

# **MATERNAL MORTALITY IN THE CHADIAN OUADDAI REGION HEALTH FACILITIES COMPARED TO THE WHOLE COUNTRY**

**A Case Study By Dr.Paluku Kapitula Augustin, Republic of Chad**

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## **ABSTRACT**

Maternal mortality is one of Chad's most pressing issues. Chad's maternal mortality ratio is 1,200 per 100,000 live births, the third highest in the world (WHO 2010). A woman's lifetime risk of maternal death is 1 in 14, one of highest in the world (Country statistics; "Unicef"). The Ouaddai region being one of the Chadian regions benefiting from humanitarian assistance due to the Darfuri Sudanese refugees' presence since 2004, this region is not sharing the alarming statistics as hereby presented. This study aims first to examine and analyze maternal mortality ratio in Ouaddai health facilities in comparison to all the country, second to light the disparities between MoH health facilities and the ONGs supported health facilities (refugee camps) within Ouaddai region. Using three years data extracted from the UNHCR Health Information system and the MoH health information database in the region, we ran a retrospective MMR study to estimate the difference relevant to each location in the Region.

The results show that the Maternal Mortality is statistically different in each of the two locations within Ouaddai and different comparing Ouaddai region to the whole country. The differences noticed is likely due to the quality health provided in the refugee camps which contribute to improve the health of women in the host communities who are benefiting for a free of charge health services in the refugee camps.

## **KEYWORDS**

Maternal mortality, Chad, Maternal death, Qouaddai region, HGRN, Neonatal mortality.

## **INTRODUCTION**

### *COUNTRY PRESENTATION.*

#### *GEOGRAPHY*

A landlocked country in north-central Africa, Chad is about 85% the size of Alaska. Its neighbors are Niger, Libya, the Sudan, the Central African Republic, Cameroon, and Nigeria. Lake Chad, from which the country gets its name, lies on the western border with Niger and Nigeria. In the north is a desert that runs into the Sahara.

By 2004, about 250,000 Sudanese refugees had fled to Chad to escape the fighting in Sudan's Darfur region, where they are living under humanitarian assistance within refugee camps<sup>1</sup>. The Ouaddai region, being the core region for this study, is one of those eastern region which hosted Sudanese refugees. This health region has itself 4 Sudanese refugees' camps as follows: Treguine, Gaga, Farchana and Bredjing the biggest refugee camp in Eastern Chad<sup>2</sup>.

#### *DEMOGRAPHY*

Chad ended 2012 with a population of 12,448,175 people, which represents an increase of 922,679 people compared to 2011. The male population is greater, with 6,232,216 men, representing 50.06% of the total, compared to 6,215,959 or 49.93% women<sup>3</sup>.

Like many of the world's developing countries (it ranks 163 out of 169 countries on UNDP's 2010 Human Development Index), Chad's population is increasing rapidly – more than 3 per cent annually. That amounts to a doubling about every 20 years. This is occurring in spite of the country's high mortality: half the population dies before the age of 50.4. With a large youth contingent -- more than half (57 per cent) of Chad's population is under 18, the population will continue to grow rapidly, even if fertility declines substantially from the current average of 6.3 children per woman. Chad's population density was measured at 10 inhabitants per square kilometer, but this figure hides significant disparities: 43 per cent of Chad's population 11 per cent of the total country area, the southern region has a humid climate.

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<sup>1</sup> Chadian Ministry of Health, monthly report, 2007

