



**MATERNAL MORTALITY RATIO IN LEBANON IN 2008:
A HOSPITAL-BASED REPRODUCTIVE AGE MORTALITY SURVEY
(RAMOS)**

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A. INTRODUCTION

A1. Rationale

The complexity of ascertaining maternal deaths makes it difficult for many low income countries to measure the levels of maternal mortality, hence the lack of valid data on such avoidable deaths. A report prepared by international agencies (1) has recently assigned Lebanon to the group H of countries with “no national data on maternal mortality”. As a result, an arbitrary equation was used to determine that Lebanon’s maternal mortality ratio (MMR) in 2005 was 150 per 100,000 live births. The Lebanese government disputes this classification and its consequences. This position is premised on the MMR values reported for Arab Gulf countries whose antenatal care is at par with that of Lebanon. Those countries which provided data to international agencies have been assigned MMRs lower than 25 per 100,000 in most cases.

The perceived discrepancy between what is believed to be the reality of the MMR experience in Lebanon and that reported in international figures has prompted the Ministry of Public Health (MOPH) to sponsor a field project leading to an accurate estimate of this indicator for the year currently under reporting 2008. Different approaches such as community-based maternal deaths reviews (verbal autopsies), facility-based maternal deaths reviews, reproductive age mortality surveys (RAMOS), and confidential enquiries into maternal deaths have been used to ascertain maternal deaths. The approach selected for this field project in Lebanon was a hospital-based RAMOS.

This report presents findings from a RAMOS project conducted in November-December 2009, to provide a valid figure for the MMR in Lebanon in 2008.

A2. Background

Fragmented data provide some evidence to back the controversy around the MMR assigned to Lebanon. The 2004 Lebanon Family Health Survey or PAFAM (2) reported an MMR of 86/100,000. More recently, an MOPH-sponsored 2008 review of deaths among 15 to 49 years old females in three out of 26 administrative districts, which include about 18% of the entire Lebanese population, was unable to detect any pregnancy-related death through a verbal autopsy (conducted through telephone verification and/or next of kin direct interview) (unpublished data). The 2005 global maternal mortality neglected to include the PAFAM 2004 or other national results due mostly to lack of communication with local authorities. On the basis of the existing 2004 PAFAM, Lebanon should be classified at least as a group G country in which punctual MMR reports exist (1). The exercise conducted in this project will launch an on-going hospital-based surveillance system for reproductive age causes-of-death. This will allow Lebanon to move to group E in the future (1).

Other elements regarding sources of data have to be considered when approaching an MMR estimation. Vital statistics periodically published on the website of the Central Agency for Statistics (CAS). The birth data are believed to be complete because no baby is allowed to leave the hospital before the birth has been declared to Vital Statistics, and less than 3% of deliveries occur in homes (PAFAM 2004). The denominator of live births necessary to calculate the MMR is readily available at CAS website (3).

Death certificates in Lebanon rarely carry any valid information regarding the condition which started the chain of events leading to death. However, women who die in reproductive ages are usually brought to a hospital either before death, or while dying or immediately after death. Consequently, these deaths should be recorded in the hospitals roster with their immediate and sometimes underlying and/or contributing causes of death. The fraction of reproductive age mortality which occurs outside the hospital

and/or is reported or not to the local vital statistics registrars is unknown, although it is believed to be extremely low.

B. METHODS

B1. Definition of terms:

1. Maternal deaths: “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 (directly or indirectly) related or aggravated by the pregnancy or its management, but not from accidental or incidental causes” (ICD10) (4). For the purposes of this survey, a more conservative definition was adopted which includes among maternal deaths those cases occurring between 42 days post-partum and the end of the year 2008.

- Examples of accidental causes of death: a pregnant woman dies after walking on a cluster bomb in a field.
- Examples of incidental causes of death: a woman dies from a terminal breast cancer days after delivering a living child.

Maternal deaths can be directly or indirectly caused by a pregnancy or delivery related cause.

