

THE APPROPRIATE USE OF CHILDBIRTH TECHNOLOGIES IN
INDIA AND BRAZIL

By

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A Thesis Submitted to The Honors College

In Partial Fulfillment of the Bachelor's degree
With Honors in

IDS/International Studies Major

THE UNIVERSITY OF ARIZONA

May 2008

Approved by:

Thesis Advisor's Full Name
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Introduction

Consider the power of medicine, we can modify and heal the human body, practically perform miracles. This power is not limited to the medically trained, the patients make the ultimate choice of whether or not they wish to seek care, thus the power of medicine lies not only in the knowledge of physicians but also in the decision to exercise the knowledge. Childbirth, as a necessary aspect of healthcare, demands several choices to be made by both patient and provider, the specifics of which differentiate among cultures. Though variations abound, the universal nature of childbirth is an intense process through which several complications can occur, thus providing reason for the worldwide maternal mortality rate of 529,000 women per year (WHO 2005). In order to reduce this grave statistic, energy must be spent toward empowering women with culturally appropriate birthing options. Unfortunately, there cannot simply be a universal method for delivering a baby. Each country and culture has their own traditional techniques and any universalized method may be contradicted by a number of socio-cultural and economic issues specific to that region.

Globalization is inevitable; however, in order to make a smooth transition, possible pressures on both health and culture should be assessed before introducing new knowledge. More so than new technologies being forced upon a culture, the balance lies in the ability to choose which innovations to accept. My goal in assessing emerging technologies in childbirth in Southern India and Brazil has been to insure that the most appropriate technologies are implemented. However, in order to make that assessment, I had to learn what was both medically appropriate and appropriate with consideration for the cultures of each region.

With the influx of modern ideas comes the impetus to change, in some cases that leads to elimination of tradition and in others simply to adaptation. Thus, in order to test this greater clash of culture and science, I chose a specific point of possible contention. In general terms, the concern was whether introducing Western medicine in childbirth was interfering with cultural beliefs. Usually synonymous with the introduction of Western medicine is biomedicalization, technologic and scientific innovations in medicine (Clarke 2003). Technologies implemented and useful in one society are not necessarily universally applicable. For instance, due to multiple factors such as cost and the technical expertise required for administration, analgesia (pain control) such as epidural blocks are not commonly used in third world societies, so this option is not taken into consideration for a delivery technique (Van Hollen 2003). Thus, though technology has greatly improved the capacity of medical professionals to provide care, there is a greater need to humanize childbirth. This humanization process returns focus to a birth plan that best benefits the mother, taking physical, social, cultural, and economic factors into consideration.

The overall goal in improving maternal healthcare is to reduce the amount of infant and maternal deaths. Several factors prior to childbirth, such as prenatal visits and the health of the mother, contribute to infant and maternal mortality. More pressing is the work to be done regarding the specific act of childbirth. A study that assessed the innovations to childbirth that were most likely to prevent death found that the addition of health centers and hospitals in both rural and urban areas would prevent 50% more deaths than antenatal care or traditional birth attendants (Maine 1991). For the healthiest optimal outcome it is necessary to humanize the choices surrounding delivery and birth itself.

In reference to these findings, the innovations considered in this study focus on the act of childbirth.

Overall, the appropriateness of a childbirth technology to a specific region should be determined before the technology is adopted. This form of evaluation will allow for a socioeconomic and culturally sustainable maternal healthcare system. In accordance, women should be empowered through the ability to make an educated choice driven by personal and cultural preference and health consciousness, rather than by economic means. This is exemplified by the current status of obstetric care delivery in India and Brazil, where care is unevenly distributed.

Both Countries in Comparison to Global Maternal Health Statistics

Goal 4 of the UN's Millennium Development Goals challenged both Brazil and India to reduce maternal and infant mortality by 75% by 2015 (Lobo, 2006; UN 2008). In 2004 Brazil's infant and maternal mortality rates were 15.3 and 74.5 deaths per 1,000 births respectively (Lobo, 2006). Likewise, a 2006 WHO fact sheet stated that India's under-5 mortality rate was 85 per 1,000 live births and the maternal mortality rate was 540 per 100,000 live births (WHO 2006). Since both rates are well above the WHO standard of 10 infant deaths and 20 maternal deaths per 1,000 births, it seems that this was a timely challenge (WHO 2006). Both antenatal and intrapartum factors lead to these unfortunate statistics.

Influence from the First World

In an effort to provide modern obstetric care, both India and Brazil look to birthing technologies of the first world as practices to imitate. However, transfer of such technologies to these countries has entailed additional complications. For one, the infrastructure and resources necessary to support these technologies are sometimes not readily available, often resulting in unsanitary compromises to the application of technologies. For instance, in developing countries some small, rural district hospitals have so little money that they reuse disposable syringes for routine IV infusion (Wagner 2001). Routine IV infusion has been scientifically proven to be unnecessary, but because wealthier countries practice this with no restriction of resources, poorer countries have attempted to mimic this form of medicalization. Such an adoption of non-evidence based practices, leads to dangerous habits like the reuse of needles (Wagner 2001). Also, because western practices are viewed as elite and able to provide the best care they are sometimes requested with out medical need, which leads to their excessive, sometimes routine use (Van Hollen 2003). As a result of individual social constructions, each country has developed an affinity for a different western technology.

Use of Oxytocins

In India, various factors have led to the perpetuation of labor induction. The majority of women have come to believe that the faster the baby comes, the less overall pain experienced and the better the birth (personal communication). The drug, Sintocin, an Oxytocin-like drug, is used to “control” the pain and induce the labor. Oxytocin is the natural hormone that both induces contractions and signals the creation of breast milk.

