

# **Maternal morbidity in a context of social vulnerability: the case of the province of Essaouira, Morocco.**

## **ABSTRACT**

**Aims:** The main aim of this study is to assess the prevalence of maternal morbidity among childbearing women and to determine the associated factors in a context of social vulnerability.

**Study design:** This is a quantitative analytical cross-sectional study.

**Place and Duration of Study:** The study was conducted in 18 health centers in the province of Essaouira, Morocco from January 2020 to January 2021.

**Methodology:** We conducted a structured interview survey. Simple: We included 1184 married women aged 18 to 49.

**Results:** The prevalence of maternal morbidity was 64.8%. The main morbidities were sexually transmitted infections (50.1%) and anemia (45.8%). Multivariate analysis showed that frequency of postnatal visits, socioeconomic level, knowledge of pregnancy risks, and couple literacy, were statistically associated with maternal morbidity.

**Conclusion:** The use of postnatal care, the improvement of the socio-economic level of households, health education programs, and the fight against illiteracy are factors that would reduce maternal morbidity.

**Keywords:** Maternal morbidity; pregnancy; delivery ; postpartum.

## **1. INTRODUCTION**

Maternal health is a priority of the Sustainable Development Goals, which aim to reduce the global maternal mortality ratio to below 70 per 100,000 live births (1). In 2017, approximately 810 women died from preventable causes related to pregnancy and childbirth, particularly in low and middle-income countries. However, maternal mortality represents only a fraction of the overall burden of poor maternal health (2,3). Women suffer from significant morbidity during pregnancy, delivery and in the postpartum period (4). For every woman who dies from pregnancy-related causes, 20 to 30 suffer from maternal morbidity (5). Maternal morbidity and associated disability is defined as "any condition attributed to and/or complicating pregnancy and childbirth that negatively impacts the woman's well-being and/or functioning" (2). It concerns less serious complications and extends to near-missed morbidity, when the woman has survived a serious maternal complication (3). Moreover it can leave permanent sequelae that can affect a woman's physical, mental or sexual health, cognitive ability, mobility, participation in society, body image, social and economic status (3,6). Some complications during pregnancy, delivery, and postpartum can have a persistent long-term impact on women's functioning, sometimes up to five years after delivery (5). Women developing severe maternal morbidity become more frequently infertile and have abnormal health conditions (7). In other words, it has a considerable impact on the quality of life of women throughout life, it is particularly heavy economically and in particular for the poorest families (5,8). Maternal morbidity is due either to "direct causes" responsible for 80% of maternal deaths in developing countries (9) including hemorrhage, severe infections, difficult or prolonged deliveries, pregnancy-related hypertension, and unsafe abortions, or "indirect causes" related to diseases aggravated by pregnancy, including anemia, heart disease, hepatitis, tuberculosis, sexually transmitted infections (STIs), and diabetes (2). Most of these complications that arise during pregnancy can be prevented or treated (10). In Morocco, the last confidential survey of maternal deaths in Morocco in 2015 showed that out of 152 audited maternal deaths of direct or indirect causes that occurred less than 42 days postpartum, 84% in health facilities or during transfer between two facilities. Three-quarters of the deaths occurred postpartum/post-abortion, related to direct causes of morbidity, of which 80% were deemed preventable and 16% were related to indirect causes (11). The province of Essaouira belongs to the Marrakech-Safi Region, it is

