

Factors Favouring Neonatal Mortality in the Masisi Health Zone, 2020-2021

Benjamin SHUKURU KASIWA ^{1*}, Beatrice MAHAMBA BANYENE ²,
Alex BAUMA BALINGENE ³, Justin MUNFANO LUKONGE ⁴, Deborah DUSABE
BAREB ⁵

¹MPH Candidate at the School of Public Health of the University of Goma, Assistant of Higher Education at the Institut Supérieur des Techniques Médicales de Masisi, ISTM/Masisi, Researcher at the Centre de Recherche sur la Démocratie et le Développement en Afrique (CREDDA/ULPGL), DRC

²Bachelor's degree in Paediatrics, Assistant in Higher Education, second term at the Institut Supérieur des Techniques Médicales de Masisi, ISTM/Masisi, DRC

³PhD, University Professor at the Institut Supérieur des Techniques Médicales de Masisi, DRC

⁴Master of Study Development from ULK, researcher at the Centre de Recherche sur la Démocratie et le Développement en Afrique (CREDDA/ULPGL), DRC

⁵MPH Candidate at the School of Public Health at the University of Goma, Treating/Attending physician at BISENGIMANA Hospital Centre, DRC

ABSTRACT

Introduction. It is an obvious principle that a newborn should not die from unknown or preventable causes. To achieve this, it is useful to investigate the reasons why in terms of factors favouring neonatal deaths within the population.

Method. This study was carried out in Masisi among patients and staff at the Masisi GRH; it is both descriptive and cross-sectional, using purely quantitative data. Two target populations constituted the sample size for this study, the first consisting of 12 medical staff in the neonatology department and the second of women of childbearing age, i.e. a sample of 84 persons. The data were collated using a survey questionnaire distributed to the two populations.

Results. After analysing, processing, tabulating and interpreting the data, we came to the following findings. Referring to the medical and health factors at the root of neonatal deaths, the results of this study indicate that a large proportion (83.3%) of respondents said that women did not fully attend prenatal consultations; among them 40% had an attendance frequency of two out of four times compared with 10% who did not attend at all. More than half of children (58.3%) are born with the combined weight categories. Regarding the socio-economic factors favouring neonatal deaths, 59.5% of respondents eat what they find during the gestation period against a minority (3.6%) who eat vegetables the most. Hence the two emerging hypotheses of this study were affirmed.

Conclusion. Women of childbearing age should be strengthened in prenatal education and take care of advice they receive; women should support the initiatives of the family planning programme by their adherence and abandon negative cultural practices. Health professionals should continue to meet the social, medical and health care needs of children in the neonatology department.

Keywords: Factor, Mortality, Neonatology, Medical, Social and Economic

* Corresponding Author

INTRODUCTION

Newborns who die during their first 28 days of life have conditions and diseases associated with lack of quality care at birth or lack of care or treatment after birth and in the first days of life. A newborn who is sick at birth needs urgent major neonatal intervention as soon as possible in an appropriate department (WHO, 2018).

Neonatal mortality accounts for 40% of under-5 deaths worldwide, particularly in developing countries. Reducing neonatal mortality would require effective programmes that take into account interventions on modifiable risk factors. According to a report by Cameroon's Ministry of Public Health consulted in Chelo's study, 33% of parturient do not visit health facilities for prenatal consultations. Furthermore, as far as births conducted by health personnel are concerned, there is a disparity between the rich (88%) and the poor (29.5%). Most level 1 health facilities admit pregnant women with limited financial resources. The quality of care in these facilities is poorly documented (Chelo et al., 2012).

Neonatal mortality remains a major and constant concern in the world in general and in developing countries in particular. There are 8 million neonatal deaths worldwide each year and 28% of neonatal deaths occur in developing countries (WHO, 2018).

According to the WHO in its report of 28 September 2018 on the reduction of neonatal mortality, shows that in 2017 2.5 million children in the world died in the first month of life and is equivalent to 7 million deaths of newborns who die per day with one million deaths during the following days. In the same year, 47% of all deaths in children under five occurred in newborns, compared with 90% in 1990. In 2015, there were approximately the same number of stillborn babies as in 1990. Since 1990, major progress has been made worldwide in child survival, with the number of neonatal deaths falling from 5 million in 1990 to 2.5 million in 2017 (WHO, 2018).

In France in 2000, the stillbirth rate was 4.6 per 1,000 births and neonatal mortality 3.0 per 1,000 (Blondel & Bréart, 2004).

