

Original Article

Evaluation of Provision, Utilization and Quality of Emergency Obstetric and Neonatal Care in the Health District of Kadiolo Mali

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Abstract

Objective: The study was aimed to improve the provision and use of emergency obstetric and neonatal care in the Health District of Kadiolo Mali.

Methodology: It was a cross-sectional descriptive study that consisted of collecting public health structures offering complete or basic emergency and neonatal care (SONUC or SONUB) in the Kadiolo health district. The sample consisted of all the women who had obstetrical complications or maternal deaths registered in the SONU. United Nations process indicators were used to compare the data.

Results: the health district of Kadiolo has one SONUC and three SONUB for 304,000 inhabitants in 2016 and for 313,480 in 2017 (standard is four SONUB or one SONUC 500,000 inhabitants) The SONUC structures were unevenly distributed in the Kadiolo district. Indeed, SONUC of Kadiolo and SONUB of the central community health center and of Zegoua were all located within a radius of 15 km. SONU of Fourou was located more than 100 km from the SONUC SONU structures. The main maternal fetal obstetric emergencies were hemorrhages (3%), uterine rupture (5%) and eclampsia (1.2%).

Conclusion: At the end of this study, we say that the improvement, use and quality of services depend on the availability of qualified staff at the districts level and the functionality of the referral – evacuation system. The extension of SONU structures and the involvement of all stakeholders are necessary to reduce maternal neonatal mortality.

Keywords: Provision, utilization, health workers. Neonatal care, maternal mortality

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Introduction

Pregnancy, childbirth and their consequences are still the main causes of death, disease and disability among women of childbearing age in developing countries.¹ In these countries, more than 300 million women suffer from acute or chronic pathologies attributable to pregnancy or childbirth. In Africa, maternal mortality is by far the highest, with a risk of maternal death of 1 in 16 compared to 1 in 2800 in rich countries. According

to the WHO, hemorrhages are the main cause of maternal death (34%), followed by infections (21%), unsafe abortions (18%) and hypertensive disorders during pregnancy (16%). A significant proportion of deaths occur during pregnancy.^{1, 2} Each year, 68 000 deaths are due to unsafe abortions. The international community concerned with health and development called for action to tackle maternal and perinatal

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mortality.

Governments have undertaken to do so, in particular at the international conference on population and development (Cairo, 1994) and the fourth world conference on women (Beijing 1995),^{3,5} in Mali, a lot of work has been devoted to maternal mortality, according to the fifth demographic health occurred in Mali (EDSMV) the maternal mortality rate is 468 per 100,000 live births, or 1 in 24 maternal deaths during the period genital activity.⁵ The health district of Kadiolo is one of the districts where the maternal and neonatal mortality rate is very high. Maternal and fetal mortality is the result of three delays which are:

- 1st delay: delay in deciding to seek treatment;
- 2nd delay: linked to transport (road and medium);
- 3rd delay: administering care. It is inherent in health services.

Emergency obstetric and neonatal care (SONU) was implemented in 2004 in Mali to ensure the management of obstetric and neonatal emergencies. Strengthening emergency obstetric and newborn care is a key strategy for achieving significant improvements in reducing maternal and newborn mortality. These SONU include a large number of obstetric and neonatal interventions. It is: parenteral administration of antibiotics, parenteral administration of oxytocics, parenteral administration of anticonvulsants, artificial delivery of the placenta, uterine evacuation by manual or electric suction; instrumented vaginal delivery; resuscitation of the newborn; obstetric surgery (cesarean section); blood transfusion. The choice to evaluate the supply and use of emergency obstetric and neonatal care in the health district of Kadiolo is motivated by several reasons including in particular the implementation in the district of the national strategy to reduce maternal and newborn mortality in line with goal 3 of the sustainable development goals (SDGS); the fact that Kadiolo health district has benefited from considerable support from technical and financial partners and from the State's contribution in terms of equipment and the allocation of qualified staff since 2016 to improve the supply and use of emergency obstetric and neonatal care (SONU). This study is justified by the importance and relevance of evaluating the supply and use of care to measure the efforts made, identify weaknesses and make improvements. Our choice was also motivated by our two years of professional experience spent in this district where the reduction of

maternal and neonatal mortality was the main goal. It is in this context that we initiated this work as a goal to describe the availability of SONU, to specific the accessibility of SONU; to determine the quality of SONU; to measure the use of SONU.

