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Obstetrical Emergencies in Ouahigouya Regional Teaching Hospital (Burkina Faso) in the Context of Insecurity Linked to Armed Groups: A Comparative Study between Patients from Precarious Security Zones and Those from Safe Areas

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Abstract

Introduction: Insecurity can be an obstacle to access to emergency obstetric and newborn care, that is why we proposed to study obstetrical emergencies in Ouahigouya Regional Teaching Hospital, a referral hospital in a region plagued by insecurity linked to armed groups. **Method:** This was an analytical cross-sectional study with prospective data collection over a 4-month period, from June 10 to October 10, 2020. Patients from precarious security areas were compared to those from safer areas. The Chi squared and Fisher tests were used for comparison of variables. **Results:** Obstetric emergencies accounted for 38.62% of admissions, from which 25.59% came from precarious security zones. Age was similar in both comparison groups. However, patients from unsafe areas were more likely to reside in rural areas ($p < 0.001$) and more likely to be in unpaid occupations ($p < 0.001$). Prenatal visits were less frequent ($p < 0.01$) and women were more often multigravidae ($p < 0.01$) in the precarious security group of patients. Apart from the more frequent uterine rupture ($p = 0.02$) in the group from precarious security zones, diagnosed complications and maternal mortality were similar in the 2 groups, while perinatal mortality was higher in the group of patients from precarious

security zones ($p < 0.01$). **Conclusion:** The precarious security situation has negative consequences on maternal and perinatal morbidity and mortality. Further studies are needed for better understanding of these consequences, and improvement of health system resilience strategies, to reduce related maternal and fetal morbidity and mortality.

Keywords

Obstetric Emergencies, Obstetric Complications, Insecurity, Armed Conflicts, Ouahigouya

1. Introduction

Obstetric emergencies are any circumstances occurring during pregnancy, childbirth and postpartum that involve the vital or functional prognosis of the mother and/or fetus in the short term [1]. The obstetric complications responsible of these emergencies require emergency obstetric and neonatal care, to avoid progression to death. At least 15% of pregnancies are affected [2]. However, many situations, including insecurity linked to armed conflict, constitute an obstacle to access to this emergency obstetric and neonatal care, due to the disruption of the health system, and the fear of populations during their displacement [3] [4] [5] [6]. Burkina Faso has been experiencing conflicts involving armed groups since 2015 in some regions. In 2020, out of 13 regions in the country, 6, including the North, were strongly affected by this phenomenon of insecurity. In the Northern region, in the second half of 2020, there were 76,218 internally displaced people, and 26.1% of health facilities were affected with the total closure of 14 health centers, 22 operating at minimum capacity, and 33 others sheltering internally displaced people [7]. Despite the implementation of a national strategy for the resilience of the health system in this context of insecurity, the situation remained worrying. Few studies have addressed maternal and perinatal health in this context [3] in our country Burkina Faso. It seemed necessary for us to study the obstetrical emergencies received in the gynecology and obstetrics department of the Ouahigouya Regional Teaching Hospital (ORTH), which is the last level referral center in the northern region of Burkina Faso, in this context of insecurity linked to armed groups. Our hypothesis is that few women in non-safe areas have access to the referral center, and this has negative consequences for their pregnancy outcomes.

2. Patients and Method

2.1. Design and Setting

This was an analytical cross-sectional study. Patients in precarious security areas were compared to those in safer areas for certain characteristics.

Our study took place in the gynecology and obstetrics department of the ORTH. This is the referral center of the health facilities of the Northern region,

which include 5 medical centers with surgical antenna offering comprehensive obstetric and newborn care, and 227 primary health care facilities that are supposed to provide basic emergency obstetric and newborn care. Unfortunately, 69.2% of these health facilities did not meet the minimum standards for qualified health workers in 2020 [8]. Emergency evacuations to the referral center are carried out using ambulances, most of which are stationed in medical centers. Access to peripheral health centers is often impossible due to poor road conditions, the risk of improvised explosive devices or targeted attacks on ambulances. Patients are then evacuated by motorbike to other health centers accessible by ambulance, or directly to the referral center.