On the African continent, the neonatal mortality rate is higher, estimated at 45% of deaths per 100 living births, compared with 43% in Asia. According to the report published by the United Nations Children's Fund (UNICEF) on 23 February 2018, Africa has been named as the most dangerous place on earth to be born. On average there are 27 neonatal deaths per 1000 births with the Central African Republic having the highest rate in Africa and recording over 42% of deaths per 1000 births. This mortality rate is more likely due to the fact that women do not follow the advice they receive during pregnancy (UNFPA, 2012a).

The neonatal death rate was 5% for the first three days, compared with 35.9% in sub-Saharan Africa in 2009. It was 27% during the first week of life in a rural district of Burkina-Faso between 2006 and 2007. In Cameroon, it was 31% at national level in 2011 for the entire neonatal period. Even if we estimate that neonatal mortality in the first 24 hours of life accounts for around 50% of overall neonatal mortality, the rate found in our study remains relatively low. It is, however, higher than the rate of 1.9% per thousand found by Baker et al. in their study of all births in New York from 1991 to 2001. In our series, the mortality rate is probably underestimated as it only takes into account newborns who died in situ in the health facility during the first three days of life. In addition, the survival of 66 (4.1%) neonates transferred to other high-level health facilities because they required specialised assistance for neonatal infection, neonatal asphyxia and prematurity was not investigated. These conditions are known to be responsible for 25%, 23% and 29% of neonatal mortality respectively. In addition, the policy of systematic in-utero transfer in the face of recognition by these health staff of high-risk pregnancies could indirectly contribute to the low death rate. Also, newborns who died at home within this three-day period were ignored in this count (UNICEF, 2017).

The DRC remains to this day one of the countries most affected by the problem of excessive child mortality. According to a report published by the DRC paediatric society on Thursday 30 December 2018 in Kinshasa, 158 per 1,000 children die every day at birth. This neonatal mortality is largely linked to the conditions in which pregnancy, childbirth and the post-partum period take place. Most neonatal deaths are the consequence of the mother's poor health and condition, combined with inadequate care before, during and after delivery (UNFPA, 2012a).

In the rural health zone of Masisi, the statistic of neonatal deaths would be overestimated in view of the many septic deliveries at home, along the way and for which newborns die for unknown causes. From 1st January to 31st December 2020, we were able to register 762 newborns who were hospitalized in the neonatal unit among which we recorded 89 neonatal deaths related to health factors such as weight level, prematurity and registered infections/diseases. In addition to these factors, there are others related to the living conditions of the pregnant woman. In view of these factors and the high frequency of neonatal deaths in this rural health zone, we felt it necessary to conduct this study in order to analyse the factors that are presumed to be at the root of this recrudescence, which is blocking the lives of newborns in this administrative entity (Administrative office of the Masisi health zone, 2020).

Based on this problem demonstrated above, it seemed imperative to us to assess and identify the factors favouring neonatal deaths in the Masisi health zone. The following questions thus guided our thinking: Firstly, what are the medical and health factors influencing neonatal mortality in the Masisi health zone, in the case of the Masisi GRH, and secondly, what are the socio-economic factors influencing neonatal mortality in the Masisi health zone, in the case of the Masisi GRH?

We assumed that prenatal consultation follow-up, birth weight, prematurity and neonatal asphyxia, gestational age, ignorance of family planning, maternal-foeto-transmissible infections and maternal treatment were the medical and health factors influencing neonatal deaths; then the mother's diet, place of residence, low family income, level of education and heavy work in the fields would be the socio-economic factors influencing neonatal deaths in the Masisi health zone.

THEORETICAL AND EMPIRICAL FRAMEWORK

Definition of Concepts

a. Neonatal mortality: This is the ratio between the number of children born alive and the number who died during their first 28 days of life.

b. Early neonatal mortality: This is the ratio between the number of babies alive and dead during their first week of life and the number of live births.

c. Mortality: This is the ratio between the number of stillbirths and the total number of births.

d. Perinatal mortality: This is the ratio between the number of children who die, either at birth or in their first week of life, and the number of live births.

e. Infant mortality: This is the number of children who died in the first year of life in relation to the total number of children born alive.

f. Neonatology: This branch of medicine deals with the care and treatment of normal and pathological newborn babies.

g. Perinatology: This is the study of childhood diseases that may occur during periods before or immediately after birth.

Causes of Neonatal Death

According to the WHO, the leading causes of neonatal death in Africa are: prematurity, asphyxia, infections and birth defects.

Medical-Health Factors Favouring Neonatal Deaths

Prenatal consultation: This is the proportion of pregnant women who have had their pregnancy medically monitored. Indeed, each woman is recommended to make 4 visits throughout her pregnancy.

