Comparison of Maternity Experience and Services in Japan and Paraguay

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Abstract
In Japan, the maternal mortality ratio per 100,000 per live births (MMR) has been decreased dramatically after the Second World War. Its MMR in 1997 is 6.5 per 100,000 live births, which is higher than that of some European countries. In Paraguay, MMR in 1995 is 130.7, which is higher than that of most Latin American countries.

The maternal health situation, health systems and maternal experiences of Japan and Paraguay are compared to learn ways to decrease MMR in each country, reviewing the statistical data and the leading studies from the Ministry of Health and the International Organization. In addition, the author’s working experience in Paraguay and four maternity experiences are documented for comparison.

In Japan, appropriate distribution of human resources and referral systems functioning on a 24-hour basis are still required to improve maternity care and services. In Paraguay, midwives trained at university level could manage some emergency cases to save mothers’ lives. However, there are not sufficient numbers of trained midwives in Paraguay. Increasing and distributing the number of trained midwives in Paraguay will be successful to reduce high MMR.

For both countries, the leading causes of high maternal mortality are complex. Japanese experience in reducing MMR and improving maternal health status after the Second World War should be analyzed from multiple aspects such as socioeconomic factors and women’s status, and can be shared with other developing countries such as Paraguay. (232 words)

Key words: Maternal mortality, Maternity services, Midwifery performance, Equity of distribution, Referral system

Introduction
The World Health Organization (WHO) recommends training of health personnel who assist at deliveries as one of the prior strategies to reduce maternal mortality. However, midwifery education and training systems are different in each country. The level of maternal mortality is not related only to health personnel training.

Medical and health care systems in Japan are of high quality compared to developing countries. However, its Maternal Mortality Ratio per 100,000 live births (MMR) is higher than that of most European countries, because the reporting system of MMR in Japan should be considered to discuss. In Paraguay, its MMR is one of the highest among Latin American countries.

In this paper, the maternal health situation, health systems, and maternal experience of Japan and Paraguay are documented and compared. The contribution of midwifery training and performance to reduce maternal mortality will be discussed. Beyond midwifery training, we can learn to establish better access to emergency services, referral
systems, and distribution of health personnel and resources in terms of the different health situations in each country.

Methods

Midwifery education and performance, maternity health systems and reporting systems of MMR in Japan and Paraguay are documented by the leading studies including the author’s working experiences in Paraguay.

Statistical data from the respective Ministries of Health of both countries is documented. MMR, the causes of maternal death, the number of physician and nursing staff, and the percentage of births attended by trained health personnel are compared. The coverage of medical insurance and women’s status such as literacy rate and the rate of school enrollment are also documented.

The author has interviewed in depth her own mother and grandmother in Japan, and the author’s working counterpart in Paraguay, and the counterpart’s mother in depth about their experience.

The interviews caused the following points.
1) How many times have you been pregnant?
2) How many times did you deliver?
3) How many babies were alive?
4) If you have experience of stillborn or perinatal death, or any other complications of pregnancy and delivery, tell details of it.
5) Where did you deliver?
6) Who assisted at your deliveries?
7) When you delivered, where did you live? If you lived in a rural area, how far from a capital city or major city where there was a hospital?
8) How old were you when you became pregnant the first time?
9) Did you attend prenatal care during your pregnancies? If yes, how many times for each pregnancy?

Results

Review of maternity situation

The Japanese MMR in 1997 is 6.5, and MMR of Switzerland and Sweden are 5. In Paraguay, MMR in 1995 is 130.7, which is high compared to other Latin American countries such as Costa Rica, which is 29, and that of Argentina is 38.

In Japan the main causes of maternal death are pulmonary embolism, postpartum hemorrhage, hypertensive disorders and indirect causes. According to Shinagawa’s study, sudden deaths are possibly related to drugs such as prostaglandin and oxytocin. Takeda’s study also reported a relation between maternal deaths and these drugs. Takeda’s study in 1996 recommends improving referral system functioning on a 24-hour basis, because most maternal deaths in Japan occur with lack of appropriate care for emergency cases in the perinatal period.

