2	5	89
Injections to speed delivery	2	2	9	88
Number of midwives	66			

(b) Mother reports

During the pregnancy, did midwife	Percent	During the birth, did midwife	Percent
Check the position of the baby	98.7	Give mother any injection	17.9
Take blood pressure	32.2	Give injection to deliver more quickly[b]	14.8
Take blood	0.6	Give injection to reduce the pain[b]	1.5
Given an injection	8.0	Given injection for another purpose[b]	0.7
Give a prescription, medicine, or remedy	19.5	Give injection of unknown purpose[b]	1.0
(n = 2891 births)		(n = 2706 births)	

[a] Some respondents volunteered responses indicating that they performed the services when necessary or depending on the situation; these have been coded as "when needed".
[b] The respondent was allowed to report more than one purpose of the injection, although few did so.
Source: (a) Midwife interviews in the EGSF (1995).
Source: (b) Mother interviews in the EGSF (1995).

procedures are considered dangerous, the former because of its association with uterine complications and the latter because of risk of infection or tetanus (Liskin, 1992; WHO, 1994; WHO, 1996). In addition, midwives frequently tell mothers to give the baby sugar water or tea in the first week of life,[12] perhaps because they believe that colostrum is "bad" or "dirty" (Lang & Elkin, 1997). However, the biomedical literature suggests that early supplementation may interfere with the initiation or continuation of breastfeeding (Safe Motherhood, 1998). On the other hand, nearly all midwives report that they routinely perform practices that are beneficial: keeping the baby warm after birth, encouraging immediate breastfeeding, and encouraging immunization.

Most midwives (85 percent) routinely bind the woman's stomach after birth in the belief that this practice closes the bones of the birth canal and prevents uterine prolapse. A much smaller proportion (about a third) prepares the traditional sauna-like sweatbath (*temascal*). Previous largely ethnographic research has stressed the importance of the sweatbath, especially during the postpartum period and among the indigenous population (Cosminsky, 2001; Acevedo & Hurtado, 1997), although estimates of its prevalence have not been available.

Quality of care

Frequencies pertaining to the 10 midwife practices that we have classified as beneficial or harmful are shown in Table 9. Beneficial practices have been coded in terms of midwives *failing to* perform the activity so that each frequency denotes the prevalence of a harmful practice. Most midwives perform between one and four of these harmful activities.

Trained midwives have almost identical scores as their untrained counterparts (2.58 as compared with 2.69, data not shown), suggesting that training has no effect on the prevalence of these harmful (or beneficial) practices. We confirm this finding by estimating a linear regression model in which the quality of care index is the outcome variable and all but one of the covariates from the referral model are included as explanatory variables. We exclude the availability of bus transportation, because this variable is less likely to be associated with the content or quality of care as compared with referrals of patients to another, potentially distant provider. Our

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[12] As shown in Table 9, midwife reports indicate that about three-quarters of midwives normally tell the mother to give the baby sugar water or tea during the first week of life. According to mothers' reports for a sample of 3211 breastfed infants, 39 percent of mothers give their infants sugar water or tea in the first week of life, and an additional 24 percent give the infant water, milk, formula, or something else.

Table 9
Distribution of quality of care index

Individual items in index	Percent
Ever give injection to speed delivery	12.1
Ever give antibiotics	4.5
Ever put powder or ointment on the umbilical cord	54.5
Normally push on stomach at beginning of delivery	23.1
Normally perform vaginal exam	37.9
Normally tell mother to give baby sugar water/tea	75.8
Do not normally keep the baby warm after birth	10.6
Do not normally encourage breastfeeding	3.0
Do not normally encourage immunization	1.5
Do not normally check mother and baby postpartum	32.3

Score on index[a]	N	Percent
Zero	1	1.6
One	13	20.3
Two	16	25.0
Three	18	28.1
Four	12	18.8
Five	4	6.3
Number of midwives[b]	64	

[a] On this index, a high score indicates greater use of potentially harmful practices (maximum possible score = 10).
[b] Two midwives have missing values on the index.
Source: Midwife interviews in the EGSF (1995).

rationale for including the remaining covariates is generally similar to that for referrals. In the case of the presence of a biomedical provider, we hypothesize that the presence of these providers may result in an informal monitoring of the midwives' practices, or at least a constraint on their behavior, as well as a decreased demand for the midwife to provide biomedical procedures that may be harmful when administered by an untrained midwife.

The coefficients from the multivariate regression, shown in Table 10, indicate that midwife training programs have had virtually no effect on the overall quality of midwife care, as defined and measured in this study. As in the case of referral practices, the effects of the midwife's education and the income level of the community are insignificant. However, the presence of a biomedical provider in the community is associated with higher quality of care (i.e., a lower score of harmful practices), while indigenous midwives appear to offer a lower quality of care than ladino midwives.

Discussion

This analysis has provided mixed findings regarding the efficacy of midwife training programs in Guatemala.