Family planning: In developing countries, family planning makes it possible to reduce the number of pregnancies by 20% per woman and to reduce by at least as much the mortality and after-effects linked to pregnancy and childbirth. It is a way to reduce the number of abortions and premature births by avoiding unwanted or unexpected pregnancies, to avoid early, late, too crowded or too close pregnancies (UNFPA, 2012b).

Maternal-foetal risk factors: Prematurity, low birth weight, infections during pregnancy, multiple pregnancies, complications during labour determine the survival of the foetus and the newborn. Maternal health and care as well as obstructed labour and malpresentation represent the highest risks and require skilled and special interventions, resulting in newborn deaths (UNICEF, 2017).

Factors of 3 delays in seeking care: They are distinguished as follows:

(a) *Factors of the first delay* – various factors are responsible for delays in seeking care, including:

- Ignorance of signs of complications and erroneous beliefs
- Traditional treatment
- Self-medication
- Traditional birth attendants
- Refusal to consult male health workers
- Decision-making takes too long
- Lack of trust in health care providers
- Attitude of health workers.

(b) *Factors of the second delay*

- Lack of transportation means
- Impassable road
- Lack of means of communication
- Poor security

(c) *Factors of the third delay*

- Absence of competent personnel/staff
- Delayed intervention by service providers
- Quality of service offered (WHO, 2018)

Socio-Economic Factors Favouring Neonatal Deaths

Poverty: Poverty is an underlying cause of many neonatal deaths. Indeed, it contributes to an increase in risk factors such as maternal infection and a decrease in effective care before, during and after pregnancy (Barry, 2008).

Place of residence: Children in rural areas are 1.7 times more likely to die before the age of five compared to those living in urban areas.

Level of education: Maternal education remains an important determinant of child survival. The children of educated mothers (even only at the primary level) have a higher survival rate than those of the uneducated. In America, neonatal mortality in countries with high percentages than in countries where women attended studies (Barry, 2008).

Domestic chores: The many domestic and rural chores often mean that women don't have the time they need to attend medical appointments, as they waste a lot of time doing so, as well as being exhausted. It is believed that the work was done to facilitate childbirth. That's why when a woman is pregnant, she mustn't rest, otherwise the foetus will stick to the mother's belly and cause a difficult birth for the mother (Diallo et al., 1998).

METHODS

Type of Study

This study is descriptive and cross-sectional, and to collate data in the field, we used the quantitative approach through a closed-type survey questionnaire.

Study Population and Sampling

The study population and target population related consists of two levels which in turn represent two statistical universes. Since the issue of neonatal mortality is complex to define, the first level of this sample was constituted by nurses or health personnel working in the neonatal department of the General Referral Hospital (GRH/Masisi) which made 12 health personnel who answered questions related to the medico-sanitary factors favouring neonatal deaths; the second level consisted of 762 children (GRH/Masisi Office, 2020: 10) admitted to the neonatology department, represented by their mothers, from whom we used the LYNCH formula to draw a sample of 84 women who answered questions relating to the socio-economic factors favouring neonatal mortality in the Masisi population.

The sampling determination was determined on the basis of two samples as judged in the previous paragraph, but calculated according to the following LYNCH formula:

$$n = \frac{NZ^2 p(1-p)}{Nd^2 + Z^2 p(1-p)}$$

Hence n = sample size; N = population size: number of children admitted to the neonatal ward in the financial year 2019-2020 (GRH/Masisi Office, 2018-2019: 22); P = the prevalence or rate of neonatal mortality qui is 6.6% for the fiscal year 2018-2019 (GRH/Masisi Office, 2019: 24); Z = standardization coefficient which is equal to 1.96; d= margin of error: 5%.

$$\begin{aligned} n &= \frac{762(1,96)^2 \times 0,066(1-0,066)}{762(0,05)^2 + (1,96)^2 \times 0,06(1-0,06)} = \frac{762 \times 3,8416 \times 0,061644}{762(0,0025) + 3,8416 \times 0,061644} \\ &= \frac{762 \times 0,236811}{1,905 + 0,236811} = \frac{180,449}{2,141} = 84,2 \approx 84 \end{aligned}$$

The samples that are used for this study are probabilistic because they offered an equal chance to all to be included. However, it is necessary to specify that for the first case, the sample is exhaustive, i.e. it was constituted by a known number of health personnel (12 people from the neonatal service of the GRH/Masisi), the sampling unit here is the individual. In the second case, the sample is a simple systematic sample and occasional with individuals as statistical units, calculated on the basis of the LYNCH formula where 84 children admitted to the neonatal department represented by their mothers. The data collection tool was pre-tested at the Masisi Reference Health Centre on 5 children represented by their mothers to avoid bias whose results allowed us to correct any errors that crept in and/or committed during its elaboration. Regarding inclusion and exclusion criteria; any newborn admitted to the neonatology unit of the GRH Masisi and who died during the neonatal period during the study period was included in the study. Newborns who died before admission, or who were admitted during the study period but died after 28 days of life, or whose data were

insufficient or unusable, or who were admitted during the study period but discharged alive after 28 days of life, were excluded from the study.