characterized by a rural predominance of 77.6%. It is the fifth poorest province in Morocco, recording a poverty incidence of 22.1% (8.2% in Morocco). Its vulnerability rate is 22.16% against 12.5% nationally (12). The activity rate in Essaouira is 45.7% with only 11.7% of women working. Illiteracy is 48.9% with 60% of women, the highest in the Marrakech-Safi region (13). Its economy is based mainly on crafts, fishing and tourism (14). To reach the nearest health facility, 49% of women would have to travel 6 km (15). Between 2020 and the first quarter of 2021, the province of Essaouira reported seven maternal deaths, 05 of which occurred in a delivery facility, and 02 during transfer to the hospital, due to obstetric complications (16). Information on maternal morbidity in developing countries is limited and often is based on hospital reports that do not reflect its true magnitude (17). There is a need to strictly include population-based studies, rather than institutional reports (4). In Morocco, very few studies on maternal morbidity and its determinants exist, although the country still has a high maternal mortality rate in relation to target 3.1 of the sustainable development objectives to which it has subscribed. Measures of maternal morbidity, including non-severe maternal morbidity, promote a comprehensive understanding of this public health problem (18). The data can be used as indicators of the quality of obstetric care provided to women (2). Understanding its determinants will help policymakers, health officials, other stakeholders, and donors to address its causes and thereby reduce maternal deaths, suffering, and long-term disability (6). Thus, in this pilot study in the province of Essaouira, we propose to evaluate the prevalence of maternal morbidity among women of reproductive age (15-49 years) as well as to understand the socio-demographic, socioeconomic, socio-cultural and health factors that contribute to it.

## **2. MATERIALS & METHODS**

### **2.1 Study design**

This is a cross-sectional survey of married women of childbearing age in the province of Essaouira. The study involved 18 health centers out of 69 urban and rural, randomly selected. These centers are located at a radius of zero to 132 km from the city of Essaouira. We adopted a stratified random sampling to identify the number of participants per center, based on the number of married women served by each facility. Our sample size calculated from the Fisher formula was 1184 women. We selected the participants at random during their visits to the health centers until the goal per center was reached. The inclusion criteria were women living in Essaouira province, attending a health center at the study site during the data collection period, aged between 18 and 49 years, whose last pregnancy was less than three years before the survey. This period is chosen to avoid omissions and errors in women's memory and to have information that are more reliable. We excluded women who were less than six weeks postpartum at the time of the survey, and those whose health status did not allow for the survey.

### **2.2 Data collection**

We conducted structured interviews, supplemented by the use of women's health diaries after the care or services for which the women came to the center. The data collection tool was developed by the authors. They allowed us to collect data on the signs and symptoms of morbidity, based on the World Health Organization's maternal morbidity matrix (3). Also data about socio-demographic, socioeconomic, socio-cultural information such as the woman's age at last birth, place of residence, level of education, occupation, the standard of living, health insurance, number of children, distance and cost of access to the health care facility. We collected also Health information by the interviewers, such as obstetrical history, knowledge of pregnancy risks, desire and outcome of the last pregnancy, course of pregnancy and delivery, place and method of delivery, prenatal and postnatal follow-up. The use of the health diaries that the women brought with them to each visit was useful for completing and verifying the information provided by the interview. We conduct the study from January 2020 to January 2021.

### **2.3 Data analysis**

We entered and analyzed the data using IBM® SPSS® 18 (Statistical Package for the Social Sciences) software. Statistical processing involved calculation of frequencies, means, standard deviations ( $\sigma$ ), chi-square test to capture associations between categorical variables, binary logistic regression to eliminate confounding factors and capture the weight of variables associated with maternal morbidity. Statistical significance was set at the 5% threshold.

### 3. Results

#### 3.1 Sociodemographic and health profile of the women studied

the data came from interviews with the 1184 women, supplemented using their health diaries. The socio-demographic and health characteristics are given in Table 1. The age of the women at the last pregnancy ranged from 15 to 46 years, with an average of 27.9 years ( $\sigma = 6.3$ ). Women from the city of Essaouira represent 20.8%, those from the semi-urban areas of the region represent 18.2% and 61.1% from rural areas. The illiteracy rate was 44.3% and 36.5% had no more than primary education. The percentage of women with secondary education or higher was 19.2%. As for the spouses, only 31.5% are illiterate, 42% have attained primary school level and 26% secondary school level and above. Thus, literate couples represent 46.6% while illiterate couples represent 22.5%.