Methodology

Study framework: Kadiolo covered an area of 60640 square kilometers for a total population of 313.480 inhabitants per square kilometer distributed of nine rural communes and 24 health areas. The Kadiolo health district is a cross border district with Ivory Coast and Burkina Faso. He had a dozen of gold panning sites were namely: in the municipalities of Fourou Messeni, Diou – These areas of gold panning sites were a mobile or floating population not resorting to care. Obstetrical in this risk group as evidenced by the reference – evacuation report. The district had a population of 313.480 inhabitants. The numbers of childbearing age were 68.966 for 15.674 pregnant women. Type and period of study: It was a retrospective cross – sectional descriptive study which consisted of collecting at the level of public health structures offering emergency obstetric and neonatal care in the Kadiolo health district. Maternal and newborn data as well as data concerning human and material resources were collected for the period of 2016 and 2017, The data allowed us to calculate the United Nations process indicators to access the availability, accessibility. The sample consisted of:

- Health structures offering basic or comprehensive emergency obstetric and neonatal care in the rural health district of Kadiolo.

All women received in public health structures in the health district of Kadiolo for any complications related to pregnancy, childbirth and post-labor in 2016 and 2017.

- All maternal and perinatal deaths are related to pregnancy, childbirth or the aftermath of childbirth recorded in health structures providing emergency obstetric care.

Data collection: The techniques used for the data collection are the documentary review of the SONU reports and the data collection from the software (management of referral-evacuation system) GESYRE and District Health information software 2 (DHIS2). in two phases. A preparatory phase and an effective data collection phase.

In preparatory phase, the activities carried out during the preparatory phase are mainly: administrative procedures with the chief medical officer of the Kadiolo district to obtain authorization to conduct the study; Establishment of a team of students acting internally for data collection; Training of team members on data collection tools, Study of the practical aspects of the investigation (logistics); registers of emergencies and maternity service; SONU reports, Activity reports of audits of maternal and perinatal deaths.

In data collection phase, the 7-day data collection took place using forms, Questionnaire. The sheets included the following parameters: type of health structure, distances from the reference center, coverage population, expected births, nature of the basic obstetric and neonatal care structure or complete obstetric and neonatal care (SONUB, SONUC), obstetrical and neonatal data, death by cause, complete human and material resources, time to treatment. Data collection and use: Data collection for a period of 6 months was carried out using a questionnaire. The questionnaire focused on maternal and perinatal deaths, the patient evacuation system, SONU structures. As this is a retrospective, the missing data have been corrected by cross-checking the different data sources. We went to the field to complete from primary supports in community health centers. The questionnaire was validated by the team responsible for the survey team at the district level of Kadiolo

To classify the reference health center, we used the classification system with simple criteria classification of quality according to Donabedian. A rating (0; 1) was made for the references identified. The rating 0 meant that the reference was ignored or the gesture was not carried out. Indeed, the reference or gesture was absent. Scoring 1 meant that the reference or gesture was present or performed. The degree or level of quality was noted from 0 to 4 for a reference or the gesture performed. That is to say, the present reference was designated by A = 4 or B = 3 or C = 2 or D = 1 by the + sign which reflected the level of quality checked. The sum of the scores achieved applied on the evaluation scale for a given center made it possible to assess the quality level of the structure. The maximum score that can be recorded for references is 52. The following ranking system has been used.

The rating scale will look like this:

- Level 4: 95% to 100% of maximum score (or Max. Sc.) or a total score of 49.5 to 52.
- Level 3: 75% to 94% of Maxi. Sc. or a total of 39 to 49.3.
- Level 2: 50% to 74% of Maxi. sc. or a total of 26 to 38.99.
- Level 1: less than 50% of Maxi. sc. or a total of less than 26.

The quality level of the quality was determined from the scores obtained when the discriminatory variables were produced. The analysis focused on 2 types of scales: A first scale where the quality was evaluated:

- "Of good quality" if all the discriminatory variables are realized;
- "Of lower quality" or of "non-quality" if at least one of the discriminatory

A second scale where the quality will be classified in four quality levels (Q):

- High Q4: 95% - 100% of the gestures of the dimension are carried out;
- Fairly high Q3: 75% - 94.99% of the gestures of the dimension are carried out;
- Average Q2: 50% - 74.99% of the gestures of the dimension are carried out;
- Low Q1: less than 50% of the gestures of the dimension are carried out.