2.2. Recruitment and Study Procedures

The study focused on patients admitted to the gynecology and obstetrics department of the ORTH and who presented an obstetric emergency.

- Inclusion criteria: we included in our study, patients in the gravido-puerperal period with an obstetric emergency and admitted to the gynecology and obstetrics department of the ORTH and who consented to participate to the study.
- Non-inclusion criteria: patients with a pregnancy of less than 28 weeks were not included in our study.
- Sampling: all patients meeting the study inclusion criteria were conducted.

2.3. Data Collection

The data was collected prospectively, from June 10 to October 10, 2020, meaning a period of 4 months. They were collected through individual patient interviews, and a review of patient records. The following variables were collected:

- Socio-demographic characteristics: age, marital status, education, and occupation.
- The area of residence.
- Clinical data: reason of admission, personal history of gynecology and obstetrics, diagnoses.
- Management and evolution: the route of delivery, the condition of the mother and that of the newborn at the discharge of the hospital.

2.4. Data Analysis

The data collected was analyzed using the R software. The chi-squared test and, where applicable, the Fisher test were used for comparison between qualitative variables at significance level p-value less than or equal to 5%.

2.5. Operational Definitions

Obstetric emergencies are any circumstances occurring during pregnancy, childbirth and postpartum that involve the vital or functional prognosis of the mother and/or fetus in the short term [1]. A normal delivery was not considered an obstetric emergency.

A precarious security zone is any locality:

- Where armed groups impose laws on the population.
- Where there have been one or more armed attacks or clashes involving armed groups.
- Where did internally displaced people leave from.
- Where travel is risky due to the presence of armed men or improvised explosive devices they may have on the roads.
- Where public services (schools, town halls...) receive threats from armed men, are closed or partially functioning because of the security risk.

A safer area: any locality that is not under the direct and imminent threat of armed groups and where people can move with a minimum sense of security. In these localities the existing public structures are fully functional.

3. Results

3.1. Incidence of Obstetric Emergencies

During our study we recorded 1103 inpatients from which 426 were received for an obstetric emergency, making an incidence of 38.6%.

Of these registered obstetric emergencies, 109 were from precarious security zones, accounting for 25.6% of obstetric emergencies and 9.9% of all admissions to the service.

3.2. Socio-Demographic Characteristics

The mean age was 26.1 years with a standard deviation of 7.7 years. The extreme ages were 15 and 45 years. In the population of patients from more secure areas, the mean age was 26.5 years, compared to 25.7 years in safer areas ($p = 0.15$).

Table 1 shows the distribution of patients according to other socio-demographic characteristics and by the two groups.

3.3. Personal History and Antenatal Care

The patient's history, as well as their prenatal care status, is summarized in Table 2.

3.4. Clinical Aspects

Methods and indications of admission

The patients who came on their own were 45 meaning 10.59% of the total. In the population of patients from precarious security areas, direct admissions accounted for 3.67%, compared to 12.93% among patients from safer areas. Evacuations and referrals accounted for 89.41% of the total population, 87.07% in patients from safer areas and 96.33% in those from precarious areas ($p < 0.01$). Table 3 shows the distribution of patients according to their reasons for admission.

Condition of newborn and fetuses at admission

At admission, 350 patients were still pregnant, with twin pregnancies in 20 of them, including 16 patients from safer areas, and 4 from precarious security

Table 1. Socio-demographic characteristics of patients admitted to ORTH for an obstetrical emergency (n = 426).

Characteristics	Total population n (%)	Security of the residential area		p-value
		Precarious n (%)	Safe n (%)	
Origin				
Rural	290 (68.07)	103 (94.50)	187 (58.99)	
Urban	136 (31.03)	6 (5.50)	130 (41.01)	<0.001
Total	426 (100)	109 (100)	317 (100)	
Educational attainment				
Uneducated	261 (61.27)	89 (81.65)	172 (54.26)	
Educated	165 (38.73)	20 (18.35)	145 (45.74)	<0.001
Total	426 (100)	109 (100)	317 (100)	
Profession				
Unpaid	397 (93.19)	108 (99.08)	289 (91.17)	
Paid	29 (6.81)	1 (0.92)	28 (8.83)	0.004
Total	426 (100)	109 (100)	317 (100)	
Marital status				
Celibacy	35 (8.20)	4 (3.67)	31 (9.78)	
Marital life	391 (91.80)	105 (96.33)	286 (90.22)	0.05
Total	426 (100)	109 (100)	317 (100)	

Table 2. History of the 426 patients admitted to emergency care, and their status in relation to antenatal care.