The monthly household income varied according to the women's declarations from zero to 34,000 Dirham, i.e. an average of 3107 Dh (Moroccan currency or 348 USD). We subdivided the women studied into 2 groups according to the value of the Guaranteed Interprofessional Minimum Wage in Morocco in 2019 and which is 2570 Dh per person (30) the equivalent of 285.94 USD. The first group has a relatively low socio-economic level and includes households with a monthly income less than or equal to the Guaranteed Interprofessional Minimum Wage, and the second group has a medium to high socio-economic level and includes women from households with a monthly income greater than the Guaranteed Interprofessional Minimum Wage. Thus, 44.9% of women belonged to the first group. We calculated the household income based on the income of the husband and wife, but the proportion of women who had a socio-professional activity at the time of the survey was only 7.7%.

As for Health Insurance, almost half of the women (51.7%) had it. The number of children per woman ranged from one to 10, with an average of 2.3 ( $\sigma = 1.3$ ), and 12.8% had a history of abortion, stillbirth, neonatal mortality or prematurity. Regarding the last pregnancy, 95.9% had live births at term. Antenatal care coverage (ANC) was 93.7%. The proportion of women who had regular prenatal care (4 visits) was 56.6%, while 37.2% of women had less than 3 ANC. Postnatal care coverage was only 18.6%, of which 4.6% was early postpartum, between the seventh and ninth day after delivery, and 14% late postpartum.

We observed knowledge of at least two pregnancy-related risks in 66.8% of women. Those who gave birth in a supervised environment were 91.6%, 72% of whom were in a hospital maternity hospital, and vaginal delivery represented 82.7% of our sample, 29.5% of whom had an episiotomy.

The distance to the nearest health care facility ranges from a few meters to 44 km, with an average of 5.9 km ( $\sigma = 6.7$ ), 22.7% of women are more than 6 km away to access care.

**Table 1:** Socio-demographic and health characteristics of the women studied

Variables	Modalities	Effective	
		(n)	%
Age at last pregnancy	15-24 years	413	34.9
	25-34 years	553	46.7
	35-49 years	218	18.4
Place of residence	Urban	246	20.8
	Semi-urban	215	18.2
	Rural	723	61.1
Couple literacy	Illiterate couple	266	22.5
	One of the spouses Literate	366	30.9
	Literate couple	552	46.6
Socio-economic level according	Low	532	44.9

to household income	Medium to high	652	55.1
Health Insurance	Yes	612	51.7
	No	572	48.3
Number of children	≤ 2 children	745	62.9
	> 2 children	439	37.1
Outcome of last pregnancy	Living birth	1136	95.9
	Intrauterine mortality	24	2.0
	Premature birth	24	2.0
Regularity of antenatal care	0	74	6.3
	1-3	440	37.2
	> = 4	670	56.6
Frequency of postnatal care	0	964	81.4
	1	159	13.4
	2-4	61	5.2
Desire for the last pregnancy	Yes	1025	86.6
	No	120	10.1
	Do not know	39	3.3
Pregnancy risk knowledge	Yes	791	66.8
	No	393	33.1
Place of birth	Maternity hospital	852	72.0
	Birthing house	232	19.6
	Home	100	8.4
Delivery mode	Low way	979	82.7
	Caesarean	205	17.3
Distance from the care structure	<or = 3km	542	45.8
	> 3km and <or = 6 km	373	31.5
	> 6 km	269	22.7
Cost of transportation for care	Less than 10 Dh	709	59.9
	From 11 to 30 Dh	435	36.7

More than 31 Dh	40	3.4
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### 3.2 Maternal Morbidity

Among 1184 women surveyed, 767 women in the sample had experienced at least one complication during their last maternity, either prepartum, during delivery, or postpartum. The prevalence of total maternal morbidity was therefore 64.8% or (767/1844). Signs of complications varied between one and seven major or minor signs per woman with an average of 1.74 episodes of morbidity. In addition, prepartum morbidity was 55.9%, intrapartum 19.1%, and 8.2% postpartum. Concerning self-reported symptoms (Table 2), out of 767 women who had at least one sign of morbidity in prepartum and/or during labor and delivery and/or postpartum, sexually transmitted infections (STIs) (leucorrhoea, pruritus, dysuria, pelvic pain) accounted for 50.1%, followed by anemia (45.8%). Labor and postpartum hemorrhage was 13.9%. Mechanical labor dystocia (osseous dystocia, lack of contraction) or dynamic labor dystocia (uterine dysfunction, lack of uterine dilation) represented (9.9%), gestational diabetes (8.3%), renal lithiasis (7.8%), infectious complications (episiotomy, surgical wound, abdominal wall, urinary tract, ext) had a rate of 7%. Finally, hypertensive disorders of pregnancy (gravidic hypertension, eclampsia, preeclampsia, and headache) were 4.2%.