This scale will be applied to dimensions with four or more variables. This is how it will allow us to determine, for the center, the proportion of pregnant women receiving good or fairly good quality care (Q4, Q3) and having a classification by center level. The criteria for this classification were:

- Level IV: 75% to 100% of pregnant women receive good and fairly good care
- Level III: 50% to 74.99% of pregnant women receive good and fairly good care
- Level II: 25% to 44.99% of pregnant women receive good and fairly good care
- Level I: less than 25% of pregnant women receive good and fairly good care

DONABEDIAN repository on the evaluation of quality of care and services was used: the standards are architectural, the reception and orientation procedures, the Structure and equipment, Equipment of delivery consultation rooms, post abortion and postpartum anointing services, Drug deposit, drug cost, laboratory functionality, Condition of toilets, operating room, water supply and waste disposal system, condition of inpatient services. We have designated A = 4; B = 3; C = 2; D = 1+ = indicates the quality level checked. For the evaluation of the supply, use and quality of care.

We have retained the 6 United Nations indicators which are:

Indicator 1: Availability of SONU. For a population of 500,000 inhabitants At least 1 Complete SONU structure and 4 Basic SONU structures are required;

Indicator 2: Distribution of SONU structures: SONUB and SONUC well distributed. 1 SONUC and 4 SONUB for 500,000 inhabitants;

Indicator 3: proportion of births in basic SONU and full SONU structures: At least 15% of births in the community should take place in basic and full SONU structures;

Indicator 4: Satisfied needs for SONU services. The number of women treated for obstetric complications should be at least equal to the estimated number of women with expected complications in this community; the desired value is 100%;

Indicator 5: Cesarean sections as a proportion of total births: This indicator should be between 5% and 10%;

Indicator 6: Case fatality rate: Proportion of women admitted with obstetric complications to the health center who die, maximum acceptable level 1%.^{2,3}

Results

Availability of emergency obstetric and neonatal care

Type of structure	Number in 2016	Number in 2017	Observation
SONUB	3	3	Zegoua community health center (CSCOM), Fourou CSCOM, central CSCOM
SONUC	1	1	Kadiolo reference health center (CSREF)
Ratio SONU B/population	3/304625	1/313480	-
SONU C/population	1/304625	1/313480	-
SONU B/SONUC	3/1	3/1	-

The health district of Kadiolo in 2016 had 304,625 inhabitants then in 2017 a population of 313,480, served by 24 CSCOMs and one CSREF including 3 SONU and one SONUC. Among the SONUBs, we have one SONUB in the Fourou area and finally in the central Kadiolo area the Kadiolo CSREF is the SONUC structure and is located in the same area as the central CSCOM. All the basic health structure performed the 6 functions defining SOUBs. The Kadiolo reference health center (CSREF) performed the 8 functions of SONUC. All of the basic health facilities were equipped with a suction cup forceps was not available and health

personnel were not trained to use it except the Kadiolo CSREF where only the gynecologist applied it thus compared to the population served the district had one SOUC and 3 SONUB for 313,480 inhabitants in 2017 (standard is 4 SOUB or one SONUC for 500,000 inhabitants).

Human and material resource: In 2016, the health district of Kadiolo had a total of 9 doctors, including 7 in SONU structures. The two other doctors were at the CSCOM of Kebeni and Diou. These two CSCOMs were not first setup as SONUB. The 7 midwives were in SONU structures. Among the 36 obstetrician nurses in the district 9 were in the SONU. The ratios showed that for midwives 7 out of 67,032 women of reproductive age, while the WHO recommends one midwife for 300 women of reproductive age. The 60 matrons were distributed throughout the district. The health staff left as follows: 3 midwives, 3 obstetrician nurses, a matron and a gynecologist for SONU who was the CSREF. SONUB Zegoua included two midwives, two obstetricians and a general practitioner. SONUB of Fourou included a general practitioner, three obstetrician nurses and three matrons. On this basis, we found that 3 SONUB health facilities met staff standard while the Kadiolo CSREF included a large number of health staff.