Characteristics	Total population n (%)	Security of the residential area		p-value
		Precarious n (%)	Safe n (%)	
Gravidae				
Primigravidae	138 (32.39)	27 (24.77)	111 (35.02)	
Multigravidae	234 (54.93)	58 (53.21)	176 (55.52)	<0.01
Large multigravidae	54 (12.68)	24 (22.02)	30 (9.46)	
Total	426 (100)	109 (100)	317 (100)	
Parity				
Nulliparous	126 (29.58)	26 (23.85)	100 (31.55)	
Primi and multiparous	275 (64.55)	72 (66.06)	203 (64.04)	2.90
Large multiparous	25 (5.87)	11 (10.09)	14 (4.42)	
Total	426 (100)	109 (100)	317 (100)	
Antenatal care				
Not up to date	62 (25.53)	25 (22.94)	37 (11.67)	
Up to date	374 (74.47)	84 (77.06)	280 (88.33)	<0.01
Total	426 (100)	109 (100)	317 (100)	

Table 3. Distribution of patients admitted for an obstetrical emergency at the ORTH, according to the reason for admission.

Reason for evacuation/consultation	Total population n (%)	Security of the residential area		p-value
		Precarious n (%)	Safe n (%)	
Dystocic labour	75 (17.61)	25 (22.94)	50 (15.77)	0.09
Pre-eclampsia/eclampsia	74 (17.37)	16 (14.68)	58 (18.30)	0.39
Acute fetal distress	57 (13.38)	13 (11.93)	44 (13.88)	0.60
Postpartum hemorrhage	52 (12.21)	11 (10.09)	41 (12.93)	0.43
Premature rupture of membranes	38 (8.92)	13 (11.93)	25 (7.89)	0.20
Severe anemia	37 (8.68)	9 (8.26)	28 (8.83)	0.85
Haemorrhage on pregnancy	32 (7.51)	9 (8.26)	23 (7.26)	0.72
Scarred/bi-scarred uterus	31 (7.28)	8 (7.34)	23 (7.26)	0.98
Threatened preterm delivery	25 (5.87)	6 (5.50)	19 (5.99)	0.85
Uterine pre-rupture	11 (2.58)	4 (3.67)	7 (2.21)	0.41
Severe malaria during pregnancy	8 (1.88)	3 (2.75)	5 (1.58)	0.44
Umbilical cord prolapse	11 (2.58)	1 (0.92)	10 (3.15)	0.20

Some patients had multiple motives at once.

areas. The patients who arrived in the immediate postpartum period were 76 including a patient who gave birth to twins. The condition of fetuses and newborns is summarized in Table 4.

Diagnostic

The diagnoses selected after the examination of patients received in emergency are summarized in Table 5.

3.5. Management

Depending on the pathologies presented by the patients, the management used different means including obstetric means. A total of 408 patients making 95.77% of the total population gave birth after their symptoms. Table 6 presents the distribution of patients by mode of delivery and area of residence of parturients.

3.6. Evolution

In mothers

During our study, 6 maternal deaths (1.41% of the total population) were recorded: 2 among patients from insecure areas and 4 from safer areas (p = 0.65). The causes were: hemorrhage, severe malaria, severe anemia.

Perinatal condition

A total of 408 parturients gave birth to 429 newborns, including 42 twins (21 twin pregnancies). The number of newborns born from mothers from precarious

Table 4. Status of fetuses and newborns at admission to ORTH.