Synthetically created oxytocins are used as a labor-inducing drugs, they increase the frequency and strength of contractions and inherently amplify the pain. In the United States, under the brand name Pitocin, oxytocins are often used in conjunction with anesthesia, such as epidurals (Ladewig, London, & Olds, 2001). In Southern India, in contrast, the oxytocin-like drug, Sintocin, is used on its own under the belief that a quick labor is beneficial to everyone involved.

The problem that the Western medical professionals generally associate with the use of Sintocin independently and not in conjunction with a pain killer is that if this optimal drug combination is available, it should be used to minimize the pain (Van Hollen 2003). In India, though painkillers (analgesics) are available, they are not used due to their high cost. The health of patients should be held with greater importance than the financial elements involved (Hippocratic Oath). PSG hospital receives a monthly shipment of Sintocin. The cost is 16 rupees per milliliter from a local distributor called Reatna, whose parent company is Pfizer. At the onset of labor pain 2.5 mL of Sintocin is normally injected, compared to 1-2 mIU/min used, only when medically necessary, in the U.S (personal communication). Throughout the labor, up to 10 mL could be injected. At the maximum injection the cost would be the U.S. equivalent of approximately four dollars, which is reasonable. Correspondingly, when added on top of a 5000-rupee private hospital stay the price of Sintocin injections seems insignificant and there is no economic reason for questioning the use of the drug (personal communication 6/2006).

Though mothers were well aware of the costs involved, they were ill informed about the drug itself. When asked, none of the mothers were aware of the proper drug name, Sintocin, or exactly why they were given the drug. The almost unanimous

response when asked if they were given any injections during labor was, “Yes, I had drips”, which was in reference to the IV used to inject the Sintocin. And, when asked the purpose for the injection the response was, “to make the baby come”(multiple informants. personal communication, May 20 – June 25, 2006). Sintocin would “make the baby come”, but this was a general explanation, devoid of any of the physiological implications of which one might expect a patient to be aware. Two informants admitted to requesting the “drips” based on the suggestion of their own mothers and female neighbors. The majority of my informants simply took the doctor’s advice, assuming it was necessary procedure. These labor-inducing drugs do have possible side effects for both the mother and child. Cervical lacerations, uterine rupture, and water intoxication are all possible complications for the mother. Additionally, the baby may experience fetal trauma, decreased oxygen supply, which leads to an irregular heartbeat, and hyperbilirubinemia, also known as jaundice (Wilson, Shannon, & Stang, 2001). Though these negative results would most likely only occur with an overdose, it does give reason to monitor routine use and for mothers to be informed about the drug.

This use of oxytocin is considered one way that biomedicalization is occurring in India. Though an increase in biomedicalization can benefit a society, it is also important to consider cultural aspects that effect medical treatment. Higher doses of oxytocins are used in India than in the U.S. This may not be the case in other regions of India, but in South-Central Tamil Nadu Sintocin was routinely used in a hospital setting. Western authorities might consider this routine rather than individualized use of Sintocin an overuse of the drug.

Caesarean Section

The Brazilian equivalent of an overused western technology is the Caesarean section (C-section). When used in the proper setting and under the necessary conditions, C-sections can be a life-saving operation. Adversely, when improperly conducted, the reverse effect is likely. The maternal mortality rate for C-sections was almost one hundred percent until the early 1900s (Murphy 1995). This was often due to not using sterile equipment and improper stitching, which led to internal bleeding (Murphy 1995). Or, often it was performed after a mother's death, solely in the interest of saving the child (Murphy 1995). Progression of this procedure in various countries occurred simultaneously, as they were able to perform the operation on live women who also survived (Murphy 1995).

Today C-sections are generally needed for complicated births, where, due to an additional health concern, the mother cannot deliver vaginally. However, in Brazil Caesarean rates have been rising based on assumptions not directly related to complication in birth (Belizan 2007). The amount of Caesarean sections performed in Brazil is much above the WHO standard (Better by the Year, 2008).

Consumer demand has long been rumored to be the driving force behind this trend (Carr & Riesco 2007). Many claim that consumers believe that c-sections are associated with better outcome and that women fear the physiological consequences related to vaginal delivery, they worry that they may lose the ability to perform sexually (Behague, 2002). Also, there is claim to a common fear that lengthened labor amounts to greater fetal distress (Behague 2002). However, recent studies show that women prefer normal vaginal birth, but are influenced by their physician's preference towards c-

sections (Carr & Riesco 2007). One common practice seems to prove the possibility of this theory. Caesarean sections are performed out of convenience for being followed by a sterilization procedure, the principal form of birth control (Carr & Riesco 2007).

According to Dr. Lynn Coppola of the UMC, a C-section is a complex procedure with increased morbidity due to intraoperative complications and estimated blood loss compared to sterilization. Sterilization is not a recognized indication for Caesarean delivery (personal communication 2/7/08).

In accordance, a recent review concluded that, in fact, Caesarean sections have greater risks than vaginal deliveries (Belizan 2007). Internationally, 3.5 medically unjustified births are performed yearly (Althabe 2006). In Latin American countries, this sizeable rate of C-sections has been linked with higher rates of maternal and neonatal mortality and morbidity (Villar 2006). One study revealed that between 1982 and 2004 the rate of C-sections in a southern Brazilian city increased from 28% to 43% (Barros et al 2004). Since there is little evidence for benefits received from elective C-sections and possible harm from them, interventions to reduce unnecessary C-sections should be proposed. Women should be empowered with the rationale for the use of C-sections and the potential consequences. Though, in appropriate situations, such as high-risk births, C-sections are needed, surgical birth should not be performed solely in an effort to align with safe medical practice. Instead, each patient should be evaluated individually with respect to optimal route of delivery.

Country Descriptions

Some of the conflict related to why the above technologies are being improperly used could be due to the fact that, though they are two of the largest economies in their individual regions of the world, India and Brazil are still classified as third world countries (O'Neill 2005). This classification is most likely due to the vast rift between wealthy and poor and a limited amount of regions that are considered developed by western standards.

