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Case Report

Early and late neonatal mortality in hospital settings. Causes and factors related to death (case of Sendwe hospital / DRC)

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Summary

Global neonatal mortality remains high in our city of Lubumbashi. It is dominated by early neonatal mortality which accounts for more than a third of overall neonatal mortality.

Objective: is to achieve a reduction in neonatal mortality by presenting the different causes and factors related to it.

Research question: What are the causes and factors associated with early and late neonatal mortality in Sendwe?

Methodology: We carried out a retrospective cross-sectional descriptive study with an analytical aim, ranging from January 1, 2019 to December 31, 2019, i.e. a period of 12 months. The analysis was performed using software, EPI INFO Version 6.04 CDC and Micrsoft Word 2016.

Results: During this period 1441 newborns were hospitalized in the neonatal department and 192 died, ie an intra-hospital neonatal mortality rate of 13.31% from all causes. Mortality is dominated by prematurity (56.25%), plus the male sex (56.25%), predominantly newborns born to mothers who suffered from uro-genital infections during pregnancy (38.02%) , newborns born to mothers aged between 25-35 years (47.40%), newborns born to women who have worked for more than 12 hours (72.63%), newborns born to upper delivery (87.50%), newborn with an APGAR score greater than 7 at the tenth minute of life (47.40%), newborns referred (68.23%), new - infants who were resuscitated (55.20%), newborns having spent more than 1 to 7 days of hospitalization (57.29%).

Conclusion

Neonatal mortality is still high at the hospital Sendwe, Regarding factors related to the mother, neonatal mortality occurred most in newborns born to women in periods of intense genital activity, women having had a prolonged labor of more than 12 hours, women who developed urogenital infections in the third trimester of pregnancy.

Keywords: Early and late neonatal mortality

Introduction:

Early and late neonatal mortality is the number of children born alive and then died within the range of 0 until the eighth day of life [Blanpain and Buisson, 2016] The latest estimates from the World Health Organization, dating from 2010, indicate that that year, about 3.7 million children died during the first 28 days of their lives.

However, the risk of death varies greatly during the neonatal period. The riskiest day after birth is the first day, with 25-45% of neonatal deaths. About three-quarters of newborn deaths (2.8 million in 2004) occur during the first seven days of life at the onset of the neonatal period. Almost two-thirds die in the first week, and for every early neonatal death, at least one stillbirth is born. Of those who die during the first week, two thirds die within 24 hours of birth: This is the two-thirds rule [Moulkhaloua and Belkheir, 2016]
Neonatal mortality is now 6.5 times lower in developed countries than in others [Moulkhaloua and Belkheir, 2016]. Indeed, a woman's risk of losing a newborn baby during her lifetime is 1 in 5 in Africa compared to 1 in 125 in developed countries. In northern European countries, the introduction of intensive newborn care in the early 1980s was the main factor in reducing early and late neonatal mortality [lancet_neonatal_survival_series_en.pdf, n.d.] In England, the neonatal mortality rate was reduced from more than 30 per 1000 live births in 2005 to 10 per 1000 in 2010 [lancet_neonatal_survival_series_en.pdf, n.d.] In Denmark the neonatal mortality rate is 4 per thousand live births. This mortality is mainly due to prematurity, asphyxia ‰ and infections ‰ [Kabera, 2007] In Canada the leading causes of neonatal mortality were immaturity (42.9%), birth defects (37.3%) and asphyxia (16.2%) (Public Health Agency of Canada, 2017). In Senegal more precisely in Dakar, the neonatal mortality rate varied between 21.8 and 42% of admissions to the Dakar University Hospital and 47% of cases of death were premature and 84% of deaths presented acute fetal distress (Cisse CT et al, 2014).

In DR Congo more precisely in South Kivu, the neonatal mortality rate was 47 ‰. This is the highest rate compared to rates in other provinces of the country (Richard MbusaKambale et al, 2016). In Lubumbashi, a study carried out at university clinics in Lubumbashi had shown that the neonatal mortality rate was 36.9%, the causes of which were prematurity 34.5%, maternal-transmitted infections 18.1%, congenital malformations 5 , 5% and respiratory distress 4.3% (LuboyaNumbi oscar et al., 2012). Another study made at the Jason Sendwe Provincial Referral General Hospital had shown that the neonatal mortality rate was 12.9%, the causes of which were 34.5% prematurity, neonatal infections, respiratory distress, congenital malformations. and other diseases (Tina Katamea et al, 2014).

For seven years, very few studies published in Lubumbashi on early and late neonatal mortality, yet it is an indicator of health; Hence the interest of the study. The loss of a child, big or small, always remains a tragedy for the family and caregivers. So, it seemed appropriate to us to have an overview on the rate of early and late neonatal mortality in Lubumbashi? Hence the question of the study: What are the causes and factors associated with early and late neonatal mortality in Sendwe? The general objective is to achieve the regression or reduction of early and late neonatal mortality in the neonatal department in order to improve the survival of newborns.

The specific objectives are as follows:

1. Determine the rate or frequency of neonatal mortality during the year 2019,

2. Determine the main causes of neonatal death,

Methodology

The study consists of analyzing the records of newborns hospitalized in the neonatology department during the period from January 1, 2019 to December 31, 2019 before the 28th day of life. These hospital records allow the distinction between a stillborn (without sign of life at birth) and a live born but died immediately after birth. These newborns come either from the maternity unit at Jason Sendwe Provincial Referral General Hospital or from peripheral maternity units.

A) Sampling and sample size All usable files of children who died in the neonatal department

during the period from January 1, 2019 to December 31, 2019 were processed. The sampling was thus exhaustive.