Condition of fetuses and newborns	Total population n (%)	Security of the residential area		p-value
		Precarious ZS n (%)	Z safe n (%)	
Pregnant patients				
Live fetuses	331 (81.46)	82 (84.54)	249 (91.21)	
Deaths in utero	39 (10.54)	15 (15.46)	24 (8.79)	0.07
Total	370 (100)	97 (100)	273 (100)	
Newborns of mothers admitted postpartum				
Living	71 (92.21)	11 (68.75)	60 (98.36)	
Dead	6 (7.79)	5 (31.25)	1 (1.64)	<0.01
Total	77 (100)	16 (100)	61 (100)	

Table 5. Distribution of diagnoses among patients admitted in emergency to the ORTH (n = 426).

Diagnoses	Total population n (%)	Security of the residential area		p-value
		Precarious n (%)	Safe n (%)	
Postpartum hemorrhage	62 (14.26)	13 (11.93)	49 (15.46)	0.37
Eclampsia/Pre-eclampsia/ Gestational hypertension	79 (18.54)	19 (17.43)	60 (18.93)	0.73
Acute fetal distress	67 (15.73)	22 (20.18)	45 (14.19)	0.14
Dystocia	112 (26.29)	30 (27.52)	82 (25.87)	0.73
Severe anemia during pregnancy	17 (3.99)	6 (5.50)	11 (3.47)	0.39
Premature rupture of membranes	34 (7.98)	11 (10.09)	23 (7.26)	0.35
Abruptio placentae	11 (2.58)	4 (3.67)	7 (2.21)	0.48
Placenta prævia	21 (4.93)	7 (6.42)	14 (4.42)	0.40
Preterm delivery	29 (6.81)	6 (5.50)	23 (7.26)	0.53
Umbilical cord prolapse	9 (2.11)	1 (0.92)	8 (2.52)	0.46
Uterine pre-rupture	23 (5.40)	7 (6.42)	16 (5.05)	0.58
Uterine rupture	3 (0.70)	3 (2.75)	0 (0)	0.02
Severe malaria during pregnancy	8 (1.88)	2 (1.83)	6 (1.89)	1

Table 6. Distribution of the 408 patients who gave birth, by route of delivery and type of area of residence.

Mode of delivery	Total population n (%)	Security of the residential area		p-value
		Precarious n (%)	Safe n (%)	
Caesarean section	222 (54.41)	47 (45.19)	175 (57.57)	
Vaginal delivery	186 (45.59)	57 (54.81)	129 (42.43)	0.03
Total	408 (100)	104 (100)	304 (100)	

security zones was 109, including 10 twins (5 twin pregnancies), and the one from mothers from safer areas was 320, including 32 twins (16 twin pregnancies). The status of newborns at birth and in the first week of life is shown in Table 7.

4. Discussion

4.1. Socio-Demographic Aspects

About a quarter (25.6%) of obstetric emergencies originated in precarious security zones during the study period. These areas corresponded to the health areas of health facilities closed or functioning at a minimum, but also to other localities that had experienced security incidents and were still fully functional health facilities. These security incidents result from the presence of mobile unidentified armed groups that travel through different localities and are responsible of targeted armed attacks, kidnappings of civilians, expulsion of civilian populations from their localities, planting of improvised explosive devices on roads [8] [9] [10] [11].

The study population is characterized by a similar average age in both comparison groups. Residence in rural areas was significantly more common among women from insecure areas. Indeed, urban areas were relatively spared from armed attacks. Women from insecure areas residing in urban areas represent women who have recently moved from their villages to the city of Ouahigouya due to insecurity. They lived in this city in precarious conditions. Professional status was marked by a large proportion of unpaid occupations in the general population. This category of unpaid occupation was significantly more represented

Table 7. Status of newborns of mothers admitted for obstetric emergencies at ORTH during the study period.