Southern India

During the summer of 2006, I spent six weeks conducting research in and around the city of Coimbatore in south central Tamil Nadu. Coimbatore and the surrounding villages have a population of 1,865,234 (wikipedia). As the textile capital of India, and perhaps even the world, Coimbatore is a rapidly modernizing city. Several movie theaters, chain restaurants and stores, hotels, and universities fill the streets. A large contributor to this growth, on a national level, is the access to urban life from the surrounding rural villages. Transportation and roadways allow for this commute. From large automobiles to bicycles, several modes of transport are available and used daily. For the majority of mid to lower class Indians, the buses are most commonly used. For a couple rupees, one can easily ride a bus within the Coimbatore city limits or to a village within approximately an hour's distance from the urban center. Auto rickshaws and taxis are also available, but for a greater price and are frequented more so by foreigners and members of the higher class. Villagers that live outside of Coimbatore view the city as a

place for commerce, recreation, and education. Weekly trips to the market for fresh fruits and vegetables, occasional afternoons at the movies, and the majority of shopping needs would be conducted in Coimbatore.

Textiles, a booming industry in India, and especially in Coimbatore, expanded from 37 billion dollars in 2005 to 49 billion in 2007 (Business 2008). Other growing industries across the country include pharmaceuticals, tourism, iron and steel manufacturing. The gross domestic product per capita is \$2,700 (World Fact Book 2007).

Brazil

Brazil too would benefit from a more homogeneous maternal healthcare system. The divide between developed and less developed is more obviously spread between the Southeast and Northeast respectively (Ribeiro et al 2007). Ribeirão Preto, SP, is an example of a Southeastern city. With an economy based on agro-business and high technology, this city is home to over 550,000 inhabitants. It is the fourth largest municipality in the state and has sunny weather year round (R.P. Travel Guide 2008). 2659 km to the north, Sao Luis, MA, is less modern (Ribeiro et al 2007). Sao Luis is an island with over 867,000 people (Brazil Travel 2008). Its principal industries include sugar refining, rum distillery, cotton mills, plants to process cacao, metallurgical products, chemicals, and hammocks (Sao Luis 2008). The per capita gross domestic product is \$9,700 (World Fact Book: Brazil 2007).

Healthcare Systems

India

Tamil Nadu divides its health care facilities first into two categories, government and private, and under each of those two categories are three main branches: tertiary, secondary, and primary (the lowest level of care) (Van Hollen, 2003). The government institutions are generally considered inferior to the private due mostly to overcrowding, less funding, and less expensive care. The city of Coimbatore has the best medical facilities in the area. KMCH, a private hospital and PSG, a grant supported school and hospital are both located in Coimbatore. KMCH and PSG are well-equipped and fully functioning facilities, even by Western standards. Additionally, at the government level there is a large hospital, not far from Coimbatore's train station, that serves several, approximately 3,000 out-patients, daily (V. Aram, personal communication, June 12, 2006). All three of these facilities, though funded by various means, are considered to be under the umbrella of tertiary institutions, the highest level of care. As one goes further from the city, the medical facilities become less technologically advanced, have minimal staff and lowered sanitation standards. A primary health care center 15 kilometers outside of the city was meant to serve 14 villages and approximately 50,000 people (Vjay, personal communication, June 10, 2006). The staff consisted of three doctors, and eleven nurses, three of which were specially trained to provide antenatal care. The facility itself was rundown and unclean. Though this facility was more conveniently located and offered affordable treatment, the overcrowded conditions mandated that many medical cases still be referred to a tertiary care facility. The focus of concern for

the Indian government in obstetrics and gynecology has been on female infanticide and family size for a number of years (Poffenberger, 1975). It has only been in recent years that the focus has begun to broaden beyond those subjects. In 1988 the per capita spending on maternal and child health care services was 5.23 rupees, which was lower than the average Indian rate of 7.19 rupees (Van Hollen, 2003). This situation has improved from the state it was in in 1988, but there is still need for revision. Overall, bridging the gap between the quality of care in tertiary versus primary care facilities, as well as urban and rural, would make a substantial difference in health care in Southern India.

Brazil

Contributing to the large number of C-sections is the significant divide between rural and urban healthcare and the insufficient number of physicians and trained birth attendants. In a study conducted between rural Sao Luis and urban Ribeirao Preto the larger number of urban physicians allowed more women to have the same physician for antenatal care and delivery, leading to a lower risk for C-section (Ribeiro 2007). The divide between rural and urban was also prevalent in the 2001 infant mortality rates, 43 per 1000 live births in the North East versus 18.2 per 1,000 live births in the South East (Better by the Year). Infant mortality is highest in the semi-dry region of the poorest states, home to 12 million children (Better by the Year). In Brazil the national ratio of physicians to patient in 2000 was 1.15 to 1,000; however, this division between rural and urban areas is also not even. An earlier study estimated that in rural areas there were only .53 physicians to 1,000 patients while urban areas boasted up to 3.28 physicians per 1,000

(CFM/FIOCRUZ 1996). One problem with decentralization and placing greater responsibility on the municipalities is that some are making improvements while others are not. There are cases where neighboring cities have drastic differences in their provision of health care (Lobato 2000). The most advanced technology and best professionals are found at public hospitals owned by the federal government, rather than states and municipalities (Lobato 2000). Overall, the selective amount of high-level facilities results in a high level of technology being used in developed regions and minimum care being provided in underdeveloped areas.

Unequally Distributed Economy

Availability of and proximity to resources are not the only determinants to receiving care; the cost to the patients is an additional concern. The spread of wealth is not always that poorer populations tend to be in rural areas, several urban poor have moved to developed regions, making previous generalizations ineffective (Lobato 2000).

