



(RESEARCH ARTICLE)



Incidence of serious maternal Morbidity at the RUASHI military hospital (DRC)

Jacques Mutono Matongo ^{1,*}, Telly Kabengele Vulukayi ², Cisuaka Nkongolo Pierre ², Derrick Bushobole Akiba ³, Jean Félix Kabangu Ngoyi ⁴ and Nana Kanane Bangirahe Therese ⁵

¹ Department of Public Health, University of Lubumbashi, Democratic Republic of Congo.

² Department of Public Health, Official University of Mbuji-Mayi, Democratic Republic of Congo.

³ Department of Public Health, Higher Institute of Medical Techniques of Uvira (ISTM-Uvira), South Kivu, DR Congo.

⁴ Department of Public Health, University of Mwene Ditu, Democratic Republic of Congo.

⁵ Department of Public Health, University of Kalemie, Democratic Republic of Congo.

World Journal of Advanced Research and Reviews, 2024, 23(03), 1612–1620

Publication history: Received on 07 July 2024; revised on 07 September 2024; accepted on 10 September 2024

Article DOI: <https://doi.org/10.30574/wjarr.2024.23.3.2477>

Abstract

Maternal morbidity is a public health problem in developing countries. The aim of our study was to determine the frequency of serious maternal morbidity at the Ruashi military hospital (DRC) with a view to ensuring good care and monitoring of pregnant women. A longitudinal descriptive study was conducted among 154 pregnant women in a prospective manner, data entry and analysis of results were carried out using Microsoft office 2016 and statistical test parameters were made using of Epi Info 7.2.

The incidence of maternal morbidity was 24.2%, of which 32.4% had anemia followed by hemorrhage with 27% and finally sepsis and uterine subinvolution with 5.4% each. However, 94.6% had followed the prenatal consultation against 5.4% and 29.7% had a frequency of 3 participations in the prenatal consultation and finally 8.1% had a frequency of 6 participations in the CPN. The analysis showed that the frequency of prenatal consultation and postnatal visits, literacy and socio-economic level are statistically associated with maternal morbidity.

Improving the socio-economic level of households, combating illiteracy and monitoring prenatal consultation are among the factors that will determine maternal morbidity.

Keywords: Incidence; Serious Maternal Morbidity; Military Hospital; RUASHI; DRC

1. Introduction

Maternal morbidity is understood as any health problem attributed and/or aggravated by pregnancy and childbirth (Tura et al., 2018 ; Villalba et al., 2022) . This problem has a negative impact on the well-being of women and can lead to serious consequences such as abortion, and further maternal death (Tariku, 2020 ; Heitkamp et al., 2022) .

(Gibson et al., 2017) list 25 possible complications, present or exacerbated by maternal morbidity, among which we can cite: nausea, pruritus, eclampsia, postpartum hemorrhage.

Most of these complications lead to long hospital stays, emotional depression as well as the impact on the bond between mother and child. Without any medical intervention, most women die (Wall-Wieler et al., 2019). It is imperative to monitor the state of the pregnancy and ensure early management of morbid cases to prevent these complications (Lazariu et al. , 2017) .

* Corresponding author: Jacques Mutono Matongo

According to the WHO, severe maternal morbidity remains a major public health problem worldwide. Around 287,000 women died in 2020 due to complications related to pregnancy and childbirth. This represents approximately 800 deaths per day (WHO, 2020) . The majority of these deaths occur in low- and middle-income countries; in fact, each year, around eight million women suffer from pregnancy -related complications and nearly 600,000 of them die (Taji Leki1 and Katenga, 2021) . These women are found in the vast majority of cases in sub-Saharan Africa and South Asia. Around 70% of global maternal deaths recorded in 2020 come from of Africa sub-Saharan Africa (WHO, 2020) .

Indranil et al 2021 reports in its study that 4,183 cases of sepsis were identified among the 3,653,783 hospitalizations for childbirth during the study period, with an incidence of 114 cases (95% CI, 111-118) per 100,000 hospitalizations and a rate mortality' 0.5%.

Significant positive predictors of serious morbidity identified by certain authors include: age below 20 and 30 years, self-payment or medical coverage for childbirth, low socio-economic status, presence of health problem chronic (Andrea et al., 2008 ; Lazariu et al., 2017) .