Table 10
Coefficients from linear regression model[a] predicting score on quality of care index[b]

Variable	Coefficient	P value
Intercept	1.61	
Trained midwife	−0.27	0.460
Any formal education	−0.43	0.231
Indigenous	1.13*	0.045
Any biomedical services in the community	−0.74*	0.029
Average per capita household consumption in the community	0.05	0.134
Number of midwives[c]	64	
R^2	0.22	

*$p < 0.05$.

[a] Model includes set of dummy variables for department of residence.

[b] On this index, a high score indicates greater use of potentially harmful practices.

[c] Two midwives have missing values on the index.

About three-quarters of midwives in the sample attended formal training and presumably were encouraged to refer their clients for biomedical care. Nevertheless, most pregnant women did not see a biomedical provider at any point during pregnancy. Previous research offers numerous reasons for women's low utilization of biomedical care, even when they are given a referral by a midwife: fear (of the treatments or the personnel), condescending attitudes of the providers, refusal by women's spouses, embarrassment, perceptions of poor quality of care, limited hours of service, language constraints, poor access to health facilities, and lack of resources (Cosminsky, 1982; Rosenthal, 1987; Hurtado & Saenz de Tejada, 2001). On the other hand, those who did combine care made several visits to the biomedical providers rather than the single visit suggested by earlier research. The postpartum period appears to be a time when more women need to be examined—either by midwives or by biomedical providers—to detect any postpartum complications and to check on their infants' health status.

Consistent with the objectives of training programs, the majority of midwives report making referrals to biomedical providers, but most do so irregularly. Nevertheless, the training programs appear to have had a substantial positive impact on the frequency of referrals. The fact that most midwives—even trained ones—do not regularly refer their clients is likely due to various factors described by Hurtado and Saenz de Tejada (2001). For example, many of the midwives in their study reported being uncomfortable with the poor treatment they received from the staff at government health facilities. Moreover, fewer than half of the midwives had actually been to the hospital designated for their referrals and hence they felt uneasy about making referrals to a place they did not know.

A detailed examination of the content of midwife care reveals that midwives continue to offer many traditional treatments although some may be less prevalent than in the past. For example, only about half of the midwives report that they routinely use abdominal massage—a prevalence much lower than that implied by earlier ethnographic work. The use of the traditional sweatbath and herbal remedies may also be on the decline. Although the absence of time series data does not permit us to verify trends, midwife practices are probably becoming increasingly biomedicalized as well. The EGSF data reveal that a substantial percentage of midwives have adopted biomedical practices such as performing vaginal exams and giving injections.

Medicalization of midwifery care is of particular concern to the extent that midwives adopt practices that are harmful or inappropriate given their training and setting. While some biomedical practices are probably beneficial even when used by an untrained midwife (e.g., giving vitamins) and others may be harmless at worst (e.g., taking blood pressure), some treatments are potentially dangerous to the pregnant woman and her unborn child. Even if training programs have reduced the prevalence of traditional practices deemed harmful, this "positive" effect is likely to be offset by midwives' increasing exposure to biomedical treatments that require extensive training for appropriate use.

This increasing biomedicalization of midwife care may be an important explanation for the absence of any relation between midwives' training status and our measure of the overall quality of care they offer. However, there are at least two other plausible reasons for this finding. One is that the many weaknesses of these training programs, which have been frequently cited in the literature and are discussed above, may render them as ineffective mechanisms for altering midwife behavior. An alternative explanation is that the training programs may focus on practices other than the ones we have identified. That is, our measure of the quality of care may not capture some of the practices emphasized during the program (such as recognition of complications) and may include practices barely mentioned.

A serious limitation of the present study is its one-sidedness: while providing an evaluation of midwife care, this investigation does not offer a corresponding assessment of biomedical pregnancy-related care. This is an unavoidable drawback, because the EGSF did not collect extensive information on the content of pregnancy care offered by government-sponsored health facilities and private doctors.

Nevertheless, the limited information in the EGSF points to several serious problems associated with biomedical pregnancy care in Guatemala. First, interviews with personnel at health facilities substantiate findings from earlier studies regarding the widespread lack of resources. For example, almost half of the 48 facilities included in the survey lack fetal stethoscopes and a similar proportion lack a regular supply of iron supplements. Second, data from a qualitative study undertaken as part of this project document the lack of social support experienced by women during hospital births (Carter, 1999). Third, among women who reported receiving an injection during delivery, more than one-quarter of those who gave birth in hospitals did not know the purpose of the injection, in contrast to about 5 percent of women who gave birth at home. This finding suggests that hospital staff may fail to explain to women the nature of and risks associated with treatments that women receive.

These limited depictions of biomedical care make it apparent that the successful integration of midwives into the formal health care system must involve more than the modification of midwife practices to make these practices consistent with biomedical standards. High quality pregnancy care must also entail the monitoring and modification of the practices of biomedical providers that serve pregnant women to (1) guarantee respect for the woman and her family; (2) avoid conflict with social and cultural norms; and (3) ensure that treatments are based on scientific evidence rather than convention and convenience of the provider. The collection of detailed information on the content of pregnancy-related care offered by both traditional and biomedical providers would be an appropriate starting point for this herculean task.

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