Perinatal fate	Total population n (%)	Security of the residential area		p-value
		Precarious n (%)	Safe n (%)	
Stillbirth				
Born alive	361 (84.15)	82 (75.23)	279 (87.19)	
Stillborn	68 (15.85)	27 (24.77)	41 (12.81)	<0.01
Total	429 (100)	109 (100)	320 (100)	
Early neonatal mortality				
Living	334 (91.56)	66 (64.44)	268 (96)	
Deceased	27 (8.44)	16 (35.56)	11 (0.4)	<0.01
Total	361 (100)	82 (100)	279 (100)	
Perinatal mortality				
Live newborns	334 (77.86)	66 (60.55)	268 (83.75)	
Dead newborns	95 (22.14)	43 (39.45)	52 (16.25)	<0.01
Total	429 (100)	109 (100)	320 (100)	

in the population of women from precarious security zones. This difference could be explained by the fact that the socio-economic tissue is often disorganized in areas under the control of armed groups, due to markets and businesses ransacked by armed groups, difficulties in supplying equipment and various foodstuffs, the prohibition of agricultural activities or the raiding of livestock and property by armed men [12] [13]. In addition, the latter often enact laws with religious and cultural overtones that tend to confine women to their traditional roles as housewives without income-generating activities. This contributes to making women more vulnerable.

4.2. Clinical and Prognostic Aspects

Obstetric history was marked by a greater number of large multigravidae (22.02%) and large multiparous (10.09%) in the group of women from precarious security zones. High multigravidae and high multiparity are, however, recognized as maternal-fetal risk factors. They are due to the fact that a contraceptive prevalence of 28.6% is still insufficient in the northern region, with disparities between rural and urban areas [14]. Rural areas most often have a lower prevalence rate. The majority of patients in the two groups we identified came from the rural areas, which are also the most affected by the phenomenon of insecurity. Discourses and prohibitions based on religious and cultural considerations and ideologies specific to armed groups in their areas of influence would reduce the demand for modern methods of contraception as also noted by Degni *et al.* in northern Mali [5]. For their part, providers of health facilities that are still functional may be reluctant to promote family planning methods to avoid being singled out. For example, the advanced strategy of health workers bringing promotional care activities such as contraceptive supplies and community-based distribution closer to their targets has been abandoned in areas with high security challenges [7], which could increase unmet need for family planning. Finally, the closure of health facilities has deprived women of family planning services.

Pregnancy monitoring was not optimal for 25.53% of the population with a significantly higher proportion in the group from precarious security zones. The closure or minimal operation of certain peripheral health facilities due to insecurity has been a factor. In addition, the security risks during travel [7] [13] due to armed men who are mobile and because of the risks associated with improvised explosive devices were well-founded and would discourage the use of remote health centers for pregnancy monitoring. The context of reduced income [13] due to the slowdown in income-generating activities could also be a cause of the large proportion of suboptimal follow-up of pregnancies. Indeed, even if antenatal consultations are free, it takes logistical means (motorcycle or other vehicle, fuel) to go to a health facility for this purpose. Yet quality antenatal care is an important pillar in the fight against maternal and perinatal morbidity and mortality [15].

Most patients (89.44%) were evacuated or referred from peripheral health centers to the Regional University Hospital of 0 uahigouya which is the referral

center of last resort in the Northern region. Patients are coming directly from safer areas more frequently than from precarious security zones ($p < 0.01$). In these precarious security zones, pregnant women must travel to other health centers further away when health centers in their localities are closed or inaccessible. Otherwise, when it comes to eutocic delivery, they are helped in an inadequate environment, by community health workers who have all received some training as part of a national plan for the resilience of health structures [7]. When the use of a referral center for surgery or blood transfusion is necessary, the journey to reach these referral centers is often long and perilous, as other authors have described in other circumstances of armed conflict [5] [16]. However, it is recognized that in order to reduce maternal and perinatal morbidity and mortality, the assistance of a qualified provider and an adequate referral system are necessary [17] [18].

Clinically, the grounds for admission to the obstetrics and gynecology department of the ORTH were dominated by dystociclabour, preeclampsia/eclampsia, acute fetal distress, and postpartum hemorrhage. No motive was significantly more common in either comparison group.

The diagnoses made at admission to the ORTH were dominated by those related to direct causes of maternal and perinatal mortality, including dystocia, preeclampsia/eclampsia, acute fetal distress, postpartum hemorrhage. Only uterine rupture was significantly more common among women in precarious security areas ($p = 0.02$).