- Direct causes are “results of obstetric complications of the pregnant state: pregnancy, delivery and post-partum, interventions, omissions or incorrect treatment, or from a chain of events resulting from any of the above. For example, direct causes include hemorrhage, eclampsia, or complications of anesthesia or cesarean sections”.
- Indirect causes are “previously existing diseases or diseases that developed during pregnancy which were not due to obstetric problems but were aggravated by physiological effects of pregnancy. Examples of indirect cause are deaths due to aggravation of an existing cardiac or renal disease”.

B2. Identification of maternal deaths

Reproductive age deaths (15-49 years) were initially identified through hospital records.

- Following a letter from MOPH and the Syndicate of Hospitals (Appendix 1), forms were sent out via all available media, to be completed for each death (Form: Appendix 2). Hospitals which did not respond within the specified period of time were contacted again several times until all forms were finally collected. The list of contacted hospitals, excluding those found to have either not started functioning yet, or closed down or not providing services to general patients (geriatric homes, chronic mental hospitals, etc...) is presented in Appendix 3.
- A trained MD travelled to each hospital which had either reported any reproductive age death, or had not provided an information sheet despite repeated calls. The aim of the field visit was to ascertain whether recorded deaths were in fact maternal deaths or not.
- Inconclusive deaths were investigated, when possible, through simplified verbal autopsies conducted by phone or face-to-face with next-of-kin. These interviews were conducted either by the visiting MD, or by the public health/ medical officer in the corresponding district ("caza"). At times, the research team had to go back to the death certificate at the local vital statistics registrar to retrieve information on the deceased person's family phone and/or address.
- All data were channelled back to a central repository in Beirut where they were entered and analyzed in preparation of the report.

B3. Variables recorded

For each nominal reproductive age death recorded in 2008, the following variables were obtained in as much as they were actually available:

1. Full name: nominal data was required to allow the cross-referencing of cases. The names were treated in confidentiality and replaced by initials in public reports
2. Age at death
3. Citizenship: all deaths were included regardless of nationality
4. Area of usual residence
5. Marital status at time of death
6. Civil ID record number

After the cause of death had been ascertained by the medical controller, each received the following identifier:

1. Maternal death: definitely yes or definitely no. Inconclusive deaths were investigated through the multiple channels described above. The few cases where uncertainty on cause of death could not be cleared were conservatively considered as maternal deaths.
2. ICD10 codes were provided for each confirmed maternal deaths.

B4. Plan of analysis

All data were entered on an Excel sheet. The number of confirmed maternal deaths found here was divided by the total number of births recorded in the CAS 2008 report. According to RAMOS standard methodology, the ratio obtained is considered the lower limit of an estimation interval, in which the upper limit is double that amount, and the reportable estimation is the mean between the lower and upper limits (1).

C. RESULTS

A total of 69 out of 139 concerned hospitals (50%) reported managing deaths or receiving “dead on arrival” (DOA) cases of women in the reproductive age-group. Those were 384 cases, of whom 13 were confirmed cases of maternal death (3.39%). Details on the ages, circumstances of death and presumed ICD10 cause-of-death of those 13 cases can be found in Appendix 4. All those confirmed cases were Lebanese citizens. A series of 17 DOA cases with no details on circumstances of death recorded in the hospital were investigated through verbal autopsy by direct interviews with next-of-kin, corroborated by the family treating physician. None of these cases had been pregnant or had delivered in the six weeks preceding death.

In 2008, there were 84,823 live births in Lebanon (3). With a numerator of 13 confirmed pregnancy-related deaths, the estimated ratio was 15.3 per 100,000. Based on RAMOS methodology explained above, this estimation became the lower limit of an uncertainty interval, with an upper limit of 30.6. Therefore, the mean of the interval which is **23/100,000** (15.3-30.6) becomes the national figure for the MMR in Lebanon in 2008.