In Paraguay, while hemorrhage and hypertensive disorders are also causes of maternal death, other major causes are abortion and obstructed labor such as prolonged labor and pelvic presentation. In Paraguay, induced abortion is prohibited, and therefore some hemorrhage in prenatal period could be related to unsafe abortion and incomplete abortion. Women who live in rural areas do not attend prenatal care. Sixty one percent of deliveries are attended by trained health personnel. The remainders are attended by untrained persons, because trained health personnel are not available in rural areas.

Women seek Traditional Birth Attendants (TBAs) for deliveries in rural areas, even though they attend prenatal care at health facilities.

In Japan, midwifery education follows on 3-4 years of nursing education at a professional nursing institute or university. As a prerequisite to nursing education, 12 years of primary and secondary education is required. Midwifery education consists of one year of specialized education after this basic nursing education. In Japan, there are multiple courses of basic nursing education.
most common is a 3-year course in a nursing college or institute. The alternative is a 4-year course in a university. In some universities, it is possible to complete a midwifery component during 4 years of nursing education.\(^{15-19}\)

In Paraguay, there are two levels of midwives; a university level trained midwife and an auxiliary level. For university trained midwives, 12 years of primary and secondary education before nursing or midwifery education is required. Midwifery education consists of one year of specialized education after 4 years nursing education. An alternative path is 4 years midwifery education without nursing education as direct entry. Those educated at university level are called “licensed midwife”.\(^{19-22}\) An auxiliary midwife is trained for 10 months after 10 or 12 months of nursing education. For auxiliary nursing education, 9-years primary and secondary education is required. However, until few years ago, basic nursing education was not required as part of auxiliary midwifery education. Some midwives who are working currently are not trained in nursing.\(^{19-22}\)

In both Japan and Paraguay, midwives assist only normal deliveries. Midwives do not suture in Japan, but the licensed midwives perform episiotomies and suture in Paraguay. In Japan, for midwives, performance of intravenous injection is not permitted, even though many do actually perform this function from experience. In Paraguay, the licensed midwives give intravenous injection, and they are formally trained to do this. In Japan, the midwives cannot prescribe any medication, even in emergency cases. In Paraguay, the midwives, at both the licensed level and auxiliary level prescribe essential drugs except antibiotics. In some remote areas of Paraguay, prescription of antibiotics is permitted to the midwives of both levels. Some Paraguayan midwifery skill are higher-level and better trained than those of Japan, such as suturing, intravenous injection and prescription of essential drugs.\(^{15-22}\)

The population of Japan is 126,486,000,\(^{7}\) and that of Paraguay is 5,218,885.\(^{8}\) The area of Paraguay is 1.1 times that of Japan. The number of physicians per 1,000 population (1988-92) of Japan in 1996 is 1.9,\(^{7}\) and that for Paraguay in 1997 is 0.69.\(^{8}\) The number of public health nurses per 100,000 persons in Japan is 25.0, and that for midwives is 18.7.\(^{7}\) The number of registered nurses and assistant nurses per 100,000 persons in Japan is 743. The number of licensed nurses and/or midwives per 100,000 persons in Paraguay is 12.\(^{8}\) The number of nurses who are trained at technical level is 25 per 100,000 persons, and that for auxiliary nurses and/or midwives is 70 per 100,000 persons in Paraguay.\(^{8}\) The total number of nursing staff per 100,000 persons in Japan is 778,\(^{7}\) and that for Paraguay is 107.\(^{8}\)

In Paraguay the major health personnel who work at health facilities in a rural area are auxiliary nurses or auxiliary midwives without physician.\(^{13,14,23}\) The Paraguayan health system is characterized by inequality and inequity of distribution of health facilities, including the referral system. Even though the quality of health personnel education at university level and their performance are high, maternal mortality continues to be a significant problem throughout Paraguay.\(^{8,13,14,19}\)

The Gross National Product (GNP) per capita of Paraguay is US$2,010, and that of Japan is US$37,850.\(^{24}\) The percentage of total health expenditure per GNP of Japan is 6.5%,\(^{25}\) and that of Paraguay is around 7.4%.\(^{8}\) In Japan, 99.9% of the population are covered by some type of medical insurance. Social insurance covers 65.3% of the population, and the national medical insurance covers 34.7%.\(^{7}\) In Paraguay, only about 14% of the population is covered by medical insurance.\(^{8}\) There is no national medical insurance in Paraguay.