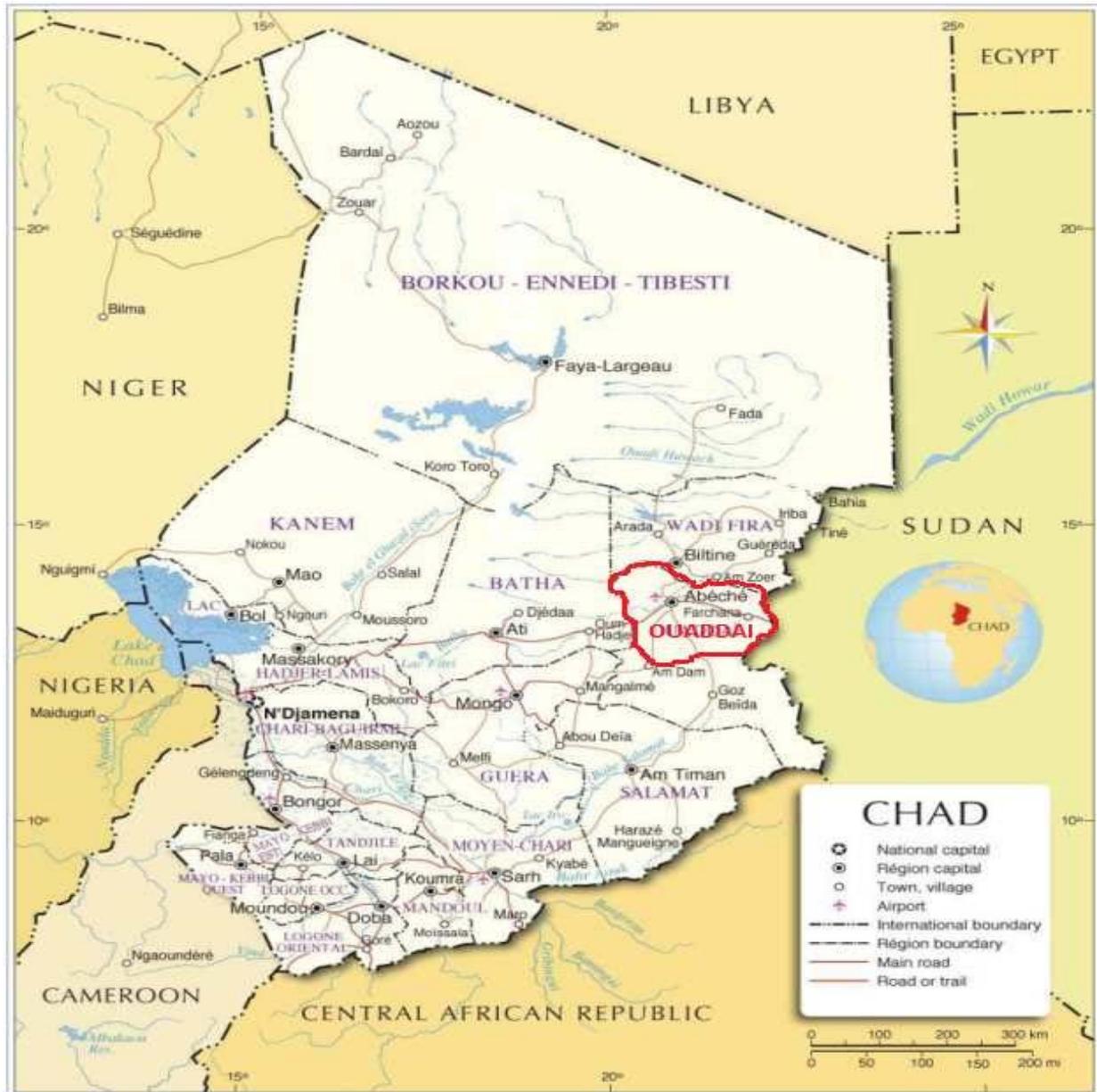
<sup>2</sup> Ouaddaï region profil, OCHA November 2012

<sup>3</sup> MICS Multiple Indicators Survey, 2010

<sup>4</sup> 2010 United Nations Development Programme (UNDP) Human Development Index

Meanwhile, the large strips of land in the Saharan North are barely populated: the Borkou, Ennedi and Tibesti regions have less than 1 inhabitant per square kilometer, mostly nomadic pastoralists, who now only account for around 3.5 per cent of the total population compared to 5.6 per cent in 1993. One explanation for their dwindling share of the population is that recurrent drought has forced herdsmen to settle in areas more conducive to their survival<sup>5</sup>.

**CHADIAN ADMINISTRATIVE MAP WITH OUADDAI REGION UNDERLINED IN RED**



Map adapted from the Department of Field Support, Cartographic Section of United Nations, March 2009.

<sup>5</sup> MICS Multiple Indicators Survey, 2010

## *HEALTH SYSTEM IN CHAD*

Chadian health system is pyramidal with 3 levels: a central level, intermediate level and peripheral level. The health district constitutes the unit for this health system<sup>6</sup>.