B) The studied variables Are studied:

B.1 Descriptive approach

Maternal residence¬ Maternal pathology during pregnancy ¬ The mother's age at the time of childbirth, expressed in years ¬B.2 For maternal factors

Birth weight in grams¬ Sex, designated as male or female ¬B.3 For neonatal factors

Length of hospital stay 19¬ Notion reference ¬ Notion of resuscitation ¬ The type of delivery: • Low route which can be eutocic (delivery occurs normally) or Obstructed (other techniques are used to clear the child from the birth canal of its mother, such as forceps, suction cup, delivery direction, internal or external versions, and • High way (cesarean operation). ¬ Duration of labor ¬B.4 For obstetric factors The following are analyzed:

C. Study criteria

C.1 Inclusion criteria: All newborns who died before the 28th day of life in the neonatal department during the study period are included. All records of newborns who died during the study period are included.

C.2 Exclusion criteria: From these files, information on deaths and their causes will be collected. Some files of children who arrived and died quickly during custody periods are not very informative and have not been used due to a lack of information. Stillbirths are excluded from the study.

Study limit

The study presents all the constraints of a retrospective study based on the use of hospital data relating to the quality of the available files, in particular the underreporting of data, the quality of the diagnoses reported and the retention of files.

Statistical analyzes

We used as software, Epi Info Version 6.04 CDC, Excel 2016 and Microsoft Word 2016 for qualitative and quantitative data analysis.

Ethical considerations

Patient consent was not necessary because we used registers and records (retrospective study), resulting in consent with the manager of the records and registry. Coding and patient anonymity were guaranteed by numbers.

RESULTS

During the period of our study we recorded, 1441 newborns were hospitalized, distributed among 756 Boys and 685 Girls.

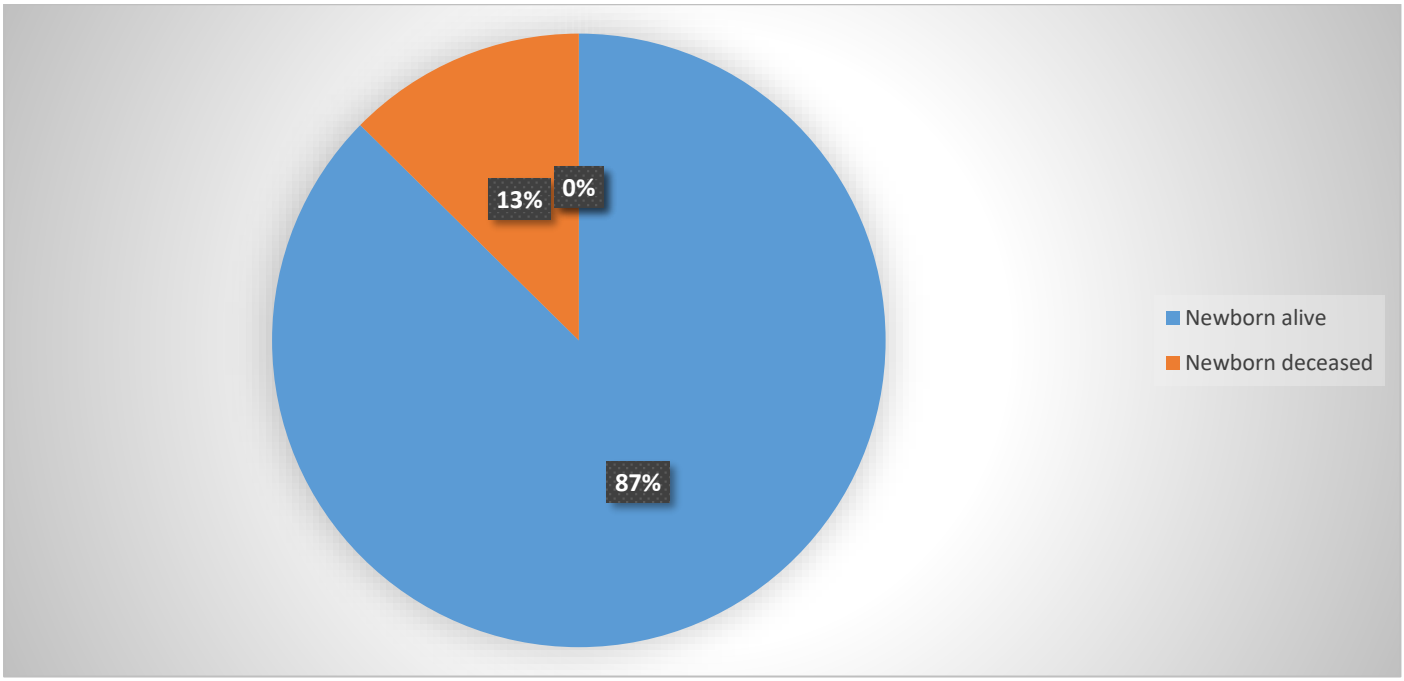

FIGURE 1: The overall death rate

During this year we recorded 192 deaths out of 1441 hospitalizations which represents a mortality rate during hospital stay of 130 deaths for

1000 live births or an overall neonatal mortality rate of 13.31%.