India is growing at the rate of seven percent per year yet still has millions of poor (Chopra 2005). One in every two children is malnourished (Chopra 2005). Mainly two efforts have the potential to shrink this economic gap. Both the government and the World Bank are providing billions of dollars to fund rural development programs (Chopra 2005). Also, since less than 10 percent of Indians have health insurance and about one fourth of hospitalized Indians are below the poverty line, nongovernmental organizations are beginning to act as insurance providers (Cox 2006). India is becoming a world leader in micro health insurance; there are now 5 to 10 million people enrolled (Cox 2006).

Although Brazil has the ninth largest economy in the world it has the greatest discrepancy between social classes (Lobato 2000). According to a 1996 report from the UN, the average income of the richest 10% was approximately 30 times the average income of the poorest 40% (IPEA 1996). In addition to geographic division, segmentation by income is present. Those than can afford it pay for various levels of insurance coverage and for specific services (Lobato 2000). Although, the amount paid does not necessarily ensure quality.

Patient Perspectives

Caesarean sections are more common among wealthy, educated (good indicator of the ability to negotiate) women that had more decision making power in the home (Behague, 2002). Poor, uneducated women, teenage mothers, those with few antenatal visits and those with “too many children” were least likely to receive an intervention (Behague 2002). In Brazil, delivering by C-section has become proof of higher economic status, thus women with low-risk pregnancy would most likely chose to deliver by C-section if they could afford it. At the socioeconomic level, poor women that feel marginalized by society may fear vaginal birth due to an antagonistic relationship with their healthcare provider and an unsafe hospital environment (Behague 2002). Thus, there may be some overlooked class-based issues that result in the quality of care provided (Behague 2002).

Why do women seek out medicalized care and how is it linked to social power? Both India and Brazil are influenced by practices of developing countries as exemplified by the modern birthing techniques. Another commonality between both the birthing

techniques is that they result in a faster than natural delivery. It is possible that, along with the common practice of these techniques, this thought process spread from a Western mindset. Consider the implication of women believing that Pitocin is needed to “make the baby come”. A natural labor should last between 18 and 24 hrs from the time the water breaks to the crowning of the head (Behague 2002). Impatience as seen in the concept that this natural process should be sped up is comparable to a western social construction of efficiency. In a normal birth, the natural process should be permitted unless there is evidence of maternal or fetal compromise. Another belief which has spread the popularity of this drug is the fact that it is perceived to be a technology from the developed world, and if a woman can afford it, the outcome of her birth will be improved. Outside of the medical reasons for acceptance of these technologies into common practice in India and Brazil, there are also underlying socio-economic reasons. Those receiving drips and C-sections tend to be of an upper class. Many medical decisions are being made based on economics and infrastructure rather than physiological reasoning; rather than assessing each individual case the use of these technologies that are viewed as the “proper” developed method of delivery is being assumed. Instead of the most modern technologies being seen as the best care option, they should be seen as an additional option when a natural delivery is not possible.

Giffen good

With the cost of these technologies and the need to facilities and medical personnel to utilize them it is logical that they have become more exclusive to the wealthier classes. However, what seems illogical is the medical reasoning behind the

almost routine use of C-sections and pitocin drips. As a luxury of the upper classes, based on reputation it seems that these technologies have become a Giffen good of Brazil and India, desired due to their high price and claim for quality. This term is more commonly used with material items rather than medical procedures, which is why it almost begs to question necessity.

In southern India, both my own study and that of Cecilia Van Hollen found that there were misconceptions regarding the purpose of oxytocin drips. Women would follow the advice of their friends and family members to deliver at the hospital and request the drips because they will reduce the pain. Their perception of pain reduction is not what one might think. These women did not believe that the oxytocin-like drug would numb the pain, in fact, they had never heard of the concept of a pain-killing drug for childbirth. They believed that since the drips made the baby come more quickly they would allow the pain to come and go at an equally rapid speed. This reasoning has led women to seek out physicians and hospitals more willing to accelerate birth; thus, this socially created concept has led to a social division related to those that can and cannot receive the “drips” during childbirth (Van Hollen 2003).

Likewise, in Brazil, social constructions of the importance of a C-section have led to increased patient demand for this technology. Poor, uneducated women and teenage mothers have to save money and seek out obstetricians willing to perform their C-section (Behague 2002). With such strong conviction about their birthing preference it is a challenge for physicians to provide their socially objective medical opinion, especially to a patient with whom they have not established a repertoire. Practicing medicine in the public sector is often more difficult because physicians do not have an established

relationship with their patient, making it harder for the patient to trust medical advice specific to them rather than demand generalized trends (Behague 2002).

Physician Perspective

However, for the majority there is logical reasoning behind physician encouragement of the use of these technologies. As previously mentioned, the ratio of physicians to patients is uneven. There is a belief that a factor that is spreading technologies that “speedup” birth is the convenience for the physicians. Essentially, by each birth requiring less time they can serve more patients and/or spend less time at work. In addition to convenience, other factors determining their use of these technologies include the economic status of the patient and malpractice issues. Physicians are beginning to notice a greater possibility of legal action (Behague 2002). Such pressure alone could cause the physician to give in to the demands of the patient, regardless of following the proper medical advice.

Alternately, the fact that a greater proportion of lower income women were induced confirms suspicions that medical staff induce birth to prevent Caesarean section only when the women are poor (Behague 2002). In healthcare systems where the procedure conducted is dependent on cost, it is evident that economic and social status would contribute to medical decision-making.

Cultural Considerations

As with development in any sector of a developing nation, culture and social perception must be considered in order to ensure that the changes will be accepted and

utilized by society. Completely adhering to Western techniques is where the science can begin to clash with culture and the problem is not that new medicines are being used but how they are being used.

Perceptions of Pain

My time in India provided me with an insight into the cultural understanding needed to suggest medical practices for a region. The connection between female empowerment, endurance of pain and childbirth are often intertwined. Thus, in attempt to comprehend perceptions of pain, as related to childbirth I studied “Sakthi”, female power.