### *THE CENTRAL LEVEL*

It includes a National Health Council, the central services of the Ministry of Health, national programs, national institutions, including the National General Referral Hospital (HGRN), the Faculty of Health Sciences (FACSS), the National School of Health and Social Agents (ENASS) and Pharmaceutical Purchasing Centre (CPA). The central level is in charge of the design, monitoring and evaluation and implementation of national health policies and program, supervision, external Aid coordination.

### *THE INTERMEDIATE LEVEL*

The intermediate level is composed of Regional Health Councils, 23 Sanitary Regional Delegations (DSR) modeled on Administrative Regions, public regional hospitals (regional referral hospital), The Regional Supply Pharmacies (PRA), and the Regional training Schools. The intermediate level is responsible for the health policy implementation in the regions. It provides technical support to the peripheral level.

### *THE PERIPHERAL LEVEL*

It is composed of District Health Councils (managed by the District management team), Health Districts (DS) divided into Health Zones (HZ) and District hospitals and health centers, located in the administrative catchment area.

The peripheral level is responsible for the policies and activities at central and intermediate levels. The health center offers the minimum package of activities (MPA) which includes preventive, curative and promotional components, while the district hospital provides additional package, i.e. the obstetric and neonatal care.

According to the 2011 statistical yearbook, Chad has currently:

- 23 Regional Sanitary Delegations (DSR),
- 103 Health Districts from which 72 are functional;
- 1290 Health Zones from which 1037 are functional.

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<sup>6</sup> Chadian National Family Planning policy document, 2013

#### *Health system actors and Maternal and neonatal Health related Indicators*

The health system involves several actors that can be divided into the following categories:

- The public or state sector;
- The private sector (cabinets, clinics)
- Multilateral and bilateral organizations;
- The voluntary and / or religious sector;
- The population.

#### *HEALTH HUMAN RESOURCES*

The number of health personnel in activity does not yet meet the demand to cover the population health needs. The needs assessment in Emergency Obstetric maternal and Neonatal Care services done in 2011 revealed a deficit in medical and paramedical staffs. The country had 19 obstetricians, 6 pediatricians, 374 medical doctors, 2,074 nurses and 282 midwives only. In terms of ratio, Chad has 1 doctor for 31,735 inhabitants, one nurse for every 5,779 inhabitants and one midwife per 9,596 women of childbearing age. All these ratios are below the minimum recommended by the WHO (eg. 2.5 health workers per 1000 inhabitants).

With regards to this, the Minister of health (MoH) and its partners have developed a number of initiatives and strategies, such as raising the staff recruitment in the public service, health staff training, decentralization and the creation of Health Schools at Regional Sanitary Delegations and Social Affairs, the licensing of private training Institutions. Moreover the agreement signed between the Government and the technical and financial partners of the health sector in November 2011 has put priority on the issues pertaining to human resources<sup>7</sup>.

#### *FINANCIAL HEALTH RESOURCES.*

The Pan African Conference of Heads of State in Abuja in 2001 urged African governments to allocate 15% of their overall budget to the health sector to provide the means of achieving the 2015 Millennium Development Goals (MDG) related to health<sup>8</sup>. From 2007 to 2013, the budget allocated to health sector had ranked between 5 and 9% which remains low than the target of 15%<sup>9</sup>.

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<sup>7</sup> General Census of the Population and Housing, Chad 2010

<sup>8</sup> UN Report on progress in achieving the millennium Development Goals in Africa, 2013 <sup>9</sup> Norms and policy for Family Planning in CHAD, validated on March 2014.

## **MATERNAL MORTALITY**

### *DEFINITION*

The Maternal mortality synonymous of maternal death is defined as follows:

“The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes”<sup>10</sup>

According to the WHO and in order to facilitate the identification of maternal deaths in circumstances in which cause of death attribution is inadequate, a new category has been introduced: “Pregnancy-related death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death”.<sup>11</sup>

### *LATE MATERNAL DEATH*

The death of a woman from direct or indirect obstetric causes, more than 42 days, but less than one year after termination of pregnancy.<sup>12</sup>

### *RATIONAL MEASURE*

In order to standardize the maternal death measurement worldwide, the ratio has been the way to come about it. Consequently, the maternal death ratio represents the number of maternal death which occurs in a specific area out of 100 000 live births, it shows the risk associated with each pregnancy. It is important to note that measuring the maternal death accurately remains quite difficult especially in some developing countries where registration of death and his cause does not exist. In such countries; surveys and census have to be used in tentative of estimating the maternal mortality.