In Africa, serious maternal morbidity is marked by worrying prevalence and incidence rates; Severe maternal morbidity is higher in sub-Saharan Africa compared to other regions of the world. According to data from the World Health Organization (WHO), around 70% of maternal deaths occur in sub-Saharan Africa, despite progress in some countries. The risk factors associated with this situation would be, among others: access to care, socio-economic conditions and health systems; Insufficient health infrastructure, lack of qualified personnel, and lack of appropriate equipment contribute to high morbidity rates (WHO, 2021 ; WHO, 2020 ; Journal of Global Health, 2023) .

In the Democratic Republic of Congo (DRC), the situation of severe maternal morbidity is particularly worrying due to various public health challenges. (African Journal of Reproductive Health, 2023) . The DRC has one of the highest rates of maternal mortality in the world. According to recent data, approximately 846 deaths per 100,000 live births are attributed to complications related to pregnancy and childbirth. Severe maternal morbidity, including complications such as postpartum hemorrhage, infections, and hypertensive disorders, is also high (World Bank, 2018) .

The challenges and contributing factors to this situation in the DRC could be attributed to: access to care as many women in the DRC, especially in rural areas, do not have access to appropriate prenatal care or emergency services. Health infrastructure is often insufficient. However, the DRC benefits from various maternal health programs, supported by international organizations and NGOs, aimed at improving prenatal care, childbirth and postnatal care. Despite these efforts, significant challenges remain. Continued attention and coordinated interventions are needed to reduce severe maternal morbidity in the DRC (Médecin sans frontières, 2019 ; BMC PregnCPNy and Childbirth, 2023) .

The city of Lubumbashi, one of the main cities in the DRC, is not spared from this problem; Maternal morbidity and mortality rates in Lubumbashi are high, although precise figures may vary. The city, like many other regions of the DRC, faces significant challenges in terms of maternal health (Tshiabuila et al., 2020) .

Although Lubumbashi has several health facilities, access to specialized care and emergency services may be limited, particularly for women living in peripheral or disadvantaged areas. In addition, hospitals and health centers face a lack of modern equipment, medicines, and qualified personnel. This affects the ability to manage serious complications. Awareness and education on prenatal care and signs of complications are sometimes insufficient, which in some cases delays seeking appropriate care (Tshiabuila et al., 2020) .

It should be noted that serious complications and maternal deaths profoundly affect families, with implications for child care and economic repercussions. Furthermore, local initiatives, supported by NGOs and international partners, aim to improve maternal care in Lubumbashi, by strengthening infrastructure and training health personnel. In addition, efforts are being made to improve the training of health professionals and expand access to specialized care for pregnant women. Despite these initiatives, continued efforts are needed to overcome challenges specific to Lubumbashi and improve maternal health in the region (Kizonde, 2010.)

In view of the above, the question of serious maternal morbidity deserves to be addressed, the interest of this study lies in its scientific contribution on serious maternal morbidity, it will show the import prenatal consulting of reducing the frequency serious maternal morbidity, to prevent maternal morbidity, to better monitor the evolution of maternal health. In addition, it will help other researchers to deepen their research using this work and guide health personnel and readers to draw inspiration from the results of this study in order to guide their philosophies regarding morbidity. serious maternal.

The present study was carried out to determine the frequency of serious maternal morbidity at the Ruashi military hospital with a view to ensuring good care and monitoring of pregnant women.

2. Materials and methods

2.1. Type of study

This is a longitudinal descriptive study and our data were collected in a prospective manner.

2.2. Study environment

Our work concerns the Democratic Republic of Congo (DRC). Our research is the results of investigations carried out in the province of Haut-Katanga, more precisely in Lubumbashi, in the Ruashi military hospital in the Camp Vangu health zone. During the period from June to October 2022.

2.3. Study population

Our main target is pregnant women, whose intermediate target was health officials.

2.4. Sample and Data Processing

Our sampling was non-probability, with a sample size of women found (154 women) (Bonita et al., 2013) .

2.5. Inclusion Criteria for the Sample

This study included women who are currently pregnant or who have recently given birth at the RUASHI military hospital; has cases of serious maternal morbidity, which could include severe complications such as preeclampsia, hemorrhage, or infection, admitted to the RUASHI military hospital for serious maternal conditions, and who have provided informed consent to participate in the study.