As for the evaluation and/or hypothesis test, we calculated the Chi-two test (X^2) with an estimated p-value of 5% or $P = 0.05$ in order to reconcile the independent variables to the dependent variable and see if there is really a significant influence or difference.

Finally, in terms of research ethics, we guaranteed respondents the confidentiality of information received through anonymity and use of codes on the survey questionnaire.

RESULTS

Results Related to Medical-Health Factors Favouring to Neonatal Mortality

Table 1: Respondent distribution by medical-health factors

Answers	Number of staff (12) Neonatal mortality	%	Chie2	P
Full follow-up of the Prenatal consultation				
Yes	2	16.7		
No	10	83.3	0.196	0.0658
Total	12	100		
If not, how often				
One in four times	2	20		
two times out of four	4	40		
Three times out of four	3	30		
Never	1	10	3.375	0.0337
Total	12	100		

Source: Field data, July 2022

Looking at this table, the results show that a large proportion (83.3%) of respondents said that women did not completely follow up the prenatal consultation, among them 40% had an attendance frequency of two out of four times compared with a minority (10%) who did not do so at all.

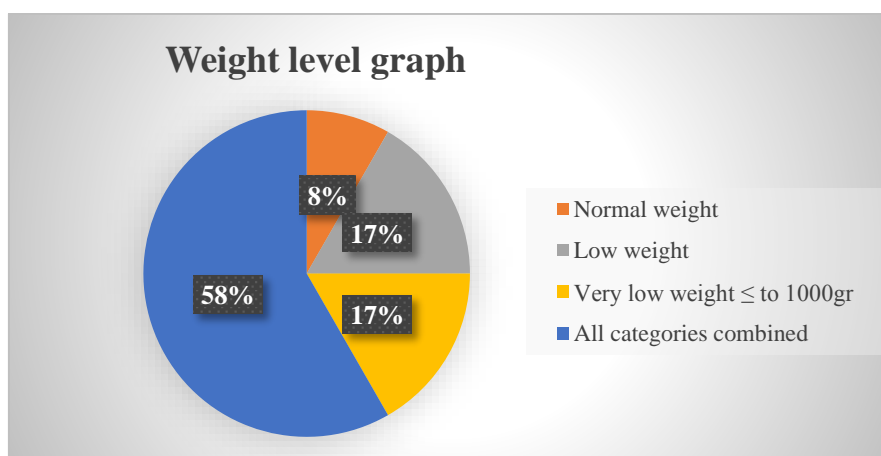


Figure 1: Weight level
Source: Field data, July 2022

The results in the above figure show us the distribution of weight level among respondents. It comes out this figure that more than half (58.3%) of the babies admitted to the

neonatology department were born at all weights, and 16.7% were born at low or very low weights of less than 1000 g.

Table 2: Respondent distribution by prematurity occurrence

Answers	Number of staff (12) Neonatal mortality	%	Chie2	P
Prematurity				
Yes	12	100		
No	0	0		
Total	12	100		
Registered neonatal diseases and infections				
Yes	12	100		
No	0	0		
Total	12	100		
Most common type of infections				
Meningitis and sepsis	2	16.7		
Enterocolitis and omphalitis	4	33.3		
All infections combined	6	50	2.357	0.0308
Total	12	100		