After their symptoms, most patients (95.77%) gave birth. The route of delivery was the caesarian section in more than half of the cases in the total population. When comparing the two groups, there were significantly more caesarean sections in the group of women coming from safer areas. Indeed, these women arrived most often on time, and the indication of an emergency caesarean section kept all its meaning because the fetus was still most often alive, and it was necessary to extract it urgently to save it, or because a maternal or adnexal reason for caesarean section was still present. On the contrary, women from precarious security zones arrived later, as ambulances were often targets of armed groups [7] [11], so they could not arrive in these areas. Patients are then forced either to come using unsuitable means (motorcycles, tricycles) or to go first to a health center where ambulances can arrive with a minimum of security. This long journey and inadequate means of transport are the cause of a long delay in evacuation to the reference center, and also the cause of postures (most often sitting on a motorcycle or in an undeveloped tricycle). The consequences were uterine ruptures, deaths in utero, delivery along the way without assistance for mothers and newborns. Thus, on arrival, the indication for an emergency caesarean section often became obsolete because of these consequences.

The result of this situation is stillbirth and higher perinatal mortality among patients from precarious security zones. Apart from the known causes of stillbirths (maternal, adnexal, dystocia and other pathologies) [15] [19], some of which are found in the diagnoses used in the patients studied, insecurity related

to armed conflict is a contributing factor to stillbirths. In fact, Buitrago *et al.* showed in their study in Colombia that a reduction in violence was associated with a reduction in stillbirth and perinatal deaths [20].

As for maternal mortality, it was noted in about the same proportions in both groups, probably because our study did not recruit patients admitted to medical centers with surgical antennas or those who could not go to a health center. But it is recognized that timely access to comprehensive emergency obstetric and neonatal care is key to reducing maternal mortality.

5. Conclusion

Insecurity linked to the presence of armed groups in the northern region of Burkina Faso is responsible for the greater vulnerability of pregnant women and their fetuses. It is likely to undermine the achievement of the sustainable development goals to which our country has subscribed, because the other regions of the country plagued by this insecurity are probably experiencing at least the same situation. It is therefore imperative that every effort be spared by all the protagonists in the conflict to restore peace and security. In the meantime, it would be wise to conduct a larger study to better understand the impact of this conflict, including the psychological one on mothers and their newborns, for a better adaptation of the resilience strategy of the country's health system.

Ethics Approval and Consent to Participate

The Directorate of Medical and Technical Services in charge of ethical issues in the Ouahigouya Regional University Hospital approved the conduct of this study. The fundamental ethical principles of the Helsinki declaration have been taken into account in order to promote health, and not to delay or prevent the provision of emergency care. The patients included in this study gave their informed consent to participate in the study.

Availability of Data and Materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Authors' Contributions

SSR, EK and MS designed the study protocol, conducted the study and prepared the manuscript. AD, IO, DO, AO provided critically reviewed protocol and manuscript. All authors approved the version for publication.

Conflicts of Interest

Authors declare that they have no competing interests.

References

[1] Traoré, Y. (2008) Development and Health: Gynaecological and Obstetrical Emer-

gencies. https://devsante.org/articles/les-urgences-gynecologiques-et-obstetricales

[2] UNICEF, WHO and UNFPA (1997) Guidelines for Monitoring the Availability and Use of Obstetric Services. United Nations Children's Fund, New York.

[3] Alliance for Health Policy and Systems Research (2020) Neglected Health Systems Research: Health Policy and Systems Research in Conflict-Affected Fragile States. United Nations Children's Fund, New York.