REFERENCES

1. Maternal Mortality in 2005. Estimates developed by WHO, UNICEF, UNFPA and The World Bank.
2. Ministry of Social Affairs et al. Lebanon Family Health Survey (2004). www.socialaffairs.gov.lb/files/PapfamreportEn.pdf
3. Monthly Statistics 2008. Central Agency for Statistics. Lebanon. www.cas.gov.lb
4. WHO. International Statistical Classification of Diseases and Related Health Problems, Tenth Revision. Geneva 1992.

APPENDIX 1 LETTER TO THE HOSPITALS



حضرة المدير المحترم

في سبيل تعديل مؤشر وفيات الأمهات المعتمد من قبل منظمة الصحة العالمية للبنان، وبما أن المؤشر المعتمد هو مرتفع جدا ولا يعكس الواقع الصحي واصبح ينعكس سلباً على تمويل القطاع الصحي. وبما أن لهذا القطاع في لبنان عامة وللمستشفيات بوجه الخصوص مصلحة اكيذة في اعطاء صورة حقيقية عن الواقع كما هو وبكل شفافية وهو بكل تأكيد افضل بكثير مما تنشره المنظمة،

تقوم وزارة الصحة العامة بالتعاون مع نقابة المستشفيات في لبنان بدراسة احصائية حول وفيات النساء في عمر الانجاب في المستشفيات اللبنانية العامة والخاصة وذلك بدعم من منظمة الصحة العالمية. تهدف الدراسة الى احصاء عدد وفيات النساء اللواتي تتراوح اعمارهن بين 15 و 49 عاما" وتحديد حالات الوفاة التي لها علاقة ما بالحمل او الولادة وفقا لتعريف منظمة الصحة العالمية.

لذلك نطلب من المستشفيات كافة التعاون التام وتقديم المعلومات المطلوبة كما هي تماما وذلك بتعبئة الاستمارة المرفقة، مؤكداين لكم الحفاظ على السرية التامة في التداول بهذه المعلومات التي لا علاقة لها بالعقود مع اي من الجهات الضامنة ولا بأي تقييم لأداء المستشفى او الجسم الطبي والتي تهدف فقط الى تحديد نسبة وفيات الأمهات مما سيحسن سمعة لبنان.

ان المعلومات المطلوبة في الاستمارات المرفقة هي لعام 2008 فقط.

تجدون مرفق ربطاً:

- استمارة خاصة بوفيات النساء في عمر الإنجاب (15-49 عاما)- قبل الوصول الى المستشفى او في الطوارئ
- استمارة خاصة بوفيات النساء في عمر الإنجاب (15-49 عاما)- أثناء الإقامة في المستشفى

نرجو ارسال الاستمارات في مدة اقصاها الاول من شهر كانون الاول 2009 بواسطة الفاكس: 01- ext: 102- [dep-stat@public-](mailto:dep-stat@public-health.gov.lb) و info@syndicateofhospitals.org.lb او البريد الالكتروني: info@syndicateofhospitals.org.lb و dep-stat@public-health.gov.lb

لمزيد من المعلومات او للحصول على نسخة الكترونية من الاستمارة ات، يرجى مراجعة السيدة ريتا الرحباني سعد في نقابة المستشفيات (تلفون: 01-611011) او الانسة هيلدا حرب في وزارة الصحة العامة (تلفون: 01-611390)

شاكرين تعاونكم،

الدكتور وليد عمار
المدير العام
وزارة الصحة العامة

المهندس سليمان هارون
الرئيس
نقابة المستشفيات في لبنان

APPENDIX 2
HOSPITAL DATA FORM



استمارة خاصة بوفيات النساء في عمر الإنجاب (15-49 عاماً) - أثناء الإقامة في المستشفى

اسم المستشفى:

الوفيات الحاصلة خلال العام 2008 (من 1-1-2008 لغاية 31-12-2008 ضمناً)