2.6. Exclusion Criteria for the Sample

Women who are not pregnant or who are not recent mothers, who did not have cases of maternal morbidity that do not meet the criteria for "serious" conditions, who were transferred to or from another hospital and not initially treated at the RUASHI military hospital, and who do not provide informed consent or refuse to participate in the study was excluded.

A closed-type questionnaire was sent to the different women selected for this study and direct observation was carried out during our field trip, an ideal opportunity to inspect health education. The variable followed by the Prenatal Consultation was considered dependent which allowed us to make statistical associations and confirmed using the P value (Small p).

Data analysis was carried out using Epi Info 7.2 statistical software.

2.7. Statement of Ethical Approval

The study was reviewed and approved by the Ethical Review Board of the RUASHI military hospital. All participants provided informed consent prior to inclusion in the study. The study adhered to the ethical principles of confidentiality, respect for persons, and the protection of participants' rights.

3. Results

3.1. Incidence of maternal morbidity

Out of a sample of 154 women identified, 37 had developed serious morbidity; this represents a rate of 24.2% (Table I).

Table 1 Distribution according to incidence of maternal morbidity

Severe maternal morbidity	Frequency	Percentage
Yes	37	24.2
No	117	75.8
Total	154	100

3.2. Sociodemographic Data

It should be noted that 75.7% of women who gave birth in the maternity ward were aged between 20 and 34; those who were married represented 97.3%; most had already conceived three pregnancy or less 72.9%; Many of these women came from the commune of Ruashi 70.3%; those who had completed the humanities accounted for 67.6%; in relation to profession, housewives were the most represented with 33 cases or 89.2% (Table 2).

Table 2 Distribution according to sociodemographic data

Variables	Frequency	Percentage
Age group		
<20	4	10.8
20-34	28	75.7
35 and over	5	13.5
Marital status		
Married	36	97.3
Bachelor	1	2.7
Gesture		
1-3	27	72.9
4-6	10	27.1
7 and above	0	0
Origin		
Kampemba	6	16.2
Ruashi	26	70.3
Kenya	4	10.8
Appendix	1	2.7
Level of education		
Secondary	10	27
Humanity	25	67.6
University	2	5.4
Occupation		
Housewife	33	89.2
Worker	2	5.4
Others	2	5.4

3.3. Type of Pathology

Frequent pathologies have been identified; in fact 32.4% of women surveyed had anemia, 27% hemorrhage and 5.4% respectively for septicemia and uterine subinvolution (Figure 1).

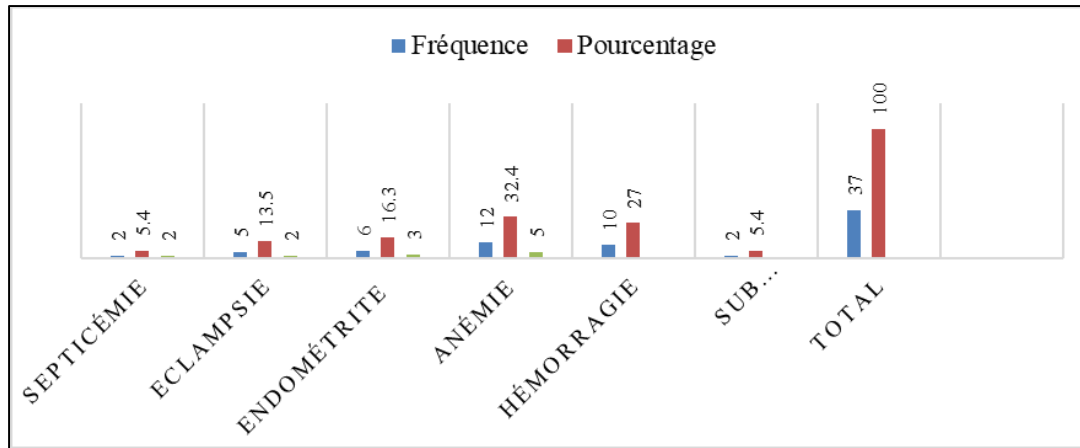


Figure 1 Distribution of respondents according to type of pathology

3.4. Prenatal monitoring

A good number of respondents, 94.59%, had attended the prenatal consultation; most women did so in the second half of pregnancy with 54.1; in addition, 29.7% of these women had completed 3 sessions of participation in the CPN (Table 3).