### *MATERNAL MORTALITY WORLDWIDE*

In reference to the WHO key facts; every day, approximately 800 women die from preventable causes related to pregnancy and childbirth. Young adolescents face a higher risk of complications and death as a result of pregnancy than older women.

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<sup>10</sup> The International Code of Diseases (ICD-10) Abstract

<sup>11</sup> International Classification of Diseases, 10th Revision, Geneva, World Health Organization, 2004 <sup>12</sup> International Classification of Diseases, 10th Revision, Geneva, World Health Organization, 2004

Skilled care before, during and after childbirth can save the lives of women and newborn babies. Between 1990 and 2010, maternal mortality worldwide dropped by almost 50%.

The study conducted by the WHO demonstrates that “there is a gap between maternal death in rich and poor countries. Almost all maternal deaths (99%) occur in developing countries. More than half of these deaths occur in sub-Saharan Africa and almost one third occur in South Asia. The maternal mortality ratio in developing countries is 240 per 100 000 births versus 16 per 100 000 in developed countries. There are large disparities between countries, with few countries having extremely high

maternal mortality ratios of 1000 or more per 100 000 live births. There are also large disparities within countries, between people with high and low income and between people living in rural and urban areas<sup>13</sup>.

#### *MATERNAL MORTALITY IN CHAD*

Different studies and health data from the Chadian MoH Health Information System have shown that indicators of morbidity and maternal & neonatal mortality in Chad are among the highest in the world. Therefore, the rate of maternal mortality was 827 per 100,000 live births in 1997 (EDST I), rose to 1.099 in 2004 (EDST II) and to 1084 in 2009 (RGPH2) and finally to 1100 for 2012.

The Obstetric and Neonatal Care Emergency assessment report in Chad (2011) found that the top five direct obstetric causes of maternal death.

#### **The Top direct obstetric causes of maternal mortality in Chad, 2011.**

- |                                |       |
|--------------------------------|-------|
| 1. Hemorrhage                  | - 34% |
| 2. Postpartum infections       | - 33% |
| 3. Eclampsia/Pre eclampsia     | - 11% |
| 4. Prolonged obstructed labour | - 7%  |
| 5. Abortion complication       | - 5%  |
| 6. Autres causes               | - 10% |

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<sup>13</sup> WHO, Fact sheet N°348, May 2012

The underlying causes of this high mortality are: poverty, low literacy rate of women , poor access to health care services ( the poor roads condition and insufficient means of transport , inadequate telephone network , the greatness of the country) , socio-cultural and religious impediments, the status of women ( and economic decision-making etc. . dependence) and a weak health system.

In her speech during the launch of CARMMA (The Campaign for Accelerated Reduction of Maternal Mortality) 25th October 2009, Mrs. Hinda Dédy Itno, the first lady of Chad emphasized additional causal factors of maternal mortality in Chad such as; the inequality between the sexes and the denial of women's sexual rights, violence against women in all its forms, the high fertility rate, young marriages and unwanted pregnancies<sup>14</sup>.

## **OUADDAI HEALTH REGION CONTEXT**

### **LITERATURE REVIEW**

One of the critical health issue Chad is facing since a decade is the maternal mortality at the extent of being ranked among the top five countries with the highest Maternal Mortality ratio. A certain number of studies have being contacted in the country as a whole. None of them have focused on the

MMR in a particular region such as Ouaddai. Given the specificity of this region hosting many Sudanese refugees since 2004, where Humanitarian NGOs have been operating health facilities with the support from UN agencies and other donors, hence the decision of contacting this research study.

The overall goals of this study is to establish first the comparison between the Ouaddai region and the National MMR as presented by some researchers, second compare the MMR recorded in Ouaddai MoH health facilities and NGOs supported health facilities. This research study will highlight the impact of health NGOs assistance in the region as a contribution in meeting the sixth Millennium Development Goal related to MMR reduction by three quarters by 2015.

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<sup>14</sup> Extract from the “Wasted lives: Why do Chadian women still die in childbirth?” Article published by KABGE Rachel, 30<sup>th</sup> August 2012, translated from French by Jennifer Allsopp.

Previous studies that have tried to broach the MMR analysis in the country used retrospective, descriptive and Transversal methodologies. Most of them were limitative in the population of study. Only health facilities with ten or more deliveries in a month were taken into account missing a certain number of health facilities.<sup>15</sup> But in our present study, statistics were compiled from all health facilities that endow this research study with a certain credential.