Table 1. Distribution of deaths by

Gender	Effective	Percentage
Feminine	84	43,75
Male	108	56,25
Total	192	100,00

This table shows the dominant proportion of deaths, i.e. we recorded 192 deaths of which 108 were males and 84 were females or respectively 56.25% against 43.75%, with a sex ratio of 1.3. Analysis of mortality by cause of death

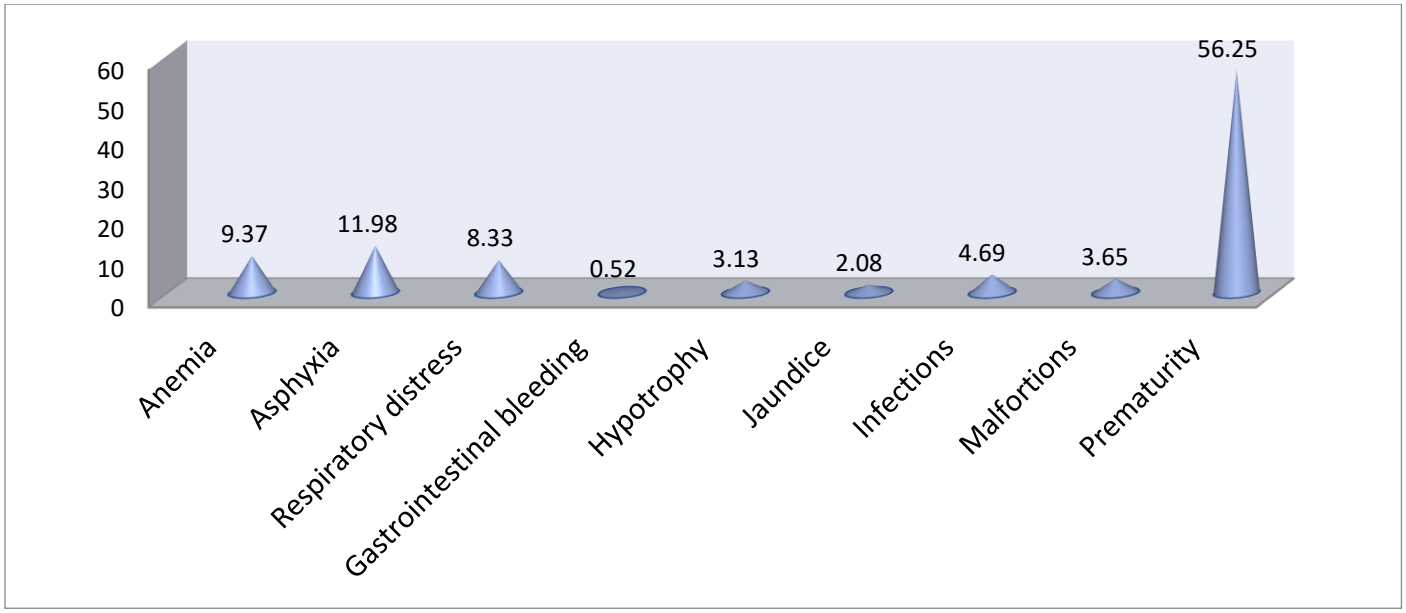

Figure 2: Distribution of mortality by cause of death

Figure 2 shows that prematurity is the leading cause of neonatal death at 56.25%, jaundice and gastrointestinal bleeding respectively represent 2.08% and 0.52% of the causes of neonatal death.