In Paraguay, the total literacy rate for females is 90%.\(^{6}\) The primary school enrollment for both males and females is 93%. The percentage of primary school children reaching grade 5 is 71%.\(^{4}\) The secondary school enrollment rate for females is 45%.\(^{4}\) In Japan, both the primary school enrollment rate and the secondary school enrollment for
females are 100%.

**Personal experience of childbirth and delivery**

The following reports of personal experience of childbirth and delivery are intended to review how maternal health care has changed in these two countries, over two different generations. These episodes will be compared available maternity services of 1940s and 1970s in two countries.

**a. Experiences in Japan**

The author's grandmother was born in 1911. When she had her first delivery in 1933, she lived in a rural area of Japan, 20 minutes by car from the center of the town. One midwife who was trained at midwifery school lived in the next town, about 40 minutes by bicycle. The medical doctor who lived closest to her village about 20 minutes by bicycle was not an obstetrician.

She had four pregnancies and deliveries, including two stillborn. She delivered twins with assistance of the trained midwife. One of twins was stillborn, and other one is the author's mother. However, the other three deliveries were attended by the owner of a tobacco shop that was 200m from her house. She never received prenatal care for any of her pregnancies.

When the author’s mother delivered her first baby at a hospital in 1965, a medical doctor attended. The hospital was located 10 minutes by car from her house in a rural area. By this time in Japan, the maternal and child health care was guaranteed by the maternal and child health law. She had a maternal and child health handbook (MCHI) from her first pregnancy. According to the handbook, she received prenatal care more than 10 times during the pregnancy. Her second and third pregnancies and deliveries were attended as well as her first experience.

These two personal histories show clearly the development of the Japanese maternal health care systems from the 1930s to 1960s in Japan.

**b. Experiences in Paraguay**

The Paraguayan grandmother, Ines (assumed name), was born in 1927. When she became pregnant in 1947, she lived in a small town about 90 km from the capital city, Asuncion. In the town, there were a few TBAs, but there was no medical doctor or trained midwife.

During this pregnancy, she never received prenatal care. When her labor began, she went to the Red Cross hospital in the capital city by bus, and alone. She delivered without problem with the help of a trained midwife. Usually women who lived in the same town delivered with the assistance of TBAs. For example, her sister had 5 deliveries. She never received prenatal care, and all of her deliveries were attended by TBAs. However, Ines did not want to deliver by TBAs.

Fifteen years later, Ines was pregnant again. She lived in the same town. At that time, there was a trained midwife at the auxiliary level, who worked at the health center. When she delivered at home, the midwife came to her home. At that time, there was still no medical doctor in the town.

Ines's first daughter was named Christina (assumed name). She was the author's working counterpart in Paraguay. She had her first delivery in 1978. She received prenatal care about 10 times with an obstetrician during the pregnancy. She had obstructed labor because her baby weighed 4.2 kg. She delivered in the hospital with the assistance of an obstetrician and a trained midwife. In 1980, she had her second delivery at the same hospital with the obstetrician and a licensed midwife, trained at the professional level.

Usually, at this time in Paraguay's history, people who lived in urban areas delivered at hospitals. However, those who lived in the small towns and rural areas delivered at home with the assistance of TBAs.

**c. Conclusion of personal experiences**

These four people's case studies show changes and developments in maternal health care services in these two countries.

The situation of rural Japan in the 1930s–1940s and rural Paraguay in the 1940s was at the same
level. A majority of rural women in both countries delivered with the assistance of an untrained person such as deliveries of the author's grandmother and Ines's sister. In Japan, MMR in 1950 was 176.1, and the perinatal mortality rate in 1952 was 45.6 per 1,000 live births.7

The situation of the capital city of Paraguay in 1970s and of the rural city of Japan in the 1960s-1970s was at the same level. The author's mother and the author's counterpart delivered with assistance of trained medical staff such as a medical doctor and midwife.