Women in Chad face a lifetime risk between 1 in 11-14 of dying due to complications arising from child birth<sup>16</sup>. In Chad, conditions have never been good, but the maternal mortality has actually increased in the last decade compared to the rates in 90's<sup>17</sup>. Approximately Maternal death ratios are 1100 deaths per 100.000live births.<sup>18</sup>

## *LOCATION*

The Ouaddai Region is composed of three Departments namely: Ouara, Assounga and Abdi. It stretches over an area of 29 940 Km<sup>2</sup> and bordered in the North by the Wadi Fira Region, in the East by Sudan, in the South by Dar Sila and on the West by the Republic of Sudan. Ouaddai counts 912 593 inhabitants 19 divided between the main ethnic groups which are: Ouaddaiens, Goranes, Zaghawas, Massalites, Peuls, Haoussas, Tamas, For and Arabs.

## *HISTORY AND SPECIFICITY OF THE REGION*

The Ouaddai Region has 4 health districts (two functional) and 60 health centers (48 operational). According to the estimates, for Abeche the Ouaddai Head town, the average is a doctor for 245,450 people and one nurse for 11,32020 persons whereas the WHO standards require 1 doctor for 10,000 inhabitants and 1 nurse State diploma for 5,000 persons. Marked by regular attacks of rebel groups, incursions of the armed militias named jenjawids from neighboring Sudan as well as from intergovernmental conflicts since year 2003, the Eastern part of Chad hosted thousands of Sudan refugees, particularly in the Ouaddai Region where Sudan refugees were gathered within four refugee camps namely: Farchana, Gaga, Bredjing and Treguine.

Since the settlement of these Refugee camps, quality health care have been provided to refugees and host communities by International and national NGOs operating in the Region with the financial

support from UNHCR and other donors.

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15 EmoC need Assessment report,  
Chad 2011 16 Save the Children,  
2006

17 African Development Bank, Gender Poverty and Economic Indicators on African  
Countries, Economic and Social Statistics Department: Tunis, Tunisia, 2007.

18 Chad CEDAW, 20, October, 2010, 02, March, 2012) 9, 38, 53

19 Figure extracted from the Abeche Regional health office  
report, July 2012 20 OCHA November 2012, Bulletin

The major health problem recorded in the whole Region is not only in terms of infrastructure and equipments alone but also in term of qualified health personnel, drugs and other medical supplies. The International Rescue Committee (IRC), BASE (Office for Environment and Health Support), are NGOs providing health assistance in the four refugee camps and host communities. In order to improve on pregnant women health as well as to Infant, the Maternal and child Health activities were integrated into the minimum initial package of health services provided by the above mentioned NGOs in the Region . We believe that the health support provided by NGOs has played a key role in maternal death reduction in the Ouaddai Region hence the motive for this research which will focus on four years retrospective data analysis starting from November 2010 to October 2013.

## **OBJECTIVES AND METHODOLOGY**

### *GENERAL OBJECTIVE*

The purpose of our study on this particular theme consists of determining the portion of health facilities related maternal death in Ouaddai region where health care has been provided by the MoH and Non Governmental Organization (NGOs) compared to the maternal mortality ratio found in the whole country.

### *SPECIFIC OBJECTIVES*

This study being applied on the Chadian Ouaddai Region would like to demonstrate the MMR status by:

1. Determining the MMR in the Ouaddai MoH health facilities.
2. Determining the MMR in the Ouaddai NGOs supported health facilities ( refugee camps health facilities)
3. Comparing the MMR obtained from both MoH and NGOs supported health facilities.
4. Comparing the MMR from Ouaddai region health facilities to the Chadian National MMR.
5. Analyzing reasons to be attributed to the differences found between the MMR in Ouaddai Health facilities and the NGOs supported health facilities.
6. Analyzing the reasons to be attributed to the differences found between the MMR in Ouaddai health facilities as a whole and the Chadian National MMR.

## RESEARCH DESIGN

The data used in this study is the fruit of retrospective information collected from UNHCR Health Information System and the Ouaddai MoH database. The research will be based on the quantity of the health information collected endowing the study with the characteristic of a quantitative research. This research study focuses on Ouaddai region, using data from three health districts which composes Ouaddai region.