Analysis of neonatal mortality by birth weight

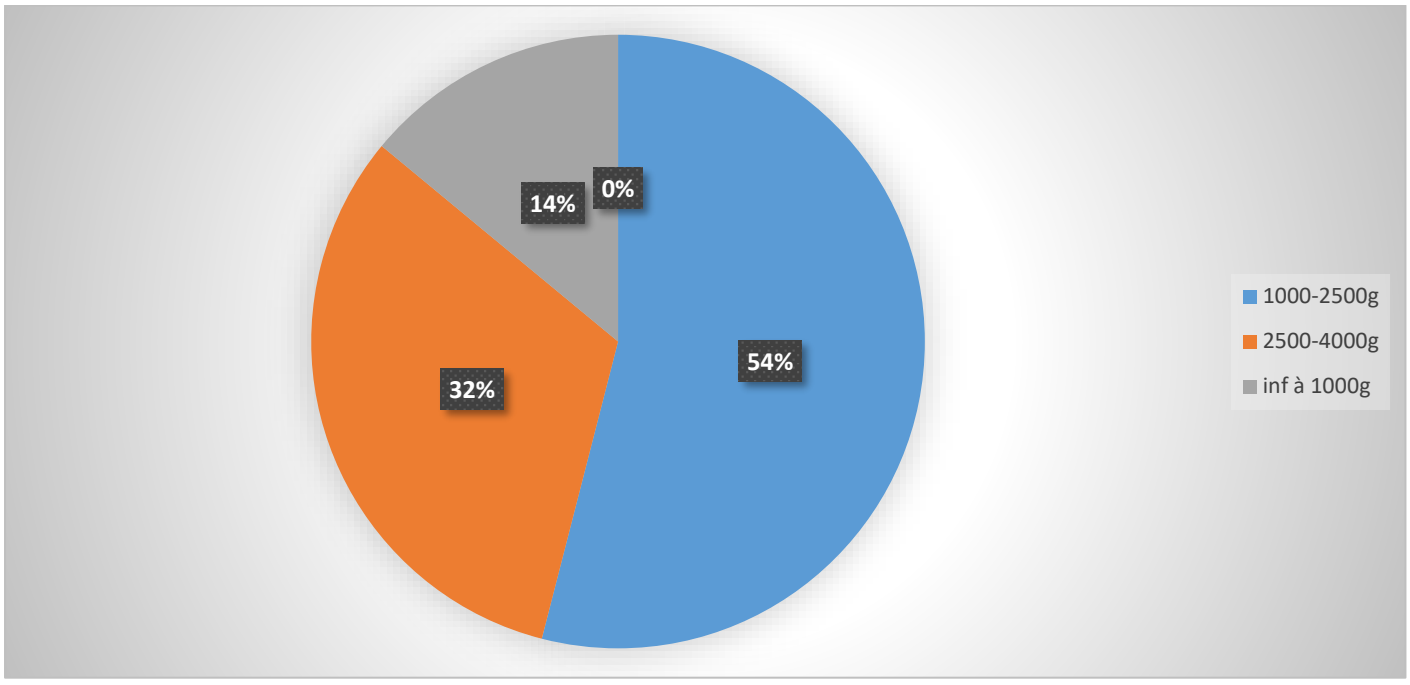

Figure 3: Distribution of mortality by birth weight

Figure 3 shows that death affects most the newborn with a birth weight between 1000 and 2500 g, i.e. 54% and fewer deaths for less than 1000 g.

Analysis of neonatal mortality following resuscitation in the delivery room

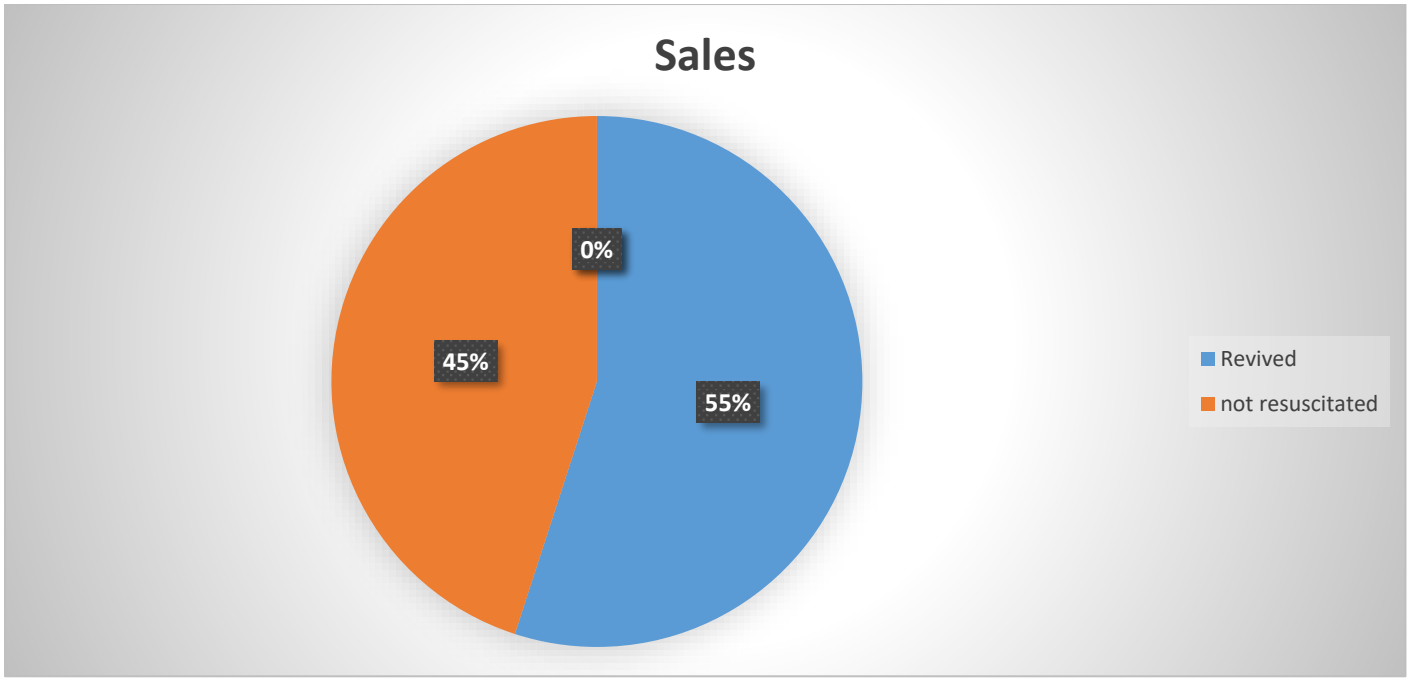

Figure 4: Distribution of mortality following resuscitation in the birthing room

This figure shows that the deaths are recorded the most among the newborn having was resuscitated at their birth ie 55%.

Table II: Analysis of neonatal mortality according to the newborn's reference

Reference	frequency	Percentage
No	61	31,77
Yes	131	68,23
Total	192	100,00

This table shows that the death most affected the newborn who was referred from another health structure to the Jason Sendwe Provincial Referral General Hospital, ie 68.23%.