In Paraguay, there are differences of quality, quantity, distribution and accessibility of health care services between urban and rural areas. According to the author's experience in rural Paraguay during 1995 to 1998, a majority of rural women deliver with the assistance of TBAs or auxiliary nursing staff. They do not receive prenatal care during their pregnancy. Many rural women have to walk more than 10 Km, sometimes 20 Km, to receive prenatal care and to deliver with the assistance of auxiliary nursing staff. It is neither easy and realistic to visit health facilities every month during their pregnancy. They prefer to ask TBA's assistance for their deliveries, because TBAs come to pregnant women's homes.

In 1997, there was a maternal death in front of the health center in a village of Paraguay. The pregnant women came to the health center from a distance early morning, because she had an obstacle of labor and hemorrhage. Nobody worked in the health center, even though a night turn nurse should be there. Eventually, she died without appropriate care.

There are no differences between available maternity services in Japan and in the urban areas of Paraguay at the present time. However, in a rural area of Paraguay there are no changes of available maternity services between 1940s and 1997.

Discussion

Statistical data

The data of UNICEF is reported by official governments, and are not adjusted concerning misclassification and misreport. WHO and UNICEF are reviewing these data.4 The Japanese data of UNICEF might have been adjusted recently, because the Japanese MMR was 18 in 1998.26 However, it is 8 in 2000.4

The Japanese maternal mortality ratio per 100,000 total births in 1997 was 6.3 according to the Ministry of Health and Welfare.9,10 However, the maternal mortality ratio per 100,000 live births is reported under an international comparison, and that of Japan is 6.5 in 1997.7 Both maternal mortality ratios include direct and indirect causes.9,10 However, the Japanese reporting system may not be suitable for reporting direct and indirect causes of maternal death.5 Twelve unreported maternal deaths in 1991 and 1992 were identified by the study group of Ministry of Health and Welfare.5 The Japanese MMR should be considered these unreported cases and misclassification, and therefore could be much higher than that of United States and European countries.5

The Paraguayan data of WHO/UNICEF could only be from institutional maternal deaths. The maternal deaths that were attended by non-professionals such as untrained TBAs and family would not be included in the official data. According to the Ministry of Health (MOH), MMR of Paraguay in 1995 is 130.7, and it is decreasing over the past 5 years.8 However, MOH reported MMR was 124.51 in 1993.13 At least, according to the data of UNICEF, MMR of Paraguay has declined from 300 in 1995 to 190 in 1999.4,27

In Paraguay, there are untrained TBAs and trained TBAs by Safe-Motherhood Initiatives of WHO/UNICEF over ten years.28 The data of the percentage of births attended by trained health personnel would include deliveries attended by TBAs trained by UNICEF. In 1998, WHO suggested that a
Skilled Birth Attendant (SBA) should attend all deliveries. "Skilled Birth Attendants" are defined by WHO as trained midwives, nurses, nurse-midwives or doctors who have completed a set course of study and are registered or legally licensed to practice. The WHO's definition of SBA does not include TBAs, including those who have been trained. According to the author's experience, deliveries attended by trained TBAs are reported as births attended by trained health personnel from 1995 to 1998 in Paraguay.

Organization of health services in Japan and Paraguay

MCHH program was a most important strategy in Japanese maternal health care. The idea was initiated by the director of Maternal and Child Health (MCH) department of Ministry of Health, and was promulgated in 1942 and was improved as MCHH in 1947. In the author's experience, the number of pregnant women who have received prenatal care has been increased by promoting MCH in rural Paraguay.

In Maeda's study, perinatal mortality reduction has been accomplished by available medical care, modern technology and medical insurance, which have been promoted by economic process and urbanization. Japanese women's high literacy rate and MCHH would contributed indirectly to a decrease in perinatal deaths, even though this does not show in statistical evidence. There is no study about the relation between the reduction of MMR and the improvement of maternity health services in Japan. A concrete study about the relation between the improvement of MCH and the economic revolution in Japan should be done to identify essential factors of development in Japanese MCH.