Table 3 Distribution of respondents according to Prenatal monitoring

Variables	Frequency	Percentage
Prenatal monitoring		
Yes	35	94.6
No	2	5.4
Prenatal monitoring start period		
First trimester	4	10.8
Second trimester	20	54.1
Third trimester	13	35.1
Prenatal monitoring frequency		
1	5	13.5
2	10	27
3	11	29.7
4	8	21.7
6	3	8.1

3.5. Type and mode of delivery

The results show that 40.5% of women had had obstructed births, and 78.4% had a vaginal delivery method (Table 4).

Table 4 Distribution of surveys according to type and mode of delivery

Variable	Frequency	Percentage
Type of Childbirth		
Eutocic	22	51.5
Dystocic	15	40.5
Delivery mode		
High way	8	21.6
Low way	29	78.4

3.6. Type of delivery and prenatal monitoring

In relation to the type of delivery, 15 women who followed prenatal consultation had had an obstructed delivery with 42.9%, this association is not statistically significant (Table 5).

Table 5 Association between type of delivery and Prenatal monitoring

	Type Delivery			P
Prenatal monitoring	Dystocic	Eutocic	Total	0.3468468468
No	0 (0.00)	2 (9.09)	2	
Yes	15(42.9)	20 (57.1)	35	
TOTAL	15	22	37	

3.7. Level of study and monitoring of prenatal monitoring

This association indicates that 25 out of 37 women who followed prenatal monitoring had a humanitarian level of study with 71.4%, this association is not statistically significant (Table 6).

Table 6 Association between level of study and prenatal monitoring

	Study Level			P	
Prenatal monitoring	Humanity	Secondary	University	Total	0.0576
No	0	2(5,4)	0	2	
Yes	25(71.4)	8(22.9)	2(5,7)	35	
Total	25	10	2	37	

3.8. Mode of delivery and prenatal monitoring

Table 7 Association between mode of delivery and Prenatal monitoring

	DELIVERY MODE			P
Prenatal monitoring	low track	high way	Total	0.0420420420
No	0(0,0)	2(5,4)	2	
Yes	29(82.9)	6(17.1)	35	
Total	29	8	37	

In fact, 29 women who followed prenatal monitoring (i.e. 82.9%) had given birth by vaginal delivery. A statistically significant association is observed. There is therefore a relationship between prenatal monitoring and route of delivery (Table 7).

4. Discussion

At the end of our study carried out at the Ruashi Military Hospital on 154 women registered and who gave birth in the maternity ward of this hospital, the results lead us to note that of all the women who gave birth in this unit care, there were 37 women or 24.2% who presented serious morbidity. Compared to the study conducted by (Romagano et al. 2020) . The group of pregnant women who did not follow the prenatal consultation early was significantly more likely to present maternal morbidity of 27.3%; $P = 0.004$ and infection 13.6%; $P = 0.006$.

According to our study, the morbidity rate was 24.2% compared to the various surveys carried out by the observation of urban change in Lubumbashi, the general morbidity rate was 18.5% in Lubumbashi with a mortality rate of 1.6%. The same survey indicates that morbidity in Lubumbashi is caused by paralyzing and infectious pathologies, malaria comes first at the community level (67%) of cases of patients as well as in healthcare structures (more than 20% of cases received). Anemia (often due to malaria) while bodily complications Prenatal consultation of pregnancy are the most common causes of maternal mortality in Lubumbashi (Massus 2011) .

A look at the age group reveals that the majority of our sample is made up of women aged 20 to 34 (i.e. 75.7%). This age group corresponds to the period when genital activity is intense, a fact which has been noted by numerous authors (Kizonde, 2010 ; Howell et al., 2017 ; Conrey et al., 2019 ; Acosta et al., 2016) .

The extreme ages of childbearing constitute the ages at risk, that is to say the group from 18 to 35 years old with 77.4% of youth. Compared to (Beverley et al., 2016) who found that significant positive predictors of serious morbidity were in the age group between < 20 and 30 years, of which this age suffers from low socio-economic status and the presence of chronic health problems because health coverage does not fully insured .