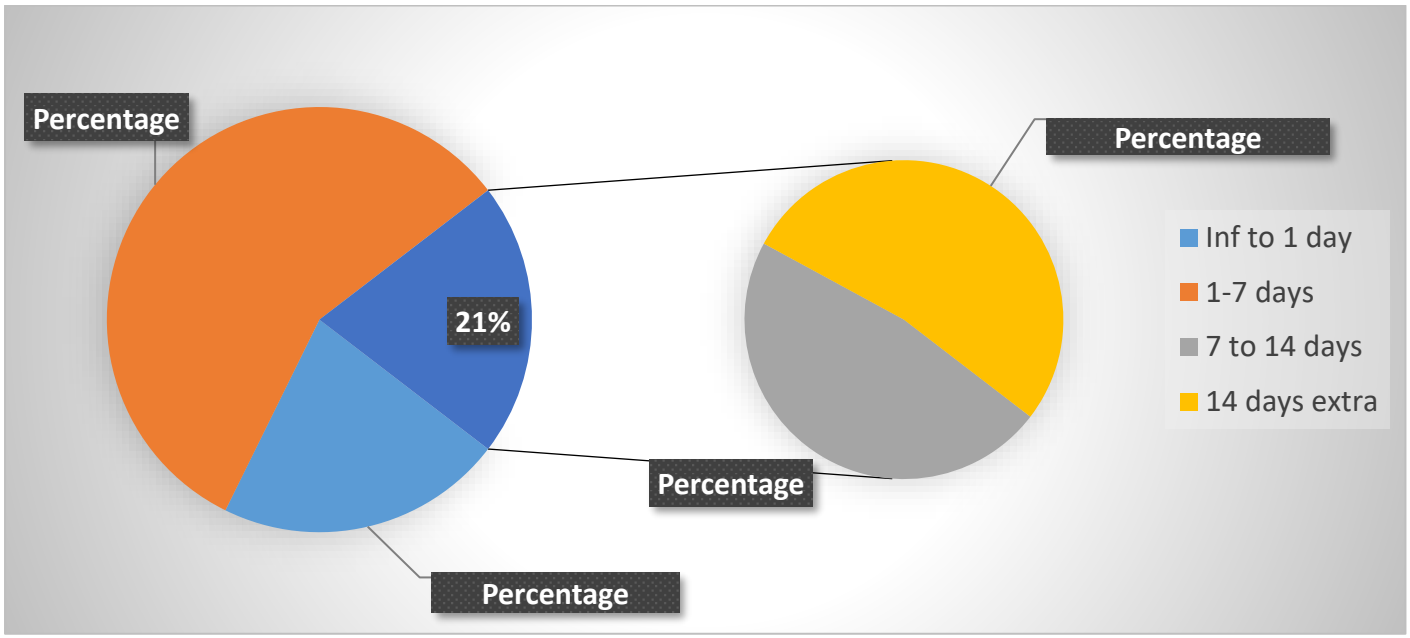

Figure 5: Distribution of mortality by length of hospitalization

The figure shows that the death affects more the newborn with an age or a hospital stay of 1 to 7 days or 57% and a small proportion of newborns with an age or a hospital stay of 7 to 14 days

Analysis of neonatal mortality according to maternal age

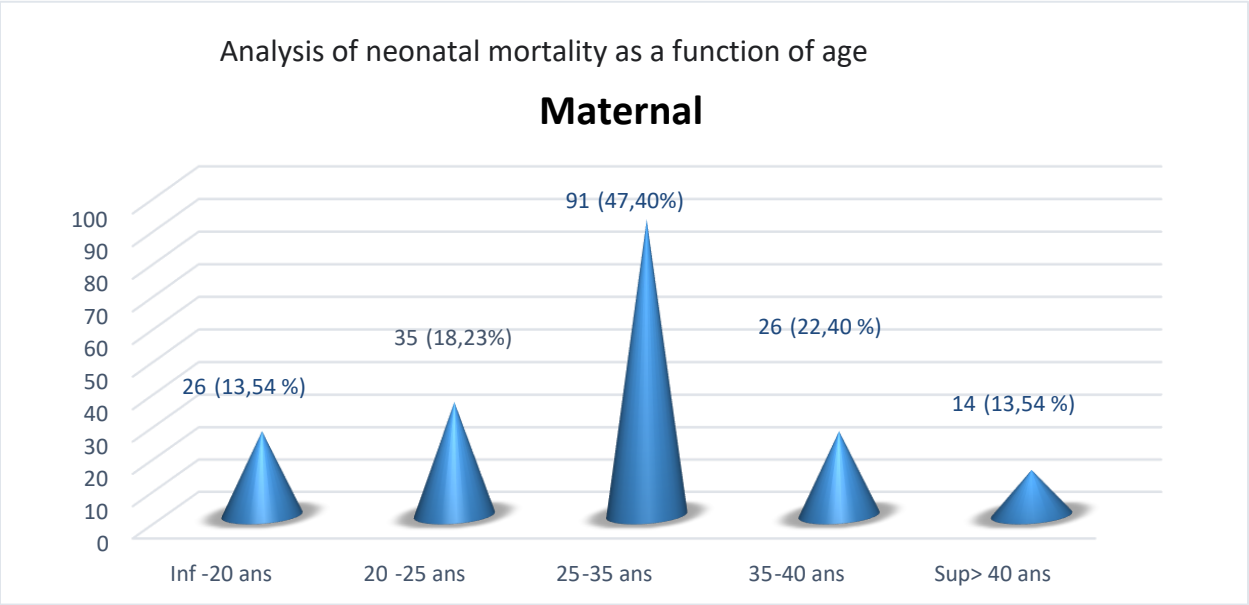

Figure 6: Distribution of mortality according to maternal age

The figure shows that death occurs more in women aged between 25 and 30 years with a proportion of 47.40% and less deaths in women over 40 years or 7.29%.

Table III: distribution of neonatal deaths according to the duration of labor in the mother

Working Time	Frequency	Percentage
Less Than 12 Hours	52	27,37
Greater Than 12 Hours	138	72,6
Total	192	100,00

This table n ° 2 shows a strong predominance of deaths among newborns of women who have worked for more than 12 hours, ie 72.63%.