Source: Field data, July 2022

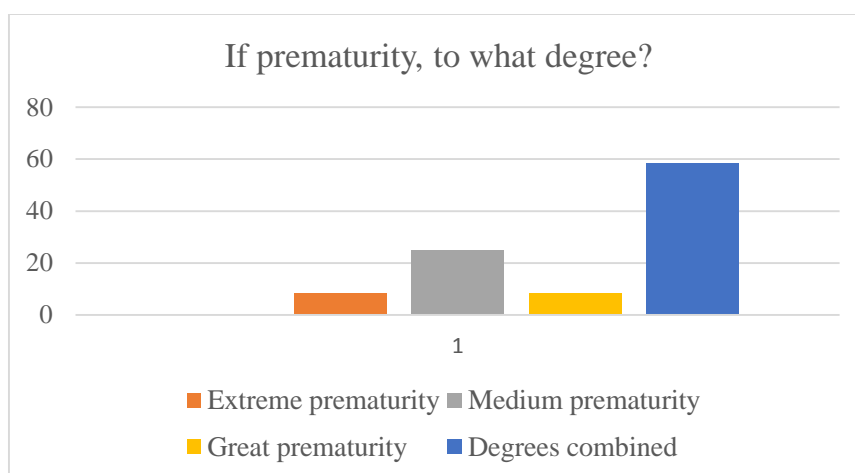


Figure 2: Degree of illness in neonatology department

Source: Field data, July 2022

The results in this table and figure are sufficient proof that all the children admitted to the neonatology department (100%), are born prematurely with neonatal illnesses and/or infections. The results emphasize that more than half (58.3%), have a combined degree of prematurity, great prematurity and neonatal asphyxia, which account for 8.3% and half (50%), respectively, of meningitis and sepsis, with enterocolitis and omphalitis being the most frequent infections.

Table 3: Distribution of respondent by the respect of the maternal age

Answers	Number of staff (12) Neonatal mortality	%	Chie2	P
Respect for maternal age				
Yes	2	16.7	0.196	0.0658
No	10	83.3		
Total	12	100		
Frequency of non-compliance				
Rarely	5	50		
Sometimes	3	30		
Frequently or totally	2	20	0.375	0.0829
Total	12	100		
Cases of newborns of unknown gestational age				
Yes	11	91.7		
No	1	8.3		
Total	12	100		
Estimated as a major factor in neonatal deaths				
Yes	7	63.6		
No	4	36.4	1.354	0.0302
Total	12	100		

Source: Field data, July 2022

Furthermore, in view of the results presented in this table, it can be seen that a large proportion of respondents (83.3%) said that women respect the maternal age, and half of them (50%) said that in the rare event of a pregnancy not respecting the maternal age. However, a large proportion (91.7%) said that there were cases of newborns whose gestational age was unknown, and the majority of respondents (63.6%) considered this to be a major factor in neonatal deaths.

On the basis of statistical tests, we note that through the results of this table that there is **no significant difference between the medical-health** factors at the occurrence of *incomplete follow-up of the prenatal consultation, the level of birth weights, the presence of neonatal diseases or infections, prematurity the case of unknown gestation age and neonatal deaths* because these factors respectively demonstrate a ($p\text{-value}=0.0337, 0.0309, 0.0308$ and 0.0302) < 0.05 in the Masisi health zone particularly at the Masisi General Referral Hospital. Thus, we can say that these aforementioned factors influence the cases of neonatal deaths within Masisi's GRH. So, we affirm this hypothesis.

Results Related to Socio-Economic Factors Favouring to Neonatal Mortality

Table 4: Distribution of respondent according to their feeding during gestation period

Answers	Number of employees (84) Neonatal mortality	%	Chie2	P
Feeding during the gestation period				
Cassava bread (fufu)	16	19		
Beans	15	17.9		
Vegetables	3	3.6		
Anything I find	50	59.5	2.466	0.0373
Total	84	100		

Source: Field data, July 2022

Observation of this table shows that most respondents (59.5%) eat whatever they can find during the gestation period, 19% usually eat cassava bread (or fufu), followed by 17.9% who frequently eat beans during gestation period while a minority (3.6%) eat vegetables.

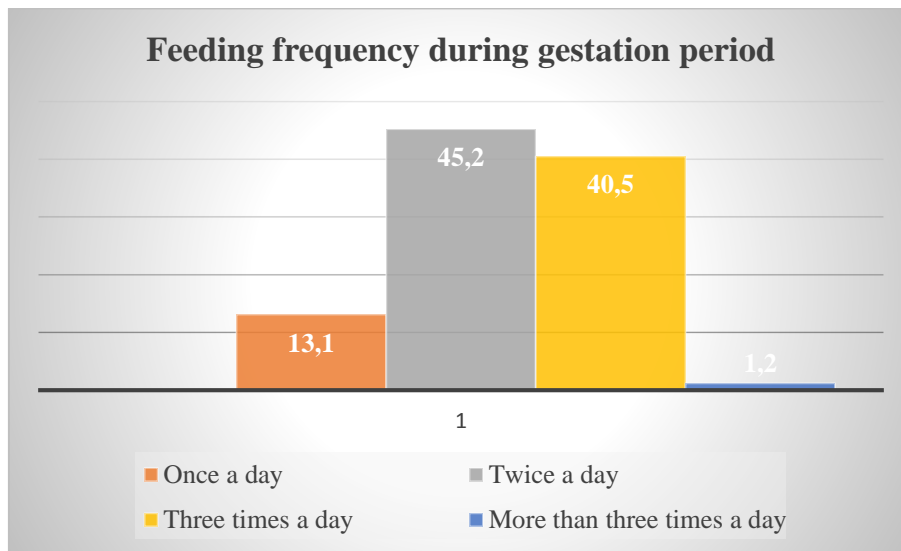


Figure 3: Feeding frequency during gestation period

Source: Field data, July 2022

In terms of daily eating frequency, a minority (1.2%) of respondents eat more than three times a day during the gestation period, compared with almost half (45.2%) who eat twice a day.