With this research study we expect to display conclusion emphasizing on the quality of health provided to women in health facilities managed by the MoH and by NGOs in refugee camps. Therefore, the maternal mortality rate in those health facilities is supposed to be the lowest as possible in comparison with the national statistics. Also, the MMR in NGOs supported health facilities is supposed to be lower than in health institutions managed by the MoH.

## PROCEDURES

### *DATA COLLECTION*

The data used in this study was collected from official tools of UNHCR (HIS) and the Ouaddai MoH database. The participants involved in this research are mainly health information system personnel from the Chadian Ministry of health and the United Nations for High Commissioner for Refugees (UNHCR) with its NGO partners in the region at the rate of 2 persons from MoH, 2 from the UNHCR, 2 from IRC and 1 from BASE with for a total of 7 personnel.

Once extracted from the tools mentioned hereby, the information was inserted in a table created purposely to allow calculation on the maternal mortality segregated by year and by the category of the health facility which may be located in the refugee camps or in the National communities.

### *DATA ANALYSIS:*

The analysis made on the collected data was done after the calculation of the maternal mortality ratio using the following formula:

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Number of maternal death (numerator) divided by the Number of live birth (denominator) multiplied by 100.000.

$$\frac{\text{Maternal death}}{\text{-----}} \times 100.000 = \text{Live birth}$$

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<sup>21</sup> ICD 10<sup>th</sup> Version, Pages 99-100

The result obtained will be object of comparison between the NGOs (refugee camps) health facilities

and the health facilities in charge of the MoH. Second the comparison will be made between the compiled health facilities maternal mortality ratio from Ouaddai and the Chadian National statistics.

## RESULTS AND DISCUSSION

### RESULTS

Using the above maternal mortality ratio calculation formula, the result recorded for Ouaddai health facilities was 159.5 deaths out of 100.000 live births which is lower than the Maternal mortality of 1100 deaths out of 100.000 live births as recorded for the whole country in 2012. Also, the MMR recorded in NGOs supported health facilities (60.2 deaths/ 100.000 live births) was lower than the one recorded in the Ouaddai MoH's health facilities (101.6 deaths/ 100.000 live births).<sup>22</sup>

The analysis of reasons to be attributed to the difference found in the MMR between the three locations are presented in the discussion paragraph.

It is important to clarify the fact that the data collected from the MoH at the Health Regional level was not complete, lacking 2 months data. Given the fact that the trend of the annual data recorded is quite the same without much variation, we guess that this will not affect significantly the final result displayed in this paragraph.

<sup>22</sup> Find the data collection tools in annex paragraph with data originated from UNHCR HIS and the Ouaddai Health Region database, January 2014.

**Statistics for Ouaddai MoH's health facilities**

Indicator	Y 2010	Y 2011	Y 2012	Y 2013	Total
Monthly Deliveries	N/A	N/A	N/A	3200	
Number of maternal death	2	4	2	11	19
Number of live birth	2209	3453	3178	3073	11913
<b>Maternal Mortality ratio</b>	<b>90.5</b>	<b>115.8</b>	<b>62.9</b>	<b>358.0</b>	<b>159.5</b>

**Statistics summary for all Ouaddai health facilities**

Indicator	Y 2010	Y 2011	Y 2012	Y 2013	Total
Monthly Deliveries	N/A	N/A	N/A	3200	
Number of maternal death	3	9	4	13	29
Number of live birth	6430	7781	7274	7051	28536
<b>Maternal Mortality ratio</b>	<b>46.7</b>	<b>115.7</b>	<b>55.0</b>	<b>184.4</b>	<b>101.6</b>

## DISCUSSION

In the light of the result hereby, we can notice that Ouaddai health facilities had a maternal death 101.6 deaths out of 100.000 live births which is 10.8 times lower than the one recorded for the whole country (1100 deaths/100.000 live births). This difference can be attributed, first to the presence of NGOs operating health facilities in the refugee camps which might contribute to increase health care accessibility for pregnant women from the host communities surrounding the refugee camps; second to the financial and training supports given to Ouaddai health facilities by UN agencies such as UNHCR, UNICEF, UNFPA and WFP.