Analysis of neonatal mortality according to the route of delivery

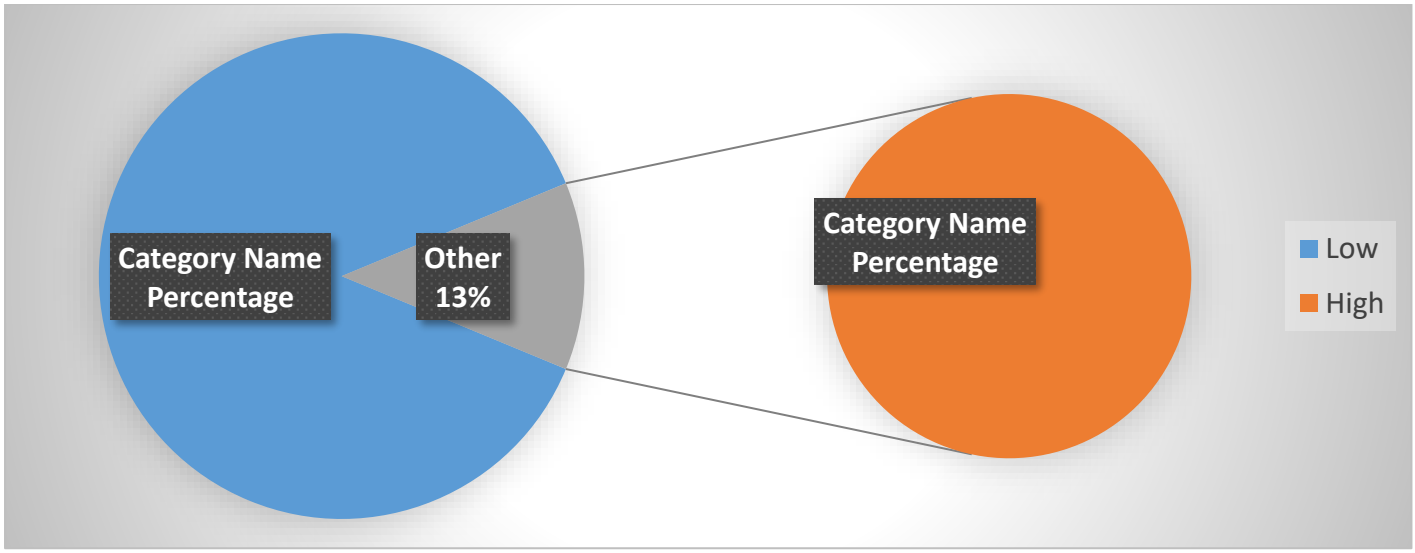

Figure 7: Distribution of mortality by route of delivery

The figure represents a strong predominance of deaths in vaginal births, ie 87%.