Regarding the level of study of women, we observe that the majority had the level of humanity or secondary school in 67.6% of cases; However, the number of women with university level is not negligible: 5.4%; which is only normal because more and more women combine school and motherhood.

The rate of severe maternal morbidity at the Ruashi Military Hospital was less than 25% or 19% as the morbidity rate found by (Elliott et al., 2017 ; Geller et al., 2018 ; Acosta et al., 2016) . However, these same authors found that women in hospitals who had already had collaborative experience in terms of hemorrhage presented 17.5%.

Compared to serious pathologies, we observe that 32.4% had anemia however, the hemorrhage is not negligible with 27% this could be explained by prenatal consultation non-complied with prenatal consultation appointments. Indeed, it has been reported that monitoring Prenatal consultation and keeping appointments has many advantages in terms of protecting the health of the pregnant woman and the well-being of the child (Aftab et al. , 2021 ; Guignard et al., 2021) .

While in Bakel we found a maternal morbidity rate due to major obstetric complications of more than 40%. Boubacar 2013) . These obstetric complications are distributed as follows: 11% linked to hemorrhages, 10% to infections, 6% to dystocia, 5% to hypertensive disorders of prenatal consultation pregnancy and 15% to abortions. Including preventive measures by respecting pregnant women during Prenatal consultation sessions is widely discussed in the literature and in developed countries to reduce maternal mortality, up to 50% of cases are considered potentially preventable (Cheng et al. , 2012) .

Concerning the follow-up of the prenatal consultation, we note that 94.6% of the women had followed the prenatal consultation. A result which agrees with that carried out by (Rackelboomt et al., 2015) who also found in his study that 95% of women followed prenatal monitoring. And this can probably be explained by the level of education of their spouses. Speaking of the frequency that a woman can present to the CPN: 29.73% participated 3 times (times what, per year? per month?), our study is similar to that conducted by Boubacar who found 33.38% of women also participated 3 times (Boubacar 2013) .

Regarding the type of delivery, our study showed that 29 women who followed prenatal consultation had given birth vaginally and 40.53% had an obstructed delivery. Statistical analyzes did not find significant relationships between prenatal monitoring and vaginal delivery or with the type of delivery (dystocic or eutocic). Our result is similar to that carried out by (Zimbeck 2008) who also found 55% of eutocic births and 45% of obstructed births.

5. Conclusion

In our country, maternal morbidity constitutes a scourge which erodes our society despite the efforts made to reduce it. The disease involves not only the vulnerability of a human life but also a prenatal consultation final expense for care.

As mortality is inextricably linked to a large number of social factors, health authorities must provide fundamental proof of the condition of women, starting prenatal consultations on time, in order to allow healthcare workers to carry out adequate follow-up to avoid obstructed births and the extent to which the health care system meets their needs; which implies their existence the accessibility and acceptability of maternity care.