Materials	CSCOM			Total
	CSREF	Zegoua	Fourou	
Delivery box	4	1	1	6
Suture box	1	1	0	1
Blood pressure monitor	3	2	0	1
Obstetric stethoscope	3	2	2	3
Delivery table	3	1	1	2
Consultation table	3	0	0	2
Newborn resuscitation kit	3	2	2	9
Suction / forceps	1	2	2	2
AMIU* box	3	1	0	1
Refrigerator	1	0	0	1
Observer bed	3	2	2	7
Dressing table	1	1	1	2
Milk shot	0	0	0	0
Thermometer	2	2	2	2
Equipped operating theater	1	0	0	0

AMIU*: manual intra-uterine suction reference means evacuation: CSREF Kadiolo had 2 ambulances to transport evacuations and references. SONUB of

Fourou had an ambulance and the other SONUBs did not have an ambulance.

For the year 2017; the district of Kadiolo had a total of 8 doctors, 7 midwives, 36 obstetrician nurses and 60 birth attendants at SONU structures. Ratios show that for midwives 7 out of 67.032 women of reproductive age eight (8) doctors for 67.032 women of reproductive age :60 birth attendants 67.032 women of reproductive age while the WHO recommended one midwife for 300 women of reproductive age. The district health staff distributed as follows 3 midwives 3 obstetricians a matron and a gynecologist for the CSREF. SONUB of Zegoua includes midwives , 3 obstetrician nurses and a general practitioner, 2 obstetrician nurses, 1 laboratory assistant and 1 laborer. On this basis, we found that 3 SOUB health facilities also met staff standards, while the Kadiolo CSREF included a large number of health staff. Material resources in 2017 are presented in table III below.

Table III: Material resources in public health structures in the district of Kadiolo in 2017

Material resources	CSREF	Zegoua	Fourou	Central CSCOM	Total
Delivery box	6	4	4	6	18
Delivery box	1	1	1	1	4
Suture box	3	1	0	1	5
Blood pressure monitor	2	1	1	2	5
Obstetric stethoscope	3	2	2	3	9
Delivery table	1	1	1	2	4
Consultation table	3	2	2	2	9
Newborn resuscitation kit	2	1	1	2	7
Suction forceps	2	1	1	1	5
AMIU box	1	1	1	1	4
Refrigerator	4	6	6	6	9
Observer bed	1	1	1	2	4
Dressing table	0	0	0	0	0
Milk shot	2	2	2	2	8
Thermometer	2	1	1	1	5

Table IV: Direct and indirect causes of maternal death

Lethality	Year 2016 (%)	Year 2017 (%)
Direct causes of maternal death		
Hemorrhage	2.27	3.70
Prolonged /obstructed	0.00	0.00
Uterine rupture	10.00	0.00
Postpartum infection	0.00	0.00
Preeclampsia – eclampsia	0.40	1.78
Abortion	0.00	1.78
Ectopic pregnancy	0.00	0.00
Embolism/OAP*	0.00	100%
Indirect causes of maternal death		

Infections hepatitis	0.00	0.00
Malaria	0.00	0.00
HIV/AIDS	4.76	0.00
Anemia	1.04	0.38
Sickle cell disease	0.00	0.00
Other*	6.25	0.00

Other*: heart disease, infectious pathology; OAP*= cute lung edema

The patient was received by an available on-call team or by qualified health staff without time. She was urgently examined and taken care of immediately. The medical products were available in the sales depots which ensured the permanence and sold the drugs the days. The SONU were equipped with equipment for taking obstetric emergencies. In the event of hospitalization, patients were admitted and continuity of care was ensured.