**Table 2:** Frequencies (%) of major signs reported by women who had at least one type of maternal morbidity during the episodes (prepartum and/or delivery and/or postpartum).

Morbidity	Symptomatology	Frequency	
		(n)	%
<b>In prepartum</b>	Sexually transmitted infections (STIs)	384	50.1
	Anemia	351	45.8
	Gestational diabetes	64	8.3
<b>During childbirth</b>	Dynamic or mechanical dystocia	76	9.9
	Hemorrhage	63	8.2
	Fetal dystocia presentation	27	3.5
<b>In postpartum</b>	Infectious complications	54	7
	Hemorrhage	44	5.7
	Breast problems (abscesses, pain, breast swelling)	6	0.8

*n*: number of signs reported by morbidly ill women. %:  $n / \text{Total number of morbidly ill women}$  (N=767)

### 3.3 Maternal morbidity and women's socio-demographic, socio-economic, socio-cultural and health profile.

According to the results in Table 3, maternal morbidity was statistically associated, in order of importance, with couple's literacy, frequency of postnatal visits, place of residence, regularity of prenatal visits, household socioeconomic level, distance to health care facility, health insurance, knowledge of pregnancy risks, and finally with the number of children delivered by the woman. According to the binary logistic regression model (Table 4), the socio-demographic and health factors that were significant and independent determinants of maternal morbidity were frequency of postnatal visits (Odds Ratio (OR)=1.51; IC 1.1 – 1.9), socioeconomic level (OR=1.39; IC 1 – 1.8), knowledge of pregnancy risks (OR=1.42; IC 1 – 1.8), and couple literacy (OR=1.1; IC 1 – 1.2).

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**Table 3: Maternal morbidity (%) and sociodemographic and health profile of women**

Variables	Modality	N	Morbidity maternal		Test $\chi^2$
			Frequency (n)	%	
Age at last pregnancy	15-24 years old	413	266	64.4	0.94ns
	25-34 years old	533	361	65.3	
	35-49 years old	218	140	64.2	
Place of residence	Urban	246	188	76.4	19.20***
	Semi-urban	215	138	64.2	
	Rural	723	441	61.0	
Literacy of the couple	Illiterate couple	266	161	60.5	35.56***
	One spouse literate	366	201	54.9	
	Literate couple	552	405	73.4	
Socio-economic level	Low	532	313	58.8	14.97***
	Medium to high	652	454	69.6	
Health insurance	Yes	612	421	68.8	8.93**
	No	572	346	60.5	
Number of children	≤ 2 children	745	501	67.2	5.36*
	> 2 children	439	266	60.6	
Regularity of prenatal care	≥4	670	446	66.6	16.13***
	1-3	440	289	65.7	
	0	74	32	43.2	
Frequency of postnatal care	No visit	964	595	61.7	21.28***
	One visit	159	124	78	
	2 to 4 visits	61	48	78.7	
Knowledge of pregnancy risk	Yes	791	492	62.2	6.95**
	No	393	275	70	
Distance to health care facility	< or = 3km	542	367	67.7	10.59**
	>3km and < or = 6km	373	248	66.5	
	>6 km	269	152	56.5	

N: number of women, n: number of morbid women, %: percentage of morbidity, ns: not significant, \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

**Table 4:** Adjusted Odds Ratios for Maternal Morbidity and Sociodemographic and Health Profile of Women

Variables	A	$\chi^2$	OR	CI
Place of residence	-0.114	1.573ns	0.892	0.747 1.066
Literacy of the couple	0.099	5.118*	1.104	1.013 1.202
Socio-economic level	0.336	6.265*	1.399	1.076 1.821
Health insurance	-0.192	2.239ns	0.825	0.642 1.061
Number of children	-0.204	2.224ns	0.815	0.623 1.066
Regularity of prenatal care	-0.192	3.387ns	0.825	0.673 1.013
Frequency of postnatal care	0.415	8.664**	1.514	1.149 1.995
Knowledge of pregnancy risks	0.354	6.098*	1.424	1.076 1.886
Distance to health care facility	-0.096	1.415ns	0.908	0.775 1.064