[4] Gopalan, S.S., Das, A. and Howard, N. (2017) Maternal and Neonatal Service Usage and Determinants in Fragile and Conflict-Affected Situations: A Systematic Review of Asia and the Middle-East. *BMC Women's Health*, **17**, Article No. 20. https://doi.org/10.1186/s12905-017-0379-x

[5] Degni, F., Amara, I.D. and Klemetti, R. (2015) Women's Experiences in Accessing Maternal and Child Health Services during the Period of the Armed Conflict in the North of Mali. *The Open Public Health Journal*, **8**, 17-22. https://doi.org/10.2174/1874944501508010017

[6] Haar, R.J. and Rubenstein, L.S. (2012) Health in Fragile and Post-Conflict States: A Review of Current Understanding and Challenges Ahead. *Medicine, Conflict and Survival*, **28**, 289-316. https://doi.org/10.1080/13623699.2012.743311

[7] Burkina Faso Ministry of Health (2019) Strategy for the Resilience of the Health System in the Precarious Security Areas of Burkina Faso. http://extwprlegs1.fao.org/docs/pdf/bkf198222.pdf

[8] Burkina Faso Ministry of Health (2021) Statistical Yearbook 2020. https://www.sante.gov.bf/fileadmin/user_upload/storages/annuaire_statistique_ms_2020_signe.pdf

[9] Burkina Faso Health Cluster (2020) Humanitarian Bulletin n˚07. June 2020. https://reliefweb.int/report/burkina-faso/bulletin-n-07-du-cluster-sant-juin-2020

[10] Burkina Faso Health Cluster (2020) Humanitarian Bulletin n˚08. July 2020. https://reliefweb.int/report/burkina-faso/bulletin-n-08-du-cluster-sant-juillet-2020

[11] Burkina Faso Health Cluster, WHO (2020) Humanitarian Bulletin n˚09. August 2020. https://reliefweb.int/report/burkina-faso/bulletin-n-09-du-cluster-sant-ao-t-2020

[12] Burkina Faso Health Cluster, WHO (2020) Humanitarian Bulletin n˚10. September 2020. https://www.humanitarianresponse.info/sites/www.humanitarianresponse.info/files/documents/files/bulletin_sectoriel_septembre.pdf

[13] Singh, N.S., Ataullahjan, A., Ndiaye, K., Das, J.K., Wise, P.H., Altare, C., *et al.* (2021) Delivering Health Interventions to Women, Children, and Adolescents in Conflict Settings: What Have We Learned from Ten Country Case Studies? *The Lancet*, **397**, 533-542. https://doi.org/10.1016/S0140-6736(21)00132-X

[14] United Nations Development Programm (UNDP) (2021) Effects of the Security Crisis on Human Development in Burkina Faso. https://www.undp.org/fr/burkina-faso/publications/effets-de-la-crise-s%C3%A9curitaire-sur-le-d%C3%A9veloppement-humain-au-burkina-faso

[15] United Nations Inter-Agency Group for Child Mortality Estimation (UN IGME) (2020) A Neglected Tragedy: The Global Burden of Stillbirths. United Nations Children's Fund, New York.

[16] Bashour, H., Kharouf, M. and DeJong, J. (2021) Childbirth Experiences and Delivery Care during Times of War: Testimonies of Syrian Women and Doctors. *Frontiers in Global Women's Health*, **2**, Article 605634. https://doi.org/10.3389/fgwh.2021.605634

[17] Millogo, T., Ouedraogo, G.H., Baguiya, A., Meda, I.B., Kouanda, S. and Sondo, B. (2016) Factors Associated with Fresh Stillbirths: A Hospital-Based, Matched, Case-Control Study in Burkina Faso. *International Journal of Gynecology & Obstetrics*, **135**, S98-S102. https://doi.org/10.1016/j.ijgo.2016.08.012

[18] United Nations Population Fund (2021) The State of the World's Midwifery 2021. https://www.unfpa.org/fr/sowmy

[19] Aminu, M., Unkels, R., Mdegela, M., Utz, B., Adaji, S. and Van Den Broek, N. (2014) Causes of and Factors Associated with Stillbirth in Low- and Middle-Income Countries: A Systematic Literature Review. *BJOG: An International Journal of Obstetrics & Gynaecology*, **121**, 141-153. https://doi.org/10.1111/1471-0528.12995

[20] Buitrago, G. and Moreno-Serra, R. (2021) Conflict Violence Reduction and Pregnancy Outcomes: A Regression Discontinuity Design in Colombia. *PLOS Medicine*, **18**, e1003684. https://doi.org/10.1371/journal.pmed.1003684

Abbreviations

ORTH: Ouahigouya Regional Teaching Hospital