Analysis of mortality according to the pathology in the mother during pregnancy

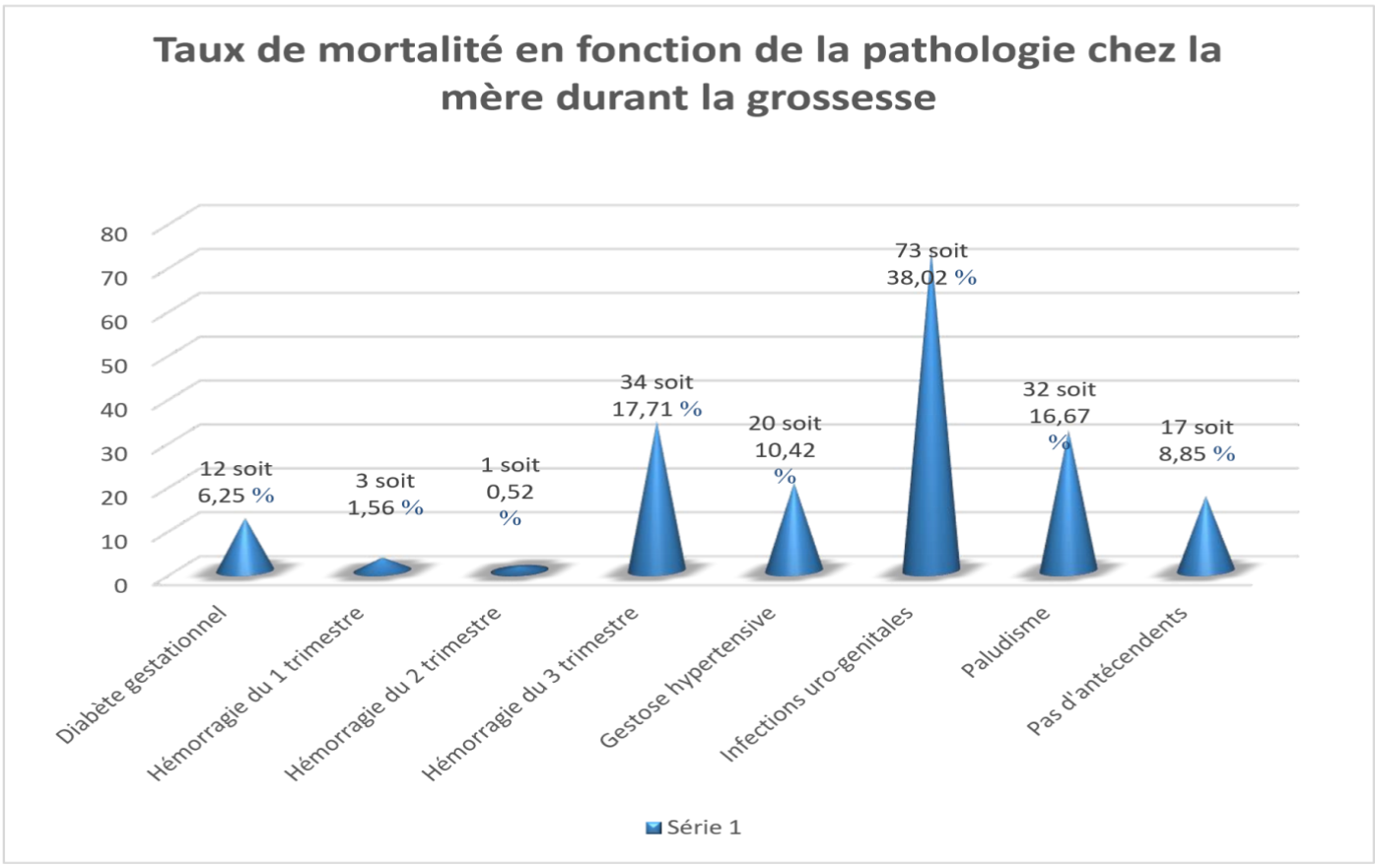

Figure 6. Death rate according to the pathology in the mother during pregnancy In the study, the majority of newborns who died came from a mother with a history of genitourinary infection in the third trimester of pregnancy, i.e. 38.02% and a small proportion represented by hemorrhages in the second trimester, i.e. 0. , 52%.

Discussion

A. Neonatal mortality rate

The rate of early and late neonatal mortality in the neonatology service of the Janson Sendwe provincial general referral hospital during the year 2019 is estimated at 13.31%, i.e. 192 deaths out of 1,442 hospitalizations, or 130.1 deaths out of 1,000 live births. . This almost similar rate compared to the result found in 2014 by Tina katamea et al, 2014 in DRC (12.9%), Mexico, Brazil and Vietnam where the neonatal mortality rate was respectively 11%, 13%, 12 %, (Rachidatou Compaore 2015 in Morocco) and 17% by Jennifer zeitlin et al in 2015 in France. Contrary to the studies made later by Luboya Numbi oscar et al, 2012 in DRC (Lubumbashi); Julia Rachel Ravelosoa et al, March 2013 in DRC (Orientale Province), Mutombo T. 2014 in Ivory Coast, Agbere AD, 2014 in Togo, Phan ThiHoan and Trinh Van Bao, 2014 in Vietnam, and Richard Mbusa Kambale et al, 2016 in the DRC (North Kivu) which showed a high overall neonatal mortality rate of 36.9%, 37%, 26.6%, 41.6%, 24.4%, and 47% respectively. The low rate in this study is justified by a slight improvement in the care of the mother and newborn in the delivery room as well as the strengthening of hygiene measures in the neonatal service of sendwe currently. Our results are far superior to the report or result found by the WHO September 2014 in the Middle East or Japan.

B. Neonatal factors

1. The sex of the newborn

A male predominance was recorded, with a sex ratio of 1.3. this excess mortality in male newborns is observed in the study carried out by Trinh Van Bao, 2010 in Vietnam, LuboyaNumbi oscar et al, 2012 in DRC (Lubumbashi), Tina katamea et al, 2014 in DRC (Lubumbashi), Yenan JP 2014 in Ivory Coast, Phan ThiHoan and Trinh Van Bao, 2014 in vitenam, KABERA S. Michée November 2015, Harir Noria et al 2015 in Algeria and Rachidatou Compaore 2015 in Morocco with the following respective proportions of sex ratio respectively of 1 , 1; 1.5; 1.9; 1.8; 1.6; 1.5; 4.9 and 1.3.

This vulnerability of boys during the neonatal period is thought to be due to biological or even genetic factors: the little girl carries a pair of X chromosomes, a chromosome carrying genes that produce IgM antibodies, while the boy carries only one associated. to a Y chromosome which means that the girl has a potential advantage over the boy, because she will have a superior immune response according to Anselme Diakite, in 2005 in Mali. And a boy's weak resistance to infectious diseases in general which has a different rate of fetal development linked to a great pulmonary fragility which leads to a higher prevalence of respiratory diseases in boys according to Rachidatou Compaore in 2015 in Morocco, but also the androgens present in the lungs delay lung development and cell surfactant production, which predispose males even more to respiratory pathologies according to Yves Tremblay and Pierre R. Provost Oct 14, 2020 23:47 in Canada.

2. Etiological factors or causes of death

The main cause of death found is prematurity (56.25%). Prematurity is the biggest cause of neonatal death due to the lack of materials for the rearing of premature newborns and also by the high frequency of premature babies in our sample. rates low or close to our rate, were found during the work of LuboyaNumbi, 2012 in DRC Lubumbashi, Rachel Ravelosoa, 2013 in DRC Province Orientale, Triqui Mohammed Racim and Lazouni Mohammed Ridha 2014 in Algeria, Phan ThiHoan, 2014 in Vietnam, Gasana K, 2014 in Rwanda, RachidatouCompaore 2015 in Morocco, and KABERA S. Micée November 2015 in Rwanda and the Public Health Agency of Canada, 2017 with the following respective proportions: 36.9%, 37%, 28.74% , 22.4%, 41.7%, 40.5%, 55.6% and 44.2%. Unlike the study by Richard MbusaKambale et al. (2016) in North Kivu (DRC), which reports very high rates of neonatal

infection in 82.0% of the causes or the first death. Similarly, the study carried out in Algeria reports respiratory distress in 35.30% of deaths (MoulkhalouaNewel and Belkheir Sarra Amina, 2016).

The same is true for most studies done in Europe and North America (developed countries) which have found that the main causes of neonatal mortality are infectious diseases in 36% of cases (including sepsis, pneumonia, tetanus and diarrhea), (Rachidatou Compaore 2015).