A: Constant,  $\chi^2$ : Chi-square value, OR: Odds ratio, CI: Confidence interval ; \*  $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

## 4. Discussion

### 4.1 Maternal Morbidity

This study involved 1184 women, the results of the interviews completed by the analysis of the women's health diaries showed that they presented between one and seven signs of morbidity in the prepartum, labor and postpartum periods, with an average of 1.74 episodes of morbidity. The prevalence of maternal morbidity found is 64.8%. This shows that women in the province are more vulnerable to illness and complications due to motherhood. Their health status is threatened. Our results are higher than those observed in Marrakech (37%) (19). They are high as in some low- and middle-income countries such as India (52.6%), Kenya-Pakistan (73.5%) (20) and Niger (21). Concerning symptoms suggestive of maternal morbidity, 50.1% of women reported signs suggestive of an STI (pruritus, leucorrhoea, urinary burning, and pelvic pain). We can explain this result by poor hygiene conditions, especially in rural areas, temporary unprotected sex by spouses working in large cities due to the economic stagnation in the province, the perception of STIs as a taboo subject, and the inadequacy of partner treatment or even refusal. The rate of STIs in our sample is higher than that observed in Marrakech (1%) (19), Pakistan (14.9%) and Malawi (7.8%) (22). They can have an impact on the outcome of pregnancy (23,24). Anemia represents 45.8% in our study, a value relatively higher than that found in the province of Essaouira in 2018 (41%) (25). We can explain this increase by the improvement in the diagnosis of anemia thanks to the free biological examinations at the public hospital for pregnant women, and the opening of a second private laboratory in the city of Essaouira. This high rate of anemia is attributed to women's low level of education, unemployment, and low socioeconomic status (25,26). Indeed, the province of Essaouira has one of the highest poverty and vulnerability rates in Morocco, reaching 9.1% and 22.2% respectively (27). In addition, the diet of women in the province of Essaouira is marked by an excessive consumption of cereals, fats, vegetables, sweetened beverages (from 1 to 9 glasses of tea per day) and a low consumption of meat and dairy products (25). These conditions contribute to the development of nutritional problems and deficiency diseases, requiring special management of anemia in prenatal care in the province. At the world level, about half of all pregnant women suffer from anemia (28). It is more common and severe in countries with low social and economic development. Moreover, it is a common and potentially reversible risk factor associated with maternal morbidity (29).

## **4.2 Maternal morbidity and socio-demographic, socio-economic, socio-cultural and health characteristics of women**

Bivariate analysis showed that maternal morbidity was statistically associated, in order of importance, with couple's literacy, frequency of postnatal visits, place of residence, regularity of prenatal visits, household socioeconomic level, distance to health care facility, health insurance, knowledge of pregnancy risks, and finally with the number of children delivered by the woman. Binary logistic regression analysis showed that only the variables frequency of postnatal visits, socioeconomic level, knowledge of pregnancy risks, and literacy of couples were significantly associated with maternal morbidity independently. This means that women who are more integrated into postnatal care and have access to available resources through financial stability and literacy experience greater maternal morbidity.

Regarding the frequency of postpartum visits, this study showed that women who consulted postnatally were more morbid. This means that women are not in the habit of monitoring their health status systematically after childbirth, they consult only in case of presumed serious complications. This attitude deprives them of their rights to preventive care, health education, contraception and birth spacing, and other health services available at the health centers. The risk is that women with less severe postpartum complications are not screened or treated. In addition, while Morocco recommends three systematic examinations after 48 hours postpartum, we note the low use of postnatal consultation by women. The proportion of postnatal consultations in Morocco is 22% (30), which is far from reaching the target of 80% by 2025 (31). Low utilization of postpartum health services may be related to their lack of awareness of its importance and of the package of care available at health centers. It could be linked to socio-economic factors (32). Women generally consulted for the vaccination of their children and to obtain a certificate to register them with the civil registry (19). Moreover, our results affirmed the low recruitment of women to postpartum care, so health care professionals can make women more aware of the benefits of postpartum care and inform them of the care available to them.