Use of emergency obstetric and neonatal care in 2016 and 2017.(Table V & VI)

Table V: Use of emergency obstetric and neonatal care

Indicators in 2016	CSREF	Zegoua	Fourou	Central CSCOM)
% Assisted delivery	100 %	94 %	97 %	103 %
% Forceps/suction cup	60.00	18.00	23.00	42.00
% Caesareans	3.51	0.00	0.00	0.00
Abortion number	91	28	27	31
% manual intrauterine aspiration	15	0	0	0
% maternal death audit	100%	0	0	0
% périnatal death audit	30	0	0	0
Number of blood bags collected	1827	0	0	0
Number of blood donor associations	1	0	0	0
Number of mobile collection pockets	1	1	1	1
Treatment of complications	100%	100%	100%	100%
Number of direct obstetric complications	514	151	83	124
Number of indirect obstetrical complications	345	284	228	537
Maternal deaths	15	0	0	0
Perinatal deaths	146	-	-	-
Stillbirth prevalence	163%	170%	160%	155%
% of death on day 1	2,8	2	5	3

CSCOM: Community Health Centre CSREF: Referral Health Centre

Maternal and perinatal deaths: The number of maternal deaths is a key indicator of the quality of care. It constitutes a challenge for district of Kadiolo and the region of Sikasso. It remains high in the Kadiolo district. Here is the evolution of maternal deaths in the last five years in the Kadiolo district in figure 1

Table Vi: use of emergency obstetric and neonatal care				
Indicators in 2017	Csref	zegoua	fourou	central cscocom
Number of assisted deliveries	893	636	389	861
% Skilled delivery	100%	58,94	58,06%	60,02 %
Childbirth/matron	0	41,06	41,94%	39,98 %
Forceps/Suction cup	72	31	15	22
% cesarean	3,58	0	0	0
Number of abortions	52	11	19	11
AMIU	40	4	19	11
Maternal death audit	100%	Nothing to report	Nothing to report	Nothing to report
%Neonatal death audit	7%	Nothing to report	Nothing report	
Number of blood bags collected	788	0	0	0
Number of donors associations	1	1	1	2
Number of mobile collection pockets	157	0	0	0
% PEC of complications	100%	100%	100%	100
Number of direct obstetrical complications	320	40	38	28
Number of indirect obstetrical complications	192	162	62	35
Maternal deaths	8	0	0	0
Perinatal deaths	119	0	0	0
% fresh stillborn	116	120	115	130
maceratedstillbirths	30%	40%	45%	46%
Stillbirth prevalence	119 %	148%	150%	160%
% of death on day 1	2,8	2,0	4,0	5,0

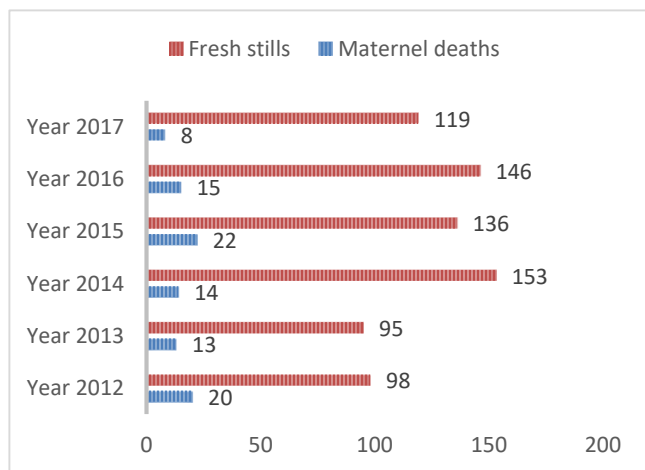


Figure 1: Annual change in the number of maternal deaths and stillbirths between 2012 and 2017 in the rural health district of Kadiolo, Mali.

It constitutes a health problem in Mali our district is particularly concentrated by this scourge the following figure 1 plots perinatal mortality and the fraction of fresh deaths from 2012 to 2017. This indicator was worrying and required urgent action. The Kadiolo health

district should reinforce these strategies to combat perinatal mortality through quality refocused antenatal consultations, extension of SONU, advanced strategies in reproductive health (RH), establishment, sustainability of community health workers and strengthening of the essential care strategy in the community. The high rate of fresh stillbirths reflected insufficient quality of services. We should focus on the quality of childbirth, the establishment of qualified staff in our 24 health areas, the strengthening of the referral-evacuation. This fraction increases from year to year. Kadiolo district has developed a SONU action plan to reduce maternal and perinatal mortality. Its rapid and efficient implementation will allow a better understanding of the problem.

Discussion

It was a cross-sectional study which made it possible to collect data prospectively. We have found that there is a match between the indicators sought and the data do not allow us to control for the confounding factors. A patient satisfaction survey was not carried out in this study to assess the quality of the SONU. Despite these limitations, the information drawn from this work is of great interest for the extension of the SONU, the measurement of maternal-perinatal mortality and the improvement of the quality of the quality of care.