In southern India widespread Hinduism has led to a crossover between Indian culture and Hindu beliefs. For instance, the caste system and the cow being seen as a noble animal are two examples of this crossover. Another such example is Sakthi which can generally be termed as female power, though it is much more complex than that simply. For a Western mind this concept is difficult to grasp. Initially, I was under the impression that each woman had a sort of threshold that they would hope to fill with Sakthi, as if there was a quantitative measure for the force. However, through speaking with informants, it became apparent that Sakthi is not kept as a reservoir but rather is an ever-attainable strength. Wadley argues that understanding Sakthi can lead to a comprehension of women’s power in Tamil society. The idea of women being innately filled with Sakthi stems from their reproductive abilities. The power can also be gained, or rather enhanced, by women learning to control their powers, especially their sexuality.

In reference to childbirth, most women told me that they felt that Sakthi was

needed to deliver the baby. Most of them did associate the power with religion and noted that prayer was necessary to be able to have this power. Which is not a far concept from a Christian prayer intention. A group of women from the village of Sunda-aprom explained Sakthi as the power needed to push the baby out (Focus group, personal communication, May 30,2006). They drew an energy-flow diagram with arrows leading from the top of the mother's head to the opening of her vagina. As if the initiation of this kinetic energy force would begin as a mental process and continue to travel through the physical organs involved in labor.

The concept of Sakthi is most likely difficult to grasp because it is a subjective term that varies with each individual's perception of strength and power. However, the term is definite in that it is recognized by all members of Tamil culture, to some degree, which means it inherently has an effect on social norms.

In Brazil, social myths have developed into perceived reasons for women to desire surgical birth. The belief that women prefer C-sections because it allows them to maintain the integrity of their vagina and avoid suffering of normal birth have been proven to not reflect the true opinion of the majority of Brazilian women. The 2002 documentary film, "Born in Brazil", explored the validity of these myths that seemed to be perpetuating the propensity of Caesarean sections. The idea the women feared the pain of normal birth and preferred the less painful surgical birth was found to be inaccurate (Biasucci 2002). In various interviews with Brazilian women, the documentary revealed that most women preferred to birth normally but had felt pressured to birth surgically. Thus, for Brazilian women, pain is an expected aspect of childbirth and most do not consider pain as a determining factor of their method of delivery.

Religion and Relationships

There were definite connections between religion and childbirth. In a conversation with Vino Aram, a pediatrician and professor at PSG medical school in Coimbatore, she mentioned the increased religious focus that a friend of hers had when pregnant. According to Aram, who is herself a devout Hindu, there should be an increase in the devoutness and seriousness of religion when a woman is pregnant. Hindu women generally do more regular scripture reading. Women are also encouraged to learn more about their family and personal god so that they can pass that information on to the baby. However, not all of my informants felt the need to have this heightened religious focus during pregnancy. Perhaps this focus on spirituality is most common among women of a certain social status and economic means, or perhaps it is the choice of each individual mother (personal interview, 6/9/06 Vino Aram).

Sumathi, an informant from the village of Parvati Puram, had a birthing experience that was greatly influenced by religion. Sumathi had previously had a miscarriage and was nervous about her current pregnancy and childbirth. While at the hospital her labor was progressing slowly. Her uncle, a devout Hindu, brought an offering to the temple on the hospital grounds. He requested that the gods give his niece strength and protection throughout her labor. Sumathi said that soon after her uncle returned, her labor progressed and she delivered the baby. She believes that the birth occurred because the gods had granted her Sakthi (Sumathi, personal communication, June 15, 2006). Religious practice is a definite choice; one which Sumathi believed enabled her to have a successful birthing experience. Five of my informants visited temple prior to giving birth and admitted to praying during labor.

Brazil is predominately Catholic and has a family-oriented culture (personal communication). As a result, consideration for family is important when entertaining a delivery technique that may not exclude additional people in the room. Also, a devout Catholic mother may pray to Lady O, the patron saint of pregnant women to ensure health (Behague 2002). A Brazilian woman may request a planned C-section to ensure that their child born on a Saint's Day or relative's birthday (Behague 2002).

A characteristic of Brazilian culture is also indicative of receiving the best healthcare: benefiting through personal relationships (Lobato 2000). A housewife whose neighbor is a nurse could benefit equally as well as a senator whose friend is the director of the hospital, in both relationships the housewife and senator could gain hospital benefits (Lobato 2000). This proves an additional detriment to the Brazilian Health System; citizens have more faith in personal relationships than in guarantees of the system (Lobato 2000).

Propaganda

If there are common knowledge medical beliefs it is important to know if they are indigenous medicine or originating from an alternate source. Brazilians are infiltrated with propaganda from the First World about technology and advanced medicine (Behague 2002). There is a multinational insurance company that controls a television station, this gives people knowledge and a feeling of entitlement to demand care that is not possible in their region (Behague 2002).

Proposals for appropriate technologies

Overall, appropriate technologies that could improve the state of childbirth in Brazil and India are overshadowed by excessive use of C-sections and Pitocin injections. There are alternatives to surgical birth, especially for normal, low-risk deliveries, for the healthiest outcome it is necessary to humanize the choices surrounding delivery and birth itself. Rather than allowing external forces, such as the economic status of the mother and the availability of healthcare in the region, to influence the resulting health of the mother and child, the appropriate use of technology should guide the decision of how to deliver.

Natural Birth Through the Use of Midwives

A resurgence of midwives would answer the shortage of physicians and create a more sustainable health care system. Also, having corrected the cultural misconception that women in these cultures request intervention in birth out of fear of pain, we know that natural birth is more likely to be accepted.