Paradoxically, women with a medium to high socioeconomic level are more likely to have maternal morbidity, which corroborates with a study in Rabat (17), and contradicts with others (33,34). We can explain this result by the ability of the latter to access care at the slightest health problem and to diagnose it. Knowledge of the risks of pregnancy protects against maternal morbidity; women who are aware of these risks consult more often and at lower risk. Lack of awareness of morbidity risks results from the low level of women's education; literacy training for women is a sine-qua-non condition for understanding health education messages. Despite Morocco's efforts to enroll girls in school, 44.3% of the women in our study are illiterate and 36.5% have not gone beyond primary school. In addition, we found that prenatal health education was insufficient in our sample (22.1% had received it). They must be fully informed about maternal morbidity (5). For this reason, the Ministry of Health has implemented the "Mothers' Class" approach at health facilities, which consists of organizing group educational sessions tailored to pregnant and postpartum women, with the aim of improving women's knowledge and attitudes on several topics. We found also that couple illiteracy was another factor associated with maternal morbidity. Literate couples are more likely to have maternal morbidity. They were more aware of the risks of pregnancy and had better access to maternal health care. As a result, they benefited more from the diagnosis and treatment of even minor health problems. This has been confirmed by studies conducted in Marrakech and its regions (35,36). Finally, prevalence estimates of self-reported morbidity are generally more specific than sensitive estimates (17). However, mothers may be more reliable sources of information than medical records (37). Diagnosis by interview may be the only way to obtain information on the prevalence of the types of maternal morbidity needed to improve obstetric care and the general health of women (38). It is true that this study combined two methods of data collection, mainly the structured interview at the women's convenience, complemented by the analysis of their health diaries. Nevertheless, a limitation of this study is that it could not estimate severe maternal morbidity due to near misses. This is because of women's difficulty in describing severe obstetric complications, their lack of health education, and their high illiteracy rate. Therefore, this study opens perspectives for research in the province of Essaouira on severe or near-accidental maternal morbidity, psychological and social morbidity of women (domestic violence).

## **5. Conclusion**

This study showed that the prevalence of maternal morbidity is 65%. STIs, Anemia are its main causes. Multivariate analysis showed that frequency of postnatal visits, socioeconomic level, knowledge of pregnancy risks, and couple literacy were correlates of morbidity. This means that

women who are more integrated into postnatal care and have access to the resources available through literacy and financial stability experience more maternal morbidity. On the other hand, the detection of morbid symptoms is lower among women with fewer resources. To reduce maternal morbidity, it seems necessary to encourage women in the perinatal period to follow up on their pregnancy and childbirth, especially in public facilities that are free of charge, and to provide them with appropriate care for the complications diagnosed. Health program managers can make more efforts in health education, recruiting women for pre- and post-natal consultations, and adopting new communication and awareness-raising strategies. Finally, policymakers must act on the social determinants of health to improve women's socioeconomic status and education in particular. The determinants observed in this study can help shape maternal health interventions in a context of high poverty and illiteracy rates. We need further investigations to compare these results.

## **CONSENT**

All authors declare that they have obtained written informed consent from the women for the publication of this article. A copy of the written consent is available for review by the editorial office/editor/editorial board of this journal.

## **ETHICAL APPROVAL**

We have obtained the authorization of the Ethics Committee of the University Hospital of Marrakech (Num 18/2021), and the authorization to collect data from the health authorities: the regional health directorate in the Marrakech-Safi region. All women gave their free and informed consent to participate in this study. This means that participation in the study respected the autonomy of the women, who had the right to participate or not and to withdraw freely at any time. In addition, the participants were informed beforehand of the nature of the study, its authors, its objectives and the confidentiality of the data collected.

## **COMPETING INTERESTS DISCLAIMER:**

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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