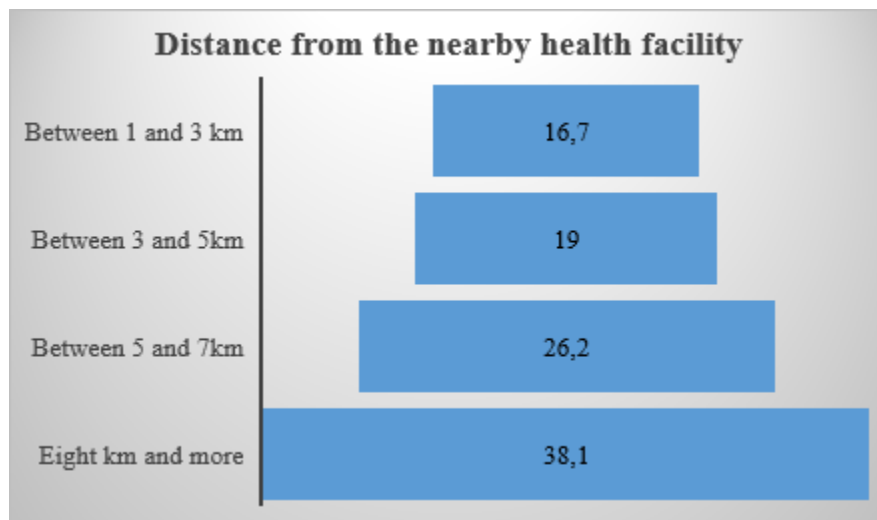


Figure 4: Distance from the nearby health facility

Source: Field data, July 2022

Having a look on this figure, it should be noted that 38.1% of respondents have to travel more than 8 km to reach a health facility, 26.2 have to travel between 5 and 7 km to reach a nearby health facility, but also 19% have to travel between 3 and 5 km to reach a nearby health facility and lastly 16.7% who travel 1 to 3 km.

Table 5: Distribution of respondent according to the economic factors

Answers	Number of employees (84) Neonatal mortality	%	Chie2	P
Carries out an IGA				
Yes	72	85.7		
No	12	14.3	7.841	0.0347
Total	84	100		
Estimated monthly income				
Between 20 and \$50 per month	20	27.8		
Between 50 and \$100 per month	27	37.5		
Between 100 and \$150 per month	7	9.7		
\$200 and more per month	15	20.8		
Less than \$20 per month	3	4.2	4.272	0.0041
Total	84	100		
Does income give you access to health care				
Yes	33	39.3		
No	51	60.7	2.687	0.0004
Total	84	100		

Source: Field data, July 2022

A large proportion (85.7%) of respondents carry out an income-generating activity, compared with 14.3% who do not. Of those who carry out an IGA, 37.7% estimate their monthly income at between \$50 and \$100 per month, compared with a minority (4.2%) who estimate it at less than \$20 per month. Furthermore, most of the respondents (60.7%) admit that this income does not allow them access to healthcare against 39.3% who affirm it.

Table 6: Distribution of respondent according to the challenges to access health facilities during pregnancy

Answers	Number of employees (84) Neonatal mortality	%	Chie2	P
Other challenges to accessing care during the pregnancy period				
Absence, delay, quality and competence of health workers	8	9.5		
Have to wait for the decision of the husband, mother-in-law and aunt	5	6		
First and foremost, traditional treatment and self-medication	13	15.5		
Attitudes of health workers	15	17.8		
Fatigue with field work	3	3.6		
Long distance, road conditions and insecurity	29	34.5		
Lack of financial means	11	13.1	4.568	0.0713
Total	84	100		

Source: Field data, July 2022

Considering other difficulties linked to access to health care encountered during the gestation period, 34.5% of respondents mentioned long distance, the state of the road and lack of safety (insecurity), 15.5% said they resorted to traditional treatment and self-medication first and foremost, 13.1% said financial resources were a major challenge, 17.8% talk about

the attitudes of health workers (medical staff), but 6% say that they have to wait for the decision of the husband, mother-in-law and aunt.