The Japanese health system is decentralized at the municipal level. Every municipal office employs public health nurses. In Japan, safe motherhood care consists of routine services offered in municipal offices, regional public health centers and private hospitals/clinics. In 1965, the maternal health care system with the Mother & Child document was completed under the Maternal & Child Health Law. This required pregnant women to register their pregnancy at the municipal office. The municipal office prepares a health record card and handbook for use during pregnancy, and until the child is six years old. These cards and handbook are used as references. Even if the pregnant women and the mother with child move to another region of Japan, these references are available. This handbook has been helpful for self-management of women during pregnancy. The high education level of Japanese women and this handbook also have helped to provide information for women.

In Japan, midwives are licensed as registered nurses. Midwives usually work in the obstetric department of hospitals. However, Japanese midwifery performance does not extend outside of hospitals/clinics or to communities that have less access. In Japan, 10.8% of midwives work in the communities in midwifery clinics or assisting at home births to manage normal deliveries.

In Paraguay, the Ministry of Public Health is developing a decentralized health system under the National Health System Plan. The maternal information system was implemented in 1996 in the national hospital and in some regional hospitals with the support of the Pan American Health Organization (PAHO) and UNICEF. However, this system does not function adequately due to a lack of human resources and funding, and a lack of information and training.

In the urban areas of Paraguay, midwives work only in the obstetric department or obstetric hospitals/clinics. They have no relationship with the general nursing department at the regional hospital level or at the national level of the Ministry of Health. Paraguayan midwifery performance at the national level does not link to the community and nursing performance. However, at the health post level, where only auxiliary midwives and/or auxiliary nurses work, the health care programs are integrated. Even auxiliary midwives perform as auxiliary nurses doing immunizations, treating
Acute Respiratory Infection (ARI) and managing diarrhea control programs.

**Maternity experiences**

Two personal histories in Japan clearly reflected the development of Japanese maternal health care. In 1950, the ratio of births in urban areas to those in rural areas was 1:2 in Japan. The institutional delivery rate was 4.5% in 1965, and it was 84.5% in 1965. After the Maternal & Child Health Law, the institutional delivery rate increased to 96.1 in 1970, and that of 1997 was 99.8%. In Japan, MMR of 1950 was 176.1, and that of 1965 was 87.6. In Paraguay, the percentage of population urbanized in 1998 is 52%. At least, a half of Paraguayan population is subject to a health situation similar to that of Japan in 1950.

**Japanese maternal mortality and maternity services**

The major causes of maternal death among Japanese women are sudden death by postpartum hemorrhage, pulmonary embolism, and hypertensive disorder occur in the perinatal period. These sudden deaths related to pregnancy and delivery may be difficult to reduce, even with the high bio-medical technology available in Japan.

**Paraguayan maternal mortality and maternity services**

The reasons for higher maternal mortality in Paraguay could be poor accessibility to health care services and inequity and inequality of distribution of health care services, functioning referral systems, and trained health personnel. The lack of health personnel/facilities and accessibility to health services should be tackled to decrease MMR in Paraguay, especially in rural areas. Both induced abortion and natural abortion could be prevented and could be handled to save mothers' lives through providing adequate prenatal care and emergency care, and referral systems. Providing appropriate and equitable health services in Japan was a key factor improving health status. In Paraguay, when the distribution of health personnel, health facilities, and accessibility to suitable maternity health care can be improved like it has in Japan, MMR of Paraguay can be decreased. In addition, socioeconomic progress and women's empowerment, such as improvement of women's education level and literacy rate could contribute into the improvement of health status in Paraguay.

WHO also suggests appropriate maternal health care services should be provided at the lowest level where the mothers can access then. Thus these services mean that skilled birth attendants should be distributed at the lowest level. At least, emergency cases should be managed using essential drugs and equipment at this level, and functioning referral systems should be available between the lowest level and higher health facilities. The World Bank has also suggested on cost-effectiveness grounds improving safe motherhood programs with the strategies described above.