In Brazil educational programs for nurse-midwifery have already begun. The University of Sao Paulo started a 4-year undergraduate program in 2005 (Carr & Riesco 2007). If establishing a nurse-midwifery program is not feasible in a certain region, the WHO and NGOs could hold training workshops in the area. In order to maintain the quality of technique taught in initial instruction and for updating new techniques, instructional videos could be used.

One concern in India would be overcoming the traditional image of a dai (midwife) as a low class position (Van Hollen 2003). However, with the additional training of a nurse, the positions should be decipherable. While traditional birth attendants, such as dais, are trained to deliver babies their training is most commonly an informal apprenticeship (Van Hollen 2003). On the other hand, there is a formal curriculum for training nurse-midwives; in the U.S. the profession requires a college education (MHA 2004). Thus, the latter profession has the support of the medical community and will be an asset in expanding the availability of quality care.

Another way to spread this birthing philosophy is through women's self help groups, which are prominent especially in southern, rural areas of India. These groups teach women practical skills in order to assist them in finding employment, thus it would be an ideal place to recruit students of nurse-midwifery (personal communication).

Birthing Centers

Both Brazil and India lack the number of hospitals and medical professionals in rural areas to care for pregnant and birthing women (Carr & Riesco; Vjay, personal communication, June 10, 2006). In the rural northeast of Brazil the amount of women that delivered in hospitals in 2003 was between 50% and 80% (Carr & Riesco 2007). Thus, in order to meet the needs of the population an increase in facility and healthcare professionals will have to occur. The introduction of additional birthing centers and nurse-midwives would be a more cost-effective move towards humanized birth practices. Also, for low risk births, these centers would be a more welcoming environment for family support and, in India could be established in a Gandhian philosophy in an effort to

overcome segregation by caste. In Brazil in 2000 the implementation of the Humanization of Prenatal Care and Childbirth Program occurred as well as a legislation that made birthing centers a feasible option in the public sector (Carr & Riesco 2007). Policy makers saw the high rate of cesarean section as a financial burden to the system and an increased health risk (Carr & Riesco 2007). Also, this shift will save the facilities and the patient because the salary for midwives is much lower than for physicians (Carr & Riesco 2007).

Education and Technology

In addition to education of healthcare professionals, education of the general public is important this will place some decision-making authority with the patient and encourage them to not solely rely on the advice of the medical professional. Also, in this education process, would be the introduction of alternate technologies for intervention that require fewer resources and, if necessary can be used in rural facilities. In rural India, the women's groups would be an ideal source for educating women. They often operate under NGOs or the government, both ideal agencies for distribution of educational materials and instructors. In Brazil, the refocus on midwifery in the 1990's resulted in the creation of two networks, REHUNA and REDESAUDE, that focus on women's rights and evidence-based medical practice (Carr & Riesco 2007). With their already established political and social presence these organizations would be to help educate the general population of women.

In the more urban areas of Southern India and Southeastern Brazil funding for an ad campaign may be most effective. By utilizing the same sources that are spreading

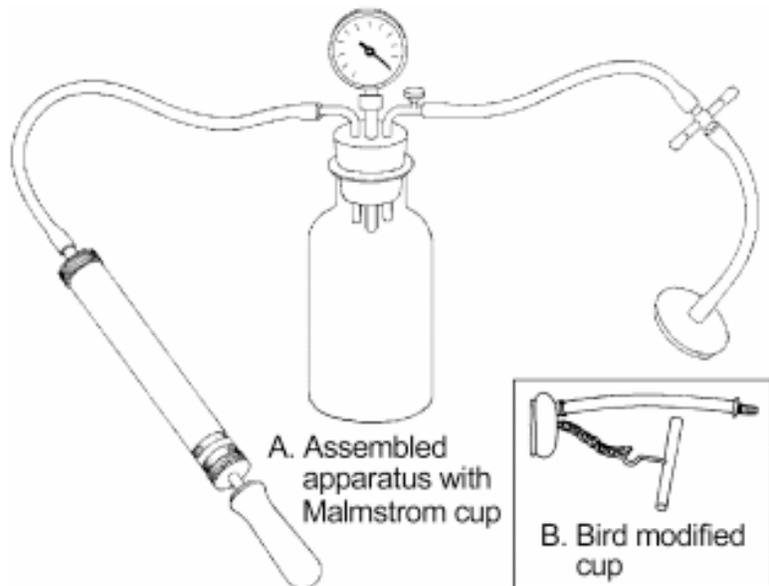
propaganda for western techniques, objective education can be just as effective. In Coimbatore, India several homes and business have television or radio and billboards and the sides of buses are also common methods of mass advertisements (personal observation 6/2006). In Brazil, there is a multinational insurance company that controls a television station, this currently has the contrasting effect of providing Brazilian women with knowledge from First World countries and a feeling of entitlement to demand care that is not possible in their region (Behague 2002). However, a shift of the information aired could make this method of advertisement alternately effective.

In countries with both developed and undeveloped regions technology will spread from developed to underdeveloped areas but may not do so successfully due to the contrast in infrastructure between the two regions. The acceptance of technologies where physicians are not needed would greatly expand the availability of safe birth for all economic classes. Though humanization of low-risk births is the overall goal, there will still be instances of high-risk birth where intervention is necessary. Obstructed labor is a health-conscious reason to perform a caesarean section, because it is a cause of maternal morbidity and mortality (Hofmeyer 2004). Labor can be obstructed due to fetopelvic disproportion, unfavorable position of the fetus, and sometimes due to pelvic tumors or genital cutting (Hofmeyer 2004). These complications lead to numerous causes of maternal death, thus it is vital that, when performing a C-section is not an option, there are alternative methods to predict and properly manage obstructed birth. The following technologies have been prioritized as the most influential in reducing maternal and child morbidity and mortality.