Table 7: Distribution of respondent according to their views on family planning

Answers	Number of employees (84) Neonatal mortality	%	Chie2	P
Family planning				
Yes	81	96.4		
No	3	3.6	7.777	0.353
Total	84	100		
FP Member				
Yes	31	36.9		
No	53	63.1	2.071	0.0624
Total	84	100		
If not why				
Program with side effects	4	7.5		
My husband refuses	21	39.6		
Program is against my religious confession	3	5.7		
I don't like it	17	32.1		
Lack of FP items	8	15.1	4.523	0.0613
Total	84	100		

Source: Field data, July 2022

Finally, considering the family planning, a large proportion (96.4%) of respondents had already heard of health facilities, while a minority (3.6%) had not. The majority of respondents (63.1%) were not members of the family planning programme and 36.9% were. Among these, 39.6% said they were not members because their husbands refused, 32.1% said they do not like it, and a minority (5.7%) said it is against their religious beliefs.

Based on statistical tests, the results in this table show that there is **no significant difference between the socio-economic factors**, i.e., *mother's diet, distance of the health facility from the place of residence, low family income, the level of education and heavy work in the fields* and **neonatal deaths**, as these factors respectively show a (**p -value=0.0373, 0.02013, 0.0310, 0.0347, 0.0041 and 0.0004**) < 0.05 in the Masisi health zone, particularly at the Masisi general referral hospital. Thus, we can say that these aforementioned factors influence the cases of neonatal deaths within the Masisi GRH. We therefore affirm this hypothesis.

DISCUSSION

According to the grouping of the first independent variable, medical and health factors, the results of this study indicate that a large proportion (83.3%) of respondents said that women did not follow up the PNC completely, with a frequency of two out of four times (40%), compared with a minority (10%) who did not do so at all. More than half (58.3%) of the babies admitted to the neonatology department were born in all weight categories, and 16.7% were born with a low or very low weight of less than 1000 g. The results of this study provide sufficient evidence that all the children admitted to the neonatology department (100%) are born prematurely with neonatal illnesses and infections, of which more than half (58.3%), have a combined degree of prematurity, (extreme prematurity) which account for 8.3% and half (50%), respectively, with meningitis and sepsis, enterocolitis and omphalitis

being the most frequent infections. Nevertheless, in view of the results mentioned in this study, a large proportion of respondents (83.3%) stated that women respect the maternal age, and half of respondents (50%) said that in the rare event of a pregnancy not respecting the maternal age. However, a large proportion (91.7%) said that there were cases of newborns whose gestational age was unknown, and the majority of respondents (63.6%) considered this to be a major factor in neonatal deaths.

These results converge with those of Blondel and Bréart (2004) in the study on stillbirths and neonatal mortality, in which they specified that the main risk factors found were related to the newborn: gestational age, birth weight, number of foetuses and the sex and social situation of the parents, maternal age and maternal parity (UNICEF, 2012: 24).

Nevertheless, the results of the present study are similar to those of Chen et al. (2008), who, in a retrospective cohort study, investigated the factors explaining the high risk of neonatal deaths and found that pregnancy in 19-year-old adolescents was associated with high neonatal and post-neonatal mortality. They were able to demonstrate that this association was linked to the high risk of premature delivery in pregnant adolescents. In Oceania, Papua New Guinea, Amoa et al. in 2002 investigated the risk factors for early neonatal mortality and their results sufficiently support those of the present study in that the factors found were: absence of PNC, abnormal amniotic fluid, male sex, very low birth weight and gestational age less than 34 weeks. When babies weighing less than 1000 g were excluded from the analysis, the risk factors were: singleness, abnormal amniotic fluid and gestational age of less than 34 weeks.

It is important to focus on health factors because, based on the results obtained from health personnel, it can be said that in the neonatology department if women attach more importance to their diet during the gestation period, attach more importance to PNC, adherence to HF and maternal treatment; cases of complications and neonatal illnesses or infections would be reduced and there would be fewer cases of neonatal deaths in the Masisi GRH.

According to the grouping of the second independent variable, socio-economic factors, the results of this study show that of the total number of respondents (84), most (59.5%) ate whatever they could find during the gestation period, while a minority (3.6%) ate vegetables. In terms of daily eating frequency, a minority (1.2%) of respondents ate more than three times a day during the gestation period, compared with almost half (45.2%) who ate twice a day. It should be noted that 38.1% of respondents had to travel more than 8 km to reach a health facility, compared with 16.7% who travelled 1 to 3 km. A large proportion (85.7%) of respondents carry out an income-generating activity, compared with 14.3% who do not. Among those who carry out an IGA, 37.7% estimate their monthly income at between \$50 and \$100 per month, compared with a minority (4.2%) who estimate it at less than \$20 per month. Most of the respondents (60.7%) admit that their income does not allow them access healthcare, compared with 39.3% who affirm it. Considering other difficulties linked to access to health care, 34.5% of respondents mentioned distance, the state of the road and lack of safety, 15.5% said they resorted to traditional treatment and self-medication respectively, and 13.1% said financial resources were a major challenge. Finally, with regard to family planning, a large proportion (96.4%) of respondents had already heard of FP, while a minority (3.6%) had not. The majority of respondents (63.1%) were not members of the family planning programme, compared with 36.9%. Of these, 39.6% said they were not members because their husbands refused, 32.1% said they did not like it, and a minority (5.7%) said it was against their religious beliefs.