References

- [1] Acosta, CD, Harrison, DA, Rowan, K., Lucas, DN, Kurinczuk, JJ, Knight, M., 2016. Maternal morbidity and mortality from severe sepsis: a national cohort study. *BMJ Open* 6, e012323. <https://doi.org/10.1136/bmjopen-2016-012323>
- [2] African Journal of Reproductive Health, 2023. Determinants of severe maternal morbidity in the Democratic Republic of the Congo: A systematic review, 2023, Vol. 27, No. 4, p. 101-114. doi:10.29063/ajrh2023.v27i4.7.
- [3] Aftab, F., Ahmed, I., Ahmed, S., Ali, SM, Amenga-Etego, S., Ariff, S., Bahl, R., Baqui, AH, Begum, N., Bhutta, ZA, Biemba, G., Cousens, S., Das, V., Deb, S., Dhingra, U., Dutta, A., Edmond, K., Esamai, F., Ghosh, AK, Gisore, P., Grogan, C., Hamer, DH, Herlihy, J., Hurt, L., Ilyas, M., Jehan, F., Juma, MH, Kalonji, M., Khanam, R., Kirkwood, BR, Kumar, Aarti, Kumar, Alok, Kumar, V., Manu, A., Marete, I., Mehmood, U., Minckas, N., Mishra, S., Mitra, DK, Moin, MI, Muhammad, K., Newton, S., Ngaima, S., Nguwo, A., Nisar, MI, Otomba, J., Quaiyum, MA, Sarrassat, S., Sazawal, S., Semrau, KE, Shannon, C., Singh, VP, Soofi, S., Soremekun, S., Suleiman, AM, Sunday, V., Dilip, TR, Tshefu, A., Wasan, Y., Yeboah-Antwi, K., Yoshida, S., Zaidi, AK, AlliCPNe for Maternal and Newborn Health Improvement (AMANHI) maternal morbidity study group, 2021. Direct maternal morbidity and the risk of pregnCPNy-related deaths, stillbirths, and neonatal deaths in South Asia and sub-Saharan Africa: A population-based prospective cohort study in 8 countries. *PLoS Med.* 18, e1003644. <https://doi.org/10.1371/journal.pmed.1003644>
- [4] Andreea A. Creanga, MD, PhD; et al., 2008. Brian T. Bateman, MD, MSc; Elena V. Kuklina, MD, PhD; William M. Callaghan, MD, MPH Racial and ethnic disparities in severe maternal morbidity: a multistate analysis.
- [5] World Bank, 2018. Demographic and Health Surveys: Democratic Republic of Congo.
- [6] Beverley Lawton, FRNZCGP; et al., 2016. Evelyn Jane MacDonald, FACHSHM; Selina Ann Brown, RN; Leona Wilson, FANZCA; James Stanley, PhD; John David Tait, FRCOG; Richard Alan Dinsdale, FCICM; Carolyn Lee Coles, MA; Stacie E. Geller, PhD Preventability of severe acute maternal morbidity.
- [7] BMC PregnCPNy and Childbirth, 2023. Addressing maternal health disparities in the Democratic Republic of Congo: Recent evidence and policy implications, 2023, Vol. 23, No. 1, Article 75. doi:10.1186/s12884-023-05714-3.
- [8] BOUBACAR B., 2013. Maternal mortality causes and contributing factors determined by verbal autopsy in the department of Bakel, FrCPNe. P34-39.
- [9] Cheng EM, Keyhani S, Ofner S, et al., 2012. Lower use of carotid artery imaging at minority serving hospitals. *Neurology*;79:138-44.
- [10] Conrey, EJ, Manning, SE, Shellhaas, C., Somerville, NJ, Stone, SL, Diop, H., Rankin, K., Goodman, D., 2019. Severe Maternal Morbidity, A Tale of 2 States Using Data for Action-Ohio and Massachusetts. *Mother. Child Health J.* 23, 989–995. <https://doi.org/10.1007/s10995-019-02744-1>
- [11] Elliott K. Main, MD; Valerie Cape, BA; et al., 2017. Anisha Abreo, MPH; Julie Vasher, DNP, RNC-OB, CNS; Amanda Woods, MA; Andrew Carpenter, BA; Jeffrey B. Gould, MD, MPH Measuring severe maternal morbidity: validation of potential measures).
- [12] Geller, SE, Koch, AR, Garland, CE, MacDonald, EJ, Storey, F., Lawton, B., 2018. A global view of severe maternal morbidity: moving beyond maternal mortality. *Reprod. Health* 15, 98. <https://doi.org/10.1186/s12978-018-0527-2>
- [13] Gibson, C., Rohan, AM, Gillespie, KH, 2017. Severe Maternal Morbidity During Delivery Hospitalizations. *WMJ Off. Publ. State Med. Soc. Wisconsin.* 116, 215–220.