Simplified round partograms (labor graph) can be used to detect obstructed labor even in low-income areas (Wacker J., Utz, B, Kyelem D., Lankoande J., & Bastert G. 1998). It has been shown that, through a self-directed learning program, midwives can learn to properly interpret the partogram (Theron 1999). In the first stage of labor, this device plots the cervical dilation and descent of the head against time (Hofmeyer 2004). Partographs identify active and obstructed labor and determine when a woman has a higher risk birth that will require her to seek additional care (Tsu, Shane 2004).

In rural areas, where a Caesarean section may not be feasible a vacuum delivery, that may need to be coupled with a symphysiotomy, is a useful option. In the event that the cervix is fully dilated and the fetus has not descended after a prolonged second stage of labor, the vacuum extractor could be used in a rural area. Essentially, a cup (figure 1) is attached to the head of the fetus and negative pressure is used to aid in extraction from the mother (RHR 2008). This procedure should be used only when the provider is experienced in this procedure, vacuum extraction alone has failed and there is no degree of disproportion (RHR 2008). In a symphysiotomy a local anaesthetic is injected around the public symphysis so that the ligaments can be divided, temporarily increasing the pelvic diameter (RHR 2008).

Vacuum extractor



(Figure 1, RHR 2008).

The use of Misoprostol is also only recommended when a safe C-section cannot be performed (RHR 2008). In incidences of pre-eclampsia or eclampsia, the most common of pregnancy complications, doses of 25mcg of Misoprostol can be used to ripen the cervix and induce labor (RHR 2008). However, this is considered an unsafe option in some regions since the technology to monitor the fetal heart rate would be required (personal communication, Coppola, L. 4/12/2008). Thus Misoprostol should be used sparingly.

Conclusions

There is not a singular technology that is most appropriate for childbirth. The most appropriate form of delivery is relative to the woman, the level of determined risk in her pregnancy, her cultural, social, and religious beliefs, as well as her economic capabilities within her country's own healthcare system. The introduction and acceptance of developing birthing technologies is key because creating more options will allow physicians, nurse-midwives and other healthcare providers to make a choice based on the needs of the women rather than the limited resources they have. However, as shown in this study of southern India and Brazil, when considering the implementation of a technology in any country the socio-economic factors, beyond strict medical reasoning, must be considered. Having been sensitive to these considerations, the key to literally implementing new technologies is to do so at a small, controlled scale. Continuous research should be conducted in order to ensure quality control and the best possible health outcome for the patient. Ideally, the goal is to avoid the social and economic justifications that have come to surround the use of C-sections and Sintocin in Brazil and India respectively.

As previously mentioned, the expansion of healthcare facilities is predicted to be the most likely innovation to reduce mortality related to childbirth. I encourage both government institutions and local NGOs to focus their healthcare funding toward this particular cause. Establishing facilities at a central location allows for a base for providing quality healthcare. Such locations do not need to consist of a large research hospital; a standard small clinic will suffice. The importance is that the facility is technologically capable of communicating to large local hospitals as well as to

international institutions. Technology is the true bridge across distance. Since patients cannot always reach the closest hospital for emergency care, having an even closer smaller facility with a nurse-midwife present who can contact a physician via phone or internet, is the next best option. Innovations in medicine are constant evolving and in most, telemedicine for example, technology is required. Thus, in an effort to improve globally, third world countries must be equipped, not only in developed areas, but in undeveloped regions as well.

In considering appropriate birthing technologies, we must also keep in mind that childbirth is a natural process, capable of occurring without the use of technology. Medical advances have been essential in reducing death in high-risk pregnancies, but low-risk pregnancies leave natural birth as a safe option. The overall aim for each country and culture to encourage the development of a sustainable system for women of all economic means to successfully receive prenatal care, deliver a healthy child and continue to receive post-partum support.

Acknowledgements

Dr. Lynn Coppola, M.D., Kennedy Center Field Studies, Dr. Decker and Audra White, and my International Studies Peers

References

- Althabe F, Sosa C, Belizán JM, et al. (2006). Caesarean section rates and maternal and neonatal mortality in low-, medium-, and high-income countries: an ecological study. *Birth*,33,270–277.
- Barros FC, Victora CG, Barros AJ, et al. (2005). The challenge of reducing neonatal mortality in middle income countries: findings from three Brazilian birth cohorts in 1982, 1993, and 2004. *Lancet*,365,847–854.
- Behague, DP, Victora CG, Barros FC.(2002). Consumer demand for cesarean sections in Brazil: informed decision making, patient choice, or social inequality? A population based birth cohort study linking ethnographic and epidemiological methods. *BMJ*,324, 942.
- Belizan, JM, Althabe, F, Cafferata, ML.(2007). Health Consequences of the Increasing Caesarean Section Rates. *Epidemiology*,18(4),485-86.
- Better by the Year* Website. Retrieved March 19, 2008, from http://www.betterbytheyear.org/brazil/brazil_health.htm
- Bhaskaranda, S. (2nd ed.). (2002). *The Essentials of Hinduism: A Comprehensive Overview of the World's Oldest Religion*. Viveka Press.
- Brazil Travel* Website. (2008). *Sao Luis, Maranhao*. Retrieved May 1, 2008, from <http://www.v-brazil.com/tourism/maranhao/sao-luis.html>
- Business Maps of India* Website. (2008). Retrieved May 1, 2008, from <http://business.mapsofindia.com/india-gdp/statistics.html>
- Biasucci, C. (Director). (2002). *Born in Brazil* [Documentary Film]. Based on research of Kristine Hopkins, Ph.D. Firefly Film Productions.
- Carr, M. and Riesco, M.L.G. (2007). Rekindling of Nurse-Midwifery in Brazil. *Public Policy and Childbirth Trends*,52(4), July/August.
- CFM/FIOCRUZ (Conselho Federal de Medicina and Fundação Oswaldo Cruz).(1996). Perfil dos médicos no Brasil. *CFM, Ministério da Saúde, FIOCRUZ, Programa da Nações Unidas para o Desenvolvimento, Rio de Janeiro, Brazil*, 1, 80, and 6, 216.
- Chopa, A. (August 25, 2005). India Moves to Spread Wealth. *The Christian Science Monitor*[online], Retrieved on May 2, 2008 from <http://www.csmonitor.com/2005/0825/p01s03-wosc.html>.