الرقم التسلسلي *	الإسم الثلاثي للمتوفاة	الجنسية	مكان وسجل القيد (للبنانيين)	مكان السكن الفعلي	تاريخ الولادة	تاريخ الوفاة	العمر	الوضع العائلي عند الوفاة**

APPENDIX 3

LIST OF LEBANESE HOSPITALS INVESTIGATED

Hospital Name	Cases	Address
El Borj	0	Borj El Barajina, Baabda
Maarbess	0	Fourn el Chebak, Baadba
ND Lourdes	0	Fourn el Chebak, Baadba
Irfane	0	Simkanieh, ch/al
Chtoura	0	Chtoura, Bekaa
Doctors	0	El Manara, Bekaa
El Batoul	0	Hermel – Mahalat El Alli, Bekaa
Farhat F.	0	Beit Chama, Bekaa
Mais	0	Chtoura, Bekaa
Mortada	0	Baalbeck, Bekaa
Taanayel General	0	Taanayel, Bekaa
Tamnine	0	Tamnine Baalbeck, Bekaa
C. H. du Sud	0	Riad El Solh St., Saida
Hamze - Maternité	0	Marwanieh, South
Najem	0	Sour
Bcharri	0	Bcharri near Baker Al-Hadith
Baalbeck	0	Al-Ain, Baalbeck, Bekaa
Hermel	0	Hermel Main Road, Bekaa
Kartaba	0	Deir Mar Sarkis Square, Kartaba
Beit El-Dine Center	0	Chouf, near Blood Bank
Shouweifet Center	0	Saida Old Road, Saida
Shehim Center	0	Shehim, Iqlim
Karantina	0	Karantina, near sleep Confort
Baabda	0	Baabda, near Serail Baabda
Tyr	0	Al Bas, Tyr
Tebnine	0	Tebnine
Tripoli	0	Al Kobbe, Tripoli
Sir el Dinieh	0	Assoun North
Rashaya	0	Al Bayader, Abha, Rashaya
Ehden	0	Ehden
Mais el Jabal	0	Caza of Marjeyoun
Jezzine	0	Main Road, Jezzine
Bint Jbeil	0	Bint Jbeil, South
Orange Nasseau	0	Tripoli, North
Kherbet Kanafar	0	West Bekaa
Tannourine	0	Beit Chelala, Batroun
Bint Jbeil-Inst.Islam.	0	Bint Jbeil, South

El Zahra'	0	El Jnah, Baabda
St Michel	0	Amchit, Jbeil
Beit Chabab	0	Beit Chabab, Metn
Libano –Français	0	Zahleh, Bekaa
El Kheir	0	El Mnieh, North
Haydar	0	Noueiry Station, Basta, Beirut
Najjar	0	Ras Beyrouth, Maamari St., Beirut
M.East Inst.of Health	0	Bsalim, Metn
Bekhaazi	0	Hamra, Maamari St., Beirut
Child&Mother	0	Tallet El Khayat, Beirut
Clémenceau Med.Cent	0	Clémenceau, Maamari St., Beirut
Fouad Khoury	0	Hamra, AbdelAziz St., Beirut
Ghorayeb	0	Ras El Nabeh, Beirut
Haddad - Srs Rosaire	0	Gemmayzé, Beirut
Trad	0	Clémenceau St., Beirut
Hajj	0	Achkout, Kesrouan
Bitar	0	Baouchrieh, El Fardaous St., Metn
El Arz	0	Zalka, Metn
Hayek	0	Sin El Fil, Metn
Libano-Canadien	0	Sin El Fil, Metn
St Georges	0	Ajaloun, Kesrouan
Baaklyn	0	Baaklin, a/c
Ousman	0	Ketermaya, a/c
Bahmad	0	Rachaya El Wadi, Bekaa
Dar El Amal Univ.	0	Douris, Baalbeck, Bekaa
Dar El Hikmeh	0	Tal El Abiad, Baalbeck, Bekaa
Ibn Sina	0	Baalbeck, Bekaa
Rayan	0	Baalbeck, Bekaa
Tal Chiha	0	Zahleh, Bekaa
El Bissar	0	Tripoli, North
El Hanane	0	Tripoli, North
Nini	0	Maarad St., Tripoli, North
Hiram	0	Jal El Baher, Tyr, South
Serhal	1	Rabieh, Metn
Ragheb Harb	1	Toul, Nabatieh
Halba	1	Abdel Al Dyr, Akkar
El Shahr	1	Kabr Chmoun, Baysour
Libano - Italien	1	Tyr
St Georges - hadath	1	Hadath, Baabda
Imane	1	Aley, Aley
Tatari	1	Baalbeck, Bekaa
C.M El Youssef	1	Halba, Akkar, North