These results converge with the thoughts of Dr. Badji, specifying that poverty is an underlying cause of many neonatal deaths. Indeed, it contributes to an increase in risk factors such as maternal infection and a reduction in effective care before, during and after

pregnancy. But the mother's education also remains an important determinant of child survival. The children of educated mothers (even only primary education) have a higher survival rate than those of uneducated mothers. In America, neonatal mortality is higher in countries with high percentages than in countries where women have attended school. Finally, the large amount of housework and work in the fields often means that women do not have the time they need to go for treatment, as they waste a lot of time doing this, in addition to the exhaustion caused by the work (Badji, 2004: 24).

We think that as soon as the economic crisis eases (population's income is low), bringing health facilities closer to the population and encouraging the population to support FP initiatives would be the ideal way to try and put an end to the number of neonatal deaths in health facilities, particularly those in rural areas such as Masisi.

CONCLUSION

The present study focuses on the factors favouring neonatal deaths, with a view to investigating the why in terms of the medical, health and socio-economic factors influencing this crisis among children. The aim is to identify and analyse these coefficients and propose remedial measures. In view of the above results, it is important to say that there is *no significant difference between medical and health factors and socio-economic factors*.

Thus, taking the results into account, conclusions can be drawn in terms of recommendations, saying that women of childbearing age should be strengthened in prenatal education and take care of the advice they receive to guarantee the life of the foetus and even the life of the child; that they should support the initiatives of the family planning programme by their massive adherence and abandon negative cultural practices. Finally, it is important that health professionals continue to meet the social, medical and health care needs of children admitted or not to the neonatology department, while informing their mothers that they are directly responsible for the life and health of their children.

REFERENCES

- Barry, B. (2008). *Memory Online - Maternal mortality: Cause and contributing factors determined by verbal autopsy in Bakel department*. Retrieved September 2, 2023, from <https://www.memoireonline.com/07/11/4592/Mortalite-maternelle-cause-et-facteurs-favorisants-determines-par-lautopsie-verbale-dans-le-d.html>
- Blondel, B., & Bréart, G. (2004). Mortinatalité et mortalité néonatale. *EMC-Pédiatrie*, 1(1), 97-108. <https://doi.org/10.1016/j.emcped.2003.09.002>
- Chelo, D., Monebenimp, F., Npanguepko, F. R. T., & Tietche, F. (2012). Mortalité néonatale précoce et ses déterminants dans une maternité de niveau I à Yaoundé, Cameroun. *Pan African Medical Journal*, 13(1).
- Chen, X. K., Wen, S. W., Fleming, N., Yang, Q., & Walker, M. C. (2008). Increased risks of neonatal and postneonatal mortality associated with teenage pregnancy had different explanations. *Journal of Clinical Epidemiology*, 61(7), 688-694.
- Diallo, F. B., Diallo, A. B., Diallo, Y., Goma, O., Camara, Y., Cisse, M., & Diallo, M. S. (1998). Mortalité maternelle et facteurs de risque liés au mode de vie. *Médecine d'Afrique noire*, 45(12), 723-727.
- UNFPA. (2012a). *Rapport d'Enquete: Evaluation des besoins en soins obstétricaux et neonatals d'urgence*. Retrieved September 2, 2023, from https://drc.unfpa.org/sites/default/files/pub-pdf/SONU_RAPPORT_ENQUETE_FINAL_DU_7_12_2012.pdf
- UNFPA. (2012b). *Social factors determining maternal mortality and disability*. Retrieved September 2, 2023, from <https://www.unfpa.org/sites/default/files/resource-pdf/FR-SRH%20fact%20sheet-Poormother.pdf>

- UNICEF. (2017). *7,000 newborns die every day despite a steady decline in under-5 mortality, according to a new report*. Retrieved September 2, 2023, from <https://www.unicef.org/fr/communiqu%C3%A9s-de-presse/7-000-nouveaux-meurent-chaque-jour-malgr%C3%A9-une-baisse-constante-de-la>
- WHO. (2018). *Newborns: Reducing mortality*. Retrieved September 2, 2023, from <https://www.who.int/fr/news-room/fact-sheets/detail/newborns-reducing-mortality>