Likewise, the NGOs supported health facilities (refugee camps) were recorded a MMR of 60.2 deaths out of 100.000 live births which is 2.64 times lower than the one recorded in the Ouaddai MoH health facilities (159.5 deaths/ 100.000 live births)<sup>23</sup>. This situation can be attributed to the breach of standards in Ouaddai MoH health facilities as follows 24:

- Lack of qualified staffs: In term of Medical personnel in Ouaddai the need was estimated at 27. Only 10 Medical personnel were available in 2012 representing 37%. The corresponding need was 17 medical personnel which represents 63% as the gap in medical staffing. Concerning midwives, only 11 were available out 97(11%) with a gap of 86 midwives representing 89%.
- Lack of equipments: One health district hospital not operational due to absence of equipments, Ouaddai region has only 2 ambulances out of 4, 24 refrigerators for routine immunization available out 57 representing 58% of gap to be filled in terms of refrigerator.

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<sup>23</sup> See figures displayed in the Result section

<sup>24</sup> Ouaddai Health Region Inventory of fixtures report, July 2012

- Poor infrastructure and maintenance ( 25 Health Centers and 3 District Hospital to be reconstructed out of the 66 MoH Health care institutions in Ouaddai Region)
- Insufficient health facilities in Ouaddai Region (48 Health facilities are operational out of 66 which is translated into 72% of operational health facilities as well as the long distance between health centers and the Districts referral hospital which was estimated with a mean of 58 km)

We can easily understand that the high maternal mortality ratio of 2012 may be allotted to the death that occurs in the community given the few number of health facilities and lack of qualified health personnel in the Country Chad.

Therefore, a maternal death analysis at the community level is recommendable to confirm the assumption regarding the place maternal death took place in Ouaddai region. This assertion leads us to the statement that most of the maternal mortality death in the region's health facilities may be due to the first and second delays.

The first delay referring to "the delay in seeking appropriate medical help for an obstetric

emergency for reasons of cost, lack of recognition of risk factors and emergency, poor education, lack of access to information and gender inequality” while the second delay stands for “the delay in reaching an appropriate facility for reasons of distance, infrastructure and **transport**”.<sup>25</sup>

## **CONCLUSION**

Despite the difficulties encountered during the course of this study, we noticed that the maternal mortality found in Ouaddai region was lower than the one recorded for the country Chad. We strongly guess that this difference may be attributed to the presence of many humanitarian NGOs operating health facilities in the Region coping with international standards and serving host communities alongside with Sudanese refugees. The presence of health center in refugee camps have likely increase health accessibility for pregnant women living in Ouaddai Region.

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<sup>25</sup> Second Demographic Health survey in Chad, 2012

In parallel, the refugee camps health facilities managed by NGOs had a lower MMR than the one found in Ouaddai MoH health facilities this can be attributed successively to the attractive quality of health care services provided in the refugee camps and the tremendous gaps noticed within Ouaddai MoH health facilities.

Believing in the data collected from the different databases, we can understand that the higher rate of maternal death recorded for Chad as a country might be due to maternal deaths occurring in the community away from the sight of clinicians. It can be a challenge for medical certifiers to attribute correctly cause of death to direct or indirect maternal causes, or to accidental or incidental events, particularly in settings where deliveries mostly occur at home.

## **RECOMMENDATION**

Given the fact that the actual research slammed the problem of Ouaddai MoH Health facilities at three levels as follows:

1. Qualified staffs
2. Lack of Health centre infrastructure and equipment.
3. Health accessibility in term of distance between the communities and the nearest health facility especially in rural zones. We have to recognize the notably effort that have been made to address the problems hereby mentioned.

In order to contribute in reducing maternal mortality in the Qouaddai region, we would like to recommend a profound analysis of maternal mortality at the community level. This will absolutely permit to understand better the problematic of the maternal death particularly in rural zones using variety of information sources like censuses, household surveys, reproductive-age mortality studies and verbal autopsies.

Solution to the disparity and MMR related issues among the Ouaddai region and all the country should be context specific and focusing on remote rural areas where pregnant women don't have

enough access to health care services.

### Graphs used to collect data.

2010 Deliveries													
Monthly	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Monthly Deliveries													0
Number of													0
Number of live birth													0

2011 Deliveries													
Monthly	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Monthly Deliveries													0
Number of													0
Number of live birth													0

2012 Deliveries													
Monthly	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Monthly Deliveries													0
Number of													0
Number of live birth													0

2013 Deliveries													
Monthly	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Monthly Deliveries													0
Number of													0
Number of live birth													0

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