Chahine	1	Tripoli, North
El Janoub - Cheaib	1	Saida, South
Raii	1	El Ghazieh, Saida, South
Marjeoun	2	Jdeideh, Marjeoun
Clinique du Levant	2	Sin El Fil, Metn
Haroun	2	Zalka, Metn
Bhaness	2	Bhaness, Metn
El Hayat	2	El Chiah, Baadba
N.D Maritime	2	Jbeil, Jbeil
Ain Wazein	2	Ain Wazein, Chouf
H.C.Mazboud	2	Mazboud, Chouf
Farhat H.	2	Kamed El Laouz, Bekaa
Universal	2	Ras Baalbeck, Bekaa
Borgi	2	Amioune, North
C. H. du Nord	2	Zghorta, North
El Salam	2	Tripoli, North
Mazloum	2	Boulevard. Tripoli, North
Dallaa	2	Natacha Saad St., Saida, South
Rizk	3	Zahar St., Beirut
Watani	3	Aley, Aley
El Assi	3	Hermel, Bekaa
Daher El Bashek	3	Roumieh, near Roumieh Prison
Zahle	3	Zahle
Abou Jaoudé	3	Jal El Dib, Metn
Mounla	3	Rue Mounla, Tripoli, North
Ala'eddine	3	Sarafand, South
St. Charles	3	Fayadieh, Baabda or Metn
El Bekaa	4	Taalabaya, Bekaa
ND Zghorta	4	Zghorta, North
St Georges Ortho	4	Rmeil St., Achrafieh, Beirut
Sacré Coeur	4	Hazmieh, Baabda
St Louis	4	Jounieh, Kesrouan
Medical 2000	4	Choueifat, Chouf
El Koura	4	El Koura, North
ND de la Paix	4	Akkar, Kobayat, North
Saida	5	Place of the Star, Saida
Beyrouth	5	Ramlet El Bayda, Beirut
Libanais	5	Jeitaoui St., Achrafieh, Beirut
Bahman	5	Haret Hreik, Adaimi St., Baabda
N.D Liban	5	Jounieh, Kesrouan
Akkar – Rahal	5	Halba, Akkar, North
Haykal	5	Haykalieh, Koura, North

Islamy	5	Azmy St., Tripoli, North
Sibline Governmental	6	Sibline
Khoury General H.	6	Zahleh, Bekaa
Sahel	7	Ghoubeiry, Baabda
St Thérèse	7	Hadath, Baabda
St Joseph	8	Daoura, Metn
Mont Liban	9	Hazmieh, Baabda
Nabatieh	10	Nabatieh Main Road
Labib Medical Center	10	Saida, South
N.D Secours	14	Jbeil, Jbeil
Jabal Amel	15	Tyr, South
Makassed	17	Tarik El Jadida, Beirut
Rassoul A'azam	18	Airport Avenue, Baabda
Rayak	18	Rayak, Bekaa
Hammoud Hosp UMC	17	Rue Dakerman, Saida, South
Hotel Dieu	23	Rue Adib Ishak, Achrafieh, Beirut
A.U.B	23	Hamra, Le Caire St., Beirut
Beirut Governmental	35	Bir Hassan, Beirut