3. Concept of resuscitation at birth

Newborns who were resuscitated at birth accounted for 55.20% of neonatal deaths; this rate is low compared to the results of studies made by Rachidatou Compaore 2015 in Morocco and Tina katamea et col 2015 in DRC; in whom resuscitation represented 68.7% and 70.73% of neonatal mortality rates, respectively. The low rate in the present study can be explained by the fact that the conditions of resuscitation of the newborn in the delivery room have been improved, the availability of quality antibiotics.

4. Reference concept

Of the 192 deaths (100%) recorded during the study, 131 (68.23%) were referred from a health facility to the Jason Sendwe Provincial Referral General Hospital. This can be explained by the fact that small centers do not accept to register deaths and transfer as quickly as possible if they are hopeless or in a very critical condition with a low probability of survival. This rate is slightly higher or similar to those of Danielle Christianekedykoum in Cameroon and col 2015 and M. Moutian habib kamate, (2018), which respectively (52% and 67.17%). A high rate of neonatal deaths in newborns having been referred from a health zone to a general referral hospital was found in the study by KABERA S. Micah November 2015 in Rwanda (71.8%) .

5. Duration of hospitalization

The study shows that the death affected more the newborn who stayed for 1 to 7 days in the neonatal unit is 57.29%. This may be explained by the fact that the new are more vulnerable the first minute, the first hour, the first day and the first week of adaptation to independent living; This means that we have more deaths the first week of life. The same observation but with higher proportions, than the result of this study, were found in; Triqui Mohammed Racim and Lazouni Mohammed Ridha, 2014 in Algeria, Rachidatou Compaore 2015 in Morocco and Moulkhaloua Newel and Belkheir Sarra Amina, 2016 in Algeria, with the following respective proportions 81.80%, 56.8%; an

C. Maternal Factors

1. The age of the mother

Newborns, women between 25 and 35 years old, presented 47.40% of neonatal deaths, those of women under 18 years old represented 13.54% and those of women above. 35 years accounted for 20.73% of neonatal mortality. There are more deaths among newborns to mothers in this age group because, the age of 25 to 35 represents the age group where the woman is more sexually active with a great desire for motherhood. period when the woman is more fertile or it is during this period that there is a lot of desired childbirth. Compared to other age groups, our results match, but with a high death rate, those of the study conducted by RachidatouCompaore 2015 in Morocco for which the mother's age between 25 and 35 years old had a frequency of 27.8% of neonatal deaths. For the same age group, our rate is slightly lower compared to the results of Danielle Christiane kedykoum 2015 who found 53.52% of neonatal death. Unlike the study made by KABERA S. Micah November 2015 in Rwanda, the neonatal mortality rate was more found in women aged between 18-35 years, ie 85%.

Similarly, the opposite result was found in the study carried out by Harir Noria et al 2015 in Algeria in which the large proportion of neonatal deaths is found in women aged over 35, i.e. 53.26%, followed by women. age between 20-35 years excluded with a proportion of 28.53% and

at the end women of less than 20 years with a proportion of 18.19%.

2. Maternal pathologies during pregnancy

In our series, mothers who suffered from urogenital infections (38.02%) recorded significantly more neonatal deaths than mothers who contracted the other complications during pregnancy. This is explained by the fact that infections are responsible for premature delivery and contamination of the newborn through the hematogenous route or by direct contact during passage through the birth canal if the delivery is through the base route. .

The similar result was found in the study made by Rachidatou Compaore 2015 in Morocco and Harir Noria et al 2015 in Algeria which also showed a large proportion of neonatal deaths in mothers who had a urogenital infection during pregnancy. with very high proportions compared to our study, namely 72.5% and 49.39% respectively,

The opposite result was found in a study done by MoulkhalouaNewel and BelkheirSarra Amina, 2016 in Algeria whose data show that there were many deaths among women without a morbid history during pregnancy, i.e. 93.1%, unlike our or we have a proportion of 8.85 for women without antecedents. This means that the existence or absence of a pathology in the mother during pregnancy has no effect on the mortality of the newborn but we can still say concerning the absence can be women at CPN or could have a pelvic problem that can lead to fetal distress.

Our results are still contrary to the study made by M. Moutian habib kamate, 2018 in Mali, which found a predominance of deaths in newborns whose mothers had a third trimester hemorrhage with either 36.25% and infections urogenital only represented 5%.

3. The working time

The study shows a strong predominance of neonatal deaths among women who worked for more than 12 hours, ie 72.63%. This can be explained by the effect that if labor is long, the risk of neonatal mortality is increased by the increased risk of infectious diseases in the mother and in the newborn (repeated vaginal examination or other obstetric acts) and also by the stress that the fetus undergoes during labor. The same result was found in the study carried out by Rachidatou Compaore 2015 in Morocco, which found a large proportion of neonatal deaths among women who worked for more than 12 hours, ie 69.8%; rate almost similar to ours.

4.The delivery route

The study shows a predominance of deaths in vaginal births, ie 87.50%. This may be explained by the effect that the large proportion of births are vaginally and the newborn is under a lot of stress during vaginal birth. The same results were found in the study of Nancy V. Yinger and Elizabeth I. Ranom, 2003 in Rwanda, Vanessa TakouTsapmene, 2012, Triqui Mohammed Racim and Lazouni Mohammed Ridha, 2014 in Algeria, Tina katamea and col 2015 in DRC Lubumbashi , Rachidatou Compaore 2015 in Morocco, Imtiaz jehan et al 2015 in Pakistan, Danielle Christiane kedykoum 2015 and Moulkhaloua Newel and Belkheir Sarra Amina, 2016 in Algeria, with the following respective proportions: 75.14%, 81.41%, 69.81%, 77, 9%, 75.6%, 71.2%, 81.31% and 67.44%.

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