The Kadiolo health district now offers its population three SONUs and one SONU for each of the 24 areas. It is a cross-border district that also receives obstetrical emergencies from Ivory Coast and Burkina Faso. Obstetrical complications were numerous and burdened with high mortality, as evidenced by the SONU reports of 2016 and 2017. Gold panning sites were numerous, with 10 in the district of Kadiolo. There were six maternity homes and rural dispensaries, and made late evacuations. The organization of the referral between the village and the CSCOM has been implemented in some areas: Zegoua, Dioumatene, loulouni and Fourou but it must be recognized that this experience is struggling to take effect. However, these motorcycle ambulances were used by some villages for field work. The distances separating the villages from the SONUB or SONUC structure were long. The socio-health development plan of the Kadiolo circle after extension of SONUB. These were the CSCOMs of Diou, Kebeni, loulouni, Dioumatene and Misseni. The number of SONU structures in our district was in line with that of WHO, but its distribution was very uneven. SONUC and Two SONUB were located in an area of

less than 15 km. This geographic distribution is contrary to WHO and national standards.^{1, 2, 5, 6}

The number of deliveries registered in a facility is an indicator that reflects the level of access and use of maternal health services. The rate of assisted delivery in our study was 78, 5% in Kadiolo.

This rate was comparable to WHO standards, which should be at least 80% higher.² In Mali, the rate of assisted deliveries was only 59% in 2012 and increased to 67% in 2018, while in industrialized countries coverage of assisted deliveries was at least 98%.^{1, 5, 7} In a study in rural Mali, out of 9,340 live births, only 28.8% of deliveries were attended by skilled staff and the probability of giving birth at home for a woman living in an urban environment.⁷ Our caesarean section rate was 3.50% which was far below WHO standards. As for the WHO standard on caesarean section rate, it was between 5 and 15%. According to a study carried out in 2005 by Benie J. found that at the level of the city of Abidjan, the practise of caesarean section was low (3.6%).

WHO standards recommended that this practice be between 5% and 15%. In 2000, the national practice of cesarean section was 0.78%¹ against 3.0% in Dakar and 1.7% in Nouakchott.

This low recourse to the practice of the caesarean section is mainly explained by the insufficiency of health establishments offering complete SOUC. Indeed, after two decades, the practice of caesarean section has varied and is increasing all over the world.⁴

The needs satisfied in SONU were 100% (table V et VI).^{1, 2} Similarly in 2004, in the city of Abidjan 60.0% of obstetric complications were treated. The level of this indicator is low compared to a level recommended by WHO which was 100%. In 2018, the needs met in the sub-region were respectively.⁴ Lethality in SONU structures: Maternal deaths have varied from year to year. We observed a peak in 2015. In general, maternal mortality is multifactorial. The maternal mortality ratio was 454 per 100,000 live births (15/3300) in 2016 and then decreased to 435 per 100,000 live births (8/3400) in 2017. This ratio was higher than that at the national level according to the EDS5 which was for the mortality ratio estimated at 368 deaths per 100,000 live births.^{5, 8} The level of maternal mortality in Mali is still very high, hence the need to develop other control strategies. Maternal death audits were carried out in the district to correct the shortcomings. It is therefore an important element for

improving the quality of the management of obstetrical complications. They make it possible, without looking for the guilty party, to specify the preventable nature or not of the death. In our context, the associated factors are the poor quality of the CPNR, the low rate of CPNE, the lack of antenatal consultations, the poor quality of the referral-evacuation, the three delays in care by comparing with this study carried out in Abidjan, lethality, for the whole Abidjan, this rate was 1,7% deaths occurring out of 100 complications treated. At the level of the districts of Abidjan, this rate was 2. 7% and 2, 1% respectively for the districts of Abidjan South 1 and West in which the Hospital center of Treichville and Yopougou is located.^{4, 9-14, 15}

Conclusion

The improvement use and quality of services require the availability of qualified personnel. The extension of SONU structures and the involvement of all stakeholders in community mobilization around reproductive health constitute conditions for the reduction of maternal and neonatal mortality. However, a study on maternal and perinatal mortality could help to better understand the problem of the quality of SONU.

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