- [14] Guignard, J., Deneux-Tharoux, C., Seco, A., Beucher, G., Kayem, G., Bonnet, M.-P., EPIMOMS group, 2021. Gestational anaemia and severe acute maternal morbidity: a population -based study. *Anaesthesia* 76, 61–71. <https://doi.org/10.1111/anae.15222>
- [15] Heitkamp, A., Vollmer Murray, L., van den Akker, T., Gebhardt, GS, Sandberg, EM, van Roosmalen, J., Ter Wee, MM, de Vries, JI, Theron, G., 2022. Great saves or near misses? Severe maternal outcome in Metro East, South Africa: A region-wide population-based case-control study. *Int. J. Gynaecol. Obstet. Off. Organ Int. Fed. Gynecol. Obstet.* 157, 173–180. <https://doi.org/10.1002/ijgo.13739>
- [16] Howell, EA, Egorova, NN, Janevic, T., Balbierz, A., Zeitlin, J., Hebert, PL, 2017. Severe Maternal Morbidity Among Hispanic Women in New York City: Investigation of Health Disparities. *Obstet. Gynecol.* 129, 285–294. <https://doi.org/10.1097/AOG.0000000000001864>
- [17] Indranil Balki, HBSc. Leyla Baghirzada, MD, MPH. Andrew Walker, PhD. Stephen Lapinsky, MB.BCh MSc. Mrinalini Balki, MBBS, MD, nd Incidence, morbidity and factors associated with sepsis among women hospitalized for childbirth: a national retrospective population-based observational study in Canada Received: 7 June 2021 / Revised: 14 August 2021 / Accepted: 8 September 2021 / Published online: 22 December 2021. 2021.
- [18] *Journal of Global Health*, 2023. Maternal morbidity in sub-Saharan Africa: A review of recent studies, 2023, Vol. 13, No. 2, p. 210-223.
- [19] KIZONDE K., 2010. Maternal and perinatal morbidity and mortality in an urban, semi-urban and rural environment, Aggregation thesis/UNILU/Lubumbashi.
- [20] Lazariu, V., Nguyen, T., McNutt, L.-A., Jeffrey, J., Kacica, M., 2017. Severe maternal morbidity: A population-based study of an expanded measure and associated factors. *PloS One* 12, e0182343. <https://doi.org/10.1371/journal.pone.0182343>
- [21] Médecin sans frontières, 2019. Maternal Health in the Democratic Republic of Congo: A Review of the Situation.
- [22] WHO, 2021. Trends in Maternal Mortality: 2000 to 2017.
- [23] R. Bonita et al, 2013. *Elements epidemiology: second edition*; p33–p45.
- [24] RACKELBOOMT, BONNET MP, MIGNON A, LE STRATS, 2015. Respective share of anesthetists-intensivists and obstetricians in the management of severe maternal morbidity, 38th national days of the French society of perinatal medicine, FrCPNe.
- [25] Romagano MP, Fofah O, Apuzzio JJ, et al., 2020. Maternal morbidity after early preterm delivery (23e28 weeks). *Am J Obstet Gynecol* MFM;2:100125. 2.
- [26] Taji Leki1, , and Katenga Bosunga, 2021. EPIDEMIO-CLINICAL ASPECTS OF “NICE ESCAPES” IN GRAVIDO-PUERPERALITY AND MATERNAL DEATHS IN BUNIA.
- [27] Tariku, M., 2020. Magnitude of Severe Acute Maternal Morbidity and Associated Factors Related to Abortion: A Cross-Sectional Study in Hawassa University Comprehensive Specialized Hospital, Ethiopia, 2019. *BioMed Res. Int.* 2020, 1781652. <https://doi.org/10.1155/2020/1781652>
- [28] Tshiabuila, D., et al., 2020. Maternal Health Challenges in Lubumbashi: A Review of Current Practices and Outcomes. *J.Glob. Health.*
- [29] Tura, AK, Zwart, J., van Roosmalen, J., Stekelenburg, J., van den Akker, T., Scherjon, S., 2018. Severe maternal outcomes in eastern Ethiopia: Application of the adapted maternal near miss tool. *PloS One* 13, e0207350. <https://doi.org/10.1371/journal.pone.0207350>
- [30] Villalba, JPG, Pereira, AL de F., Queiroz, ABA, Batista, DBDS, Guimarães, JCN, 2022. AssistCPNe process to women with severe maternal morbidity: a mixed study. *Rev. Gaucha Enferm.* 43, e20210046. <https://doi.org/10.1590/1983-1447.2022.20210046.en>
- [31] Wall-Wieler, E., Carmichael, SL, Urquia, ML, Liu, C., Hjern, A., 2019. Severe maternal morbidity and postpartum mental health-related outcomes in Sweden: a population-based matched-cohort study. *Arch. Womens Ment. Health* 22, 519–526. <https://doi.org/10.1007/s00737-018-0917-z>
- [32] WHO, 2020. Maternal mortality - World Health Organization.
- [33] ZIMBECK M., 2008. Implementation of indicators of severe maternal morbidity at European level, 38th national days of the French society of perinatal medicine, Europe.