APPENDIX 4

CONFIRMED PREGNANCY-RELATED DEATHS IN 2008

Patient	Hospital recording death	Age at death	Death Circumstances	ICD 10
1. JAMK	Al Makassed Beirut	30	Admitted on 25/7/2008 for intra-abdominal hemorrhage of unknown origin 6 hours after delivery. Patient was transferred to the ICU where further investigations revealed a hemorrhagic necrotic pancreatitis with triglycerides at 1200, amylase at 208, and lipase at 708. A tentative to drain the collection was documented. Patient then developed an ARDS and was intubated. She also had phlebitis and developed several nosocomial infections (not precised). Tracheostomy and a thoracic drain were performed on 14/8/2008. Patient died one week later (20/8/2008) of cardiac arrest.	O99.6/K85
2. MKC	El Youssef El Toubi Halba, Akkar	26	3rd trimester pregnancy presenting on 27/7/2008 for pre-eclampsia and placenta abruptia. Urgent C-section was performed. Patient presented a massive post-partum hemorrhage with hypovolemic choc, CIVD, and acute renal failure, so she was put on hemodialysis for 5 days. She then developed a septic choc of pelvic origin. On 13/8/3008 she was readmitted for a septic choc and an epileptic state. Imagery wasn't conclusive. Patient died on 02/09/2008.	O85
3. HKT	Dalla'a General Sour	31	Eclampsia	O15.1

4. SMY	Farhat Sour	42	6th month pregnancy presented for meningitis. Patient went into coma. An urgent C-section performed resulted in the delivery of a premature newborn and death of the patient after the surgery.	098.8/G03.9
5. SMS	Tatari Baalback	33	8th month pregnancy death on arrival. No direct cause of death documented. Probable pulmonary embolism.	088.2
6. AEC	St. Georges Orthodox Beirut	35	5th week pregnancy patient with severe diffuse myositis. MRSA myocarditis was diagnosed. Probably died of infectious cardiac failure.	008.0/I40.0
7. ZHS	Jabal Amel Sour	38	Uterine hemorrhage with pulmonary embolism.	088.2
8. MSS	Jabal Amel Sour	47	Massive uterine hemorrhage 5 days following her C-section operation.	072.2
9. RDK	Jabal Amel Sour	36	Death occurred 10 days after delivery. No direct cause of death documented.	095
10. HOH	Sibline	36	Pulmonary embolism that occurred following a C-section and the delivery of twins.	088.2
11. SRS	Watani Aley	35	Patient died during C-section delivery of her baby of uterine rupture, and subsequent bleeding.	071.1

12. ZFH	Shahar Aley	37	Patient known to be multipara admitted for a normal vaginal delivery, prior to delivery, patient had no known problems but only complained of periodic abdominal pain. During the delivery patient lost consciousness however a baby boy was delivered by forceps with APGAR score of 10. However upon loss of consciousness patient developed respiratory distress and bradycardia. No sign of abruption placenta, no bleeding. Patient resuscitation was started during delivery as the patient had cardiac arrest. Placenta was removed, however even though physician mentioned that the patient had a soft uterus prior to delivery, contraction of the uterus did not happen post-delivery, most likely because the mother had gone into bradycardia while delivering. Suspected amniotic fluid pulmonary embolism.	O88.1
13. GYM	N. D. du Secours Jbeil	41	32nd week pregnancy patient admitted for vaginal bleeding. Urgent C-section was performed for a case of placenta previa. Post incision placenta accreta reaching the bladder and the pelvis was noted. Surgery then performed hysterectomy, and multiple transfusions. However during the operation there was profuse bleeding, patient then had severe bradycardia and severe hypothermia and hypotension. Reanimated then admitted to ICU where she developed another episode of hypotension, bradycardia, resuscitated for 30 min, then developed an episode of cardiac arrest.	O44.1