- Clarke, A., Shim, J. K., Mamo, L., Fosket, J.R., and Fishman, J.R. (2003). Biomedicalization: Technoscientific transformations of health, illness, and U.S. biomedicine. *American Sociological Review*, 68, 161-194.
- Cox, C. (November 8, 2006). Micro Health Insurance Hedges Risk for India's Poorest. *The Christian Science Monitor* [online]. Retrieved on May 2, 2008 from <http://www.csmonitor.com/2006/1108/p04s01-wosc.html>
- Theron, G.B. (1999). Effect of the maternal care manual of the perinatal education programme on the ability of midwives to interpret antenatal cards and partograms. *J Perinatol*, 19, 432-435.
- Hippocratic Oath, Modern Version Survivor M.D.* Website. Retrieved on May 1, 2008 from http://www.pbs.org/wgbh/nova/doctors/oath_modern.html
- Hofmeyr, G.J. (2004) Obstructed labor: using better technologies to reduce mortality. *International Journal of Gynecology and Obstetrics*, 85, Suppl. 1, S62-S72.
- IPEA (Instituto de Pesquisa Econômica e Aplicada). (1996). *Relatório sobre o desenvolvimento humano no Brasil*. IPEA, Rio de Janeiro, Brazil, 185.
- Ladewig, P., London, M., and Olds, S. (5th ed.). (2001). *Contemporary Maternal-Newborn Nursing Care*. New Jersey: Prentice Hall.
- Lobato, L. (2000). *A Comparative Analysis of Health Care Reform in Argentina, Brazil and Mexico*. IDRC book. Retrieved on March 28, 2008 from http://www.idrc.ca/en/ev-35519-201-1-DO_TOPIC.html.
- Lobo, Irene. (2006). Maternal Mortality Still Too High in Brazil: 74 Deaths Per 1,000 Births, Retrieved on 3/25/08 from <http://www.brazzilmag.com/content/view/6403/53/>
- Maine, D. (1991) *Safe Motherhood Programs: Options and Issues*. Center for Population and Family Health. New York: Columbia University.
- MHA Health Career Center* Website. (2004). Certified Nurse Midwife. Retrieved on May 2, 2008 from <http://www.mshealthcareers.com/careers/certnursemidwife.htm>.
- O'Neill, J. (2005). *Global Economics Paper No. 134*. Goldman Sachs Global Economic Website. Retrieved on May 1, 2008 from <https://portal.gs.com>.
- Poffenberger, T. (1975). *Fertility and Family Life in an Indian Village*. Ann Arbor: The University of Michigan.

- RHR, WHO Website. (2008). Retrieved on March 20, 2008 from
http://www.who.int/reproductivehealth/impac/Procedures/Vacuum_extraction_P27_P31.html
- Ribeirao Preto Travel Guide Website. (2008). Retrieved on May 1, 2008 from
<http://www.world66.com/southamerica/brazil/ribeiraopreto>.
- Ribeiro, V.S., Figueiredo, F.P., Silva, A.A.M., Bettiol, H., Batista, R.F.L., Coimbra, L.C., et al. (2007) Why are the rates of cesarean section in Brazil higher in more developed cities than in less developed ones? *Brazilian Journal of Medical and Biological Research*, online ahead of print, www.biournal.com.br.
- Sao Luis. (2008). Retrieved on May 1, 2008 from
<http://darkwing.uoregon.edu/~sergiok/brasil/saoluiz.html#start>.
- Tsu VD, Shane B. (2004) New and utilized technologies to reduce maternal mortality: call to action from a Bellagio workshop. *International Journal of Gynecology and Obstetrics*, 85, Suppl. 1, S83 – S93.
- U.N. Millenium Development Goals Website. (2008). UN Web Services Section, Department of Public Information. Retrieved on March 20, 2008 from
<http://www.un.org/millenniumgoals/>
- Van Hollen, C. (2003). *Birth on the Threshold: Childbirth and Modernity in South India*. Los Angeles: University of California Press.
- Villar J, Valladares E, Wojdyla D, et al. (2006). Caesarean delivery rates and pregnancy outcomes: the 2005 WHO global survey on maternal and perinatal health in Latin America. *Lancet*, 367, 1819–1829.
- Wacker J., Utz, B, Kyelem D., Lankoande J., & Bastert G. (1998). Introduction of a simplified round partogram in rural maternity units: Seno province, Burkina Faso, West-Africa. *Tropical Doctor*, 28(3), 146-152.
- Wadley, Susan, ed. (1980). *The Powers of Tamil Women*. Syracuse, N.Y.: University of Syracuse, Foreign and Comparative Studies Program.
- Wagner, M. (2001). Fish can't see water: the need to humanize birth. *International Journal of Gynecology & Obstetrics*, 75, S25-S37.
- Wilson, B., Shannon, M., Stang, C. (2001). *Nursing Drug Guide*. New Jersey: Prentice Hall.

WHO Website. (2008). Retrieved on March 19, 2008 from <http://www.who.int/whosis/database>.

WHO Website. (2006). Mortality Country Fact Sheet 2006. Retrieved on March 31, 2008 from http://www.who.int/whosis/mort/profiles/mort_searo_ind_india.pdf.

WHO. (2005). *Facts and Figures_* Switzerland: World Health Organization.

Wikipedia Website. (2008). Coimbatore, India Page. Retrieved on March 20, 2008 from <http://www.wikipedia.com>.

World Fact Book Website. (2007). India and Brazil. Retrieved on May 1, 2008 from <https://www.cia.gov/library/publications/the-world-factbook/print/in.html>