Auxiliary midwives in Paraguay cannot contribute significantly to reducing maternal mortality, even though auxiliary midwives can help to provide better pre- and postnatal care. Auxiliary midwives are trained to assist at normal deliveries and to provide basic pre- and postnatal care, but they are not trained to manage emergency cases. Licensed midwives in Paraguay are trained sufficiently to assist at normal deliveries and to detect risks and complications related to pregnancy. And licensed midwives can manage some complications of pregnancy and delivery. If licensed midwives were distributed in rural areas instead of or in addition to TBAs and auxiliary midwives, they could contribute to reducing maternal mortality, performing some medical skills such as suturing, intravenous injection and prescribing medications. However, still they cannot contribute enough, if there are no functioning referral systems and transportation, because many cases of maternal deaths need assistance of obstetricians performing such procedures as cesarean and blood transfusion.

To decrease high maternal mortality, Paraguay requires an increasing number of midwives trained...
at university level and appropriately distributed, improving performance of auxiliary midwives and TBAs for assistance of normal deliveries, and establishing referral systems with functioning transportation and communication systems, such as radio. Social infrastructures such as main road maintenance and disaster prevention and measures, especially for flooding in Paraguay, also are required. When these resources and systems are functioning, the role of midwives, including licensed and auxiliary midwives, as well as TBAs can contribute to saving mothers’ lives.

Conclusion

Maternal mortality is one of the priorities among world health problems that have to be solved in the world. WHO and other organizations, and countries have been challenged to improve safe motherhood and to reduce maternal mortality. However, the leading causes of maternal mortality are complex. It is difficult to solve these problems by a vertical strategy; in other words, to improve maternal health multiple strategies are required.

We have learnt from the case studies of Japan and Paraguay that it is important to distribute basic maternity health care services with trained health personnel and a functioning referral system. The obstacle of maldistribution of health services in a health system relates not only to a lack of trained health personnel and equipment, but to a lack of resources in peripheral areas. A sustainable and feasible health system should be accomplished by trained health personnel with a functioning referral system to manage emergency cases.

Continuing midwifery training, even TBA training, can contribute to early detection of risk factors during pregnancy and postpartum, and better assistance at normal deliveries. These are same ways for the midwife to reduce maternal mortality. At the same time, the support systems such as referral system and functioning equipment should exist to provide effective and efficient health care services.

There is a paradigm shift of health care services to promoting broadly basic health care services, instead of increasing health care services with high technology in narrow areas. This comprehensive approach may make health care services function more cost-effectively in both Japan and Paraguay.

The Japanese experiences of the reduction of MMR and the improvement of maternity systems/services should be analyzed concretely from multiple points of views, for example the relationship between economic revolution and the improvement of maternity status. The Japanese process of development could highlight factors feasible for implementation in other countries.

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References


日本とパラグアイにおける妊娠・出産に関する経験と保健サービスの比較

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要旨

1997年の日本の妊娠婦死亡率は6.5であり、一方1995年のパラグアイの妊娠婦死亡率は130.7である。日本とパラグアイにおける妊娠保健の状況と妊娠・出産に関する経験を比較し、妊娠婦死亡率を低下させるための戦略を考察する一助とする。日本においては、現在においても妊娠婦保健医療向上のために、数多、質共に適切な医療従事者の配置と24時間管理体制の整備が必要であると報告されている。パラグアイにおいては、トレーニングを受けた助産婦数の確保と適切な配置が、妊娠婦死亡率を低下させる戦略として不可欠である。しかしながら、両国における妊娠婦死亡原因とそれをとりまく背景は複雑に入り組んでいる。今後の課題として、戦後、日本がたどった妊娠婦死亡率低下と妊娠婦保健サービス向上の経験を、社会・経済的要因や女性の地位等も含めて多角的に研究することにより、パラグアイをはじめとする開発途上国の妊娠婦保健向上のために貢献できると考える。

キーワード：妊娠婦死亡、妊娠婦保健サービス、助産婦の機能、公正な配置、レファラル・システム