Report On The Maternal Mortality Surveillance. Iraq, 2009

Ministry of Health

Maternal Death Surveillance and Response (MDSR) Iraq

2010-2012

NATIONAL MDSR COMMITTIE WHO WRITE MDSR REPORT 2010-2012

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to its completion. We also acknowledge the tremendous achievement of lowering the national maternal mortality ratio and strong support for the Maternal and Child Health Program has greatly contributed to this achievement.
A major study such as this is only possible through the help and collaboration of many people. We would like to express our thanks to all those whose great efforts and excellent work ensured the success and accuracy of the study.
The report was made possible by the work of a Central MDSR COMMITTIE, a and 20 Local MDSRGroups, from each
governorate, who supplied the detailed records and reports of the maternal deaths. Particular thanks are owed to the consultant obstetricians who determined the causes of maternal deaths.
. Members of the MDSR committee who collaborated in the study are shown in the last section of this report.
We would like to acknowledge with deep appreciation the hard work and invaluable contributions of all those named in this report and the support
. Many thanks are also due Dr. batool ali for her technical assistance in the preparation of the report.
It is my sincere hope that the recommendations from this report will contribute to our efforts to continue to reduce the number of pregnant women who die from avoidable causes.

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Abbreviations

ANC Antenatal care
APH Ante partum hemorrhage
CE Confidential Enquiries
CS Cesarean section
DOH Directorate Of Health
EMONC Emergency Obstetric Newborn Care

EOC Essential Obstetric Care
FD Female deaths
FETP Field Epidemiology Training Program (*A program in the Ministry of Health with the US Center s for Disease Control*.
IFHS Iraqi Family Health Survey
IMMS Iraqi Maternal Mortality Survey
DHS Demographic and Health Survey
HM/HC Healthy Mother/Healthy Child
ICD-10 International Statistical Classification of Diseases,Injuries and Causes of Death, Tenth Revision

MNCH Maternal ,Neonatal and child health
MD Maternal deaths
MDG Millennium Development Goals
MMR Maternal mortality ratio
MOH Ministry of Health
MRCOG Member of Royal College of Obstetrics and Gynecology
MS Masters of Science
NGO Non-governmental organization
NMMR National maternal mortality ratio
NMMS National Maternal Mortality Study
NCCEMD National Committee of Confidential Enquiries of Maternal Death
Obs/Gyn Obstetrics and Gynecology
PNC Post Natal Care
PPH Postpartum hemorrhage
RAMOS Reproductive Age Mortality Study
TBA Traditional birth attendant or daya
UNFPA United Nations Population Fund
UNICEF United Nations Children' s Fund
USAID United States Agency for International Development
WHO World Health Organization

Introduction

Maternal health refers to the health of women during pregnancy, childbirth and the postpartum period. While motherhood is often a positive and fulfilling experience, for too many women it is associated with suffering, ill-health and even death (1).

About 287 000 women died in 2010 of complications during pregnancy or childbirth. Most of these largely preventable deaths occur in low-income countries and in poor and rural areas and nearly all of these deaths can be avoided if the necessary medical interventions exist in time, yet in most of the developing countries the key obstacle is pregnant women's lack of access to quality care before, during and after childbirth (2).

More than 70% of all maternal deaths are due to five major complications: haemorrhage, infection, unsafe abortion, hypertensive disorders of pregnancy, and obstructed labour. The majority of maternal deaths (61%) occur in the postpartum period, and more than half of these take place within a day of delivery. An estimated 40% of pregnant women experience pregnancy-related health problems during or after pregnancy, and childbirth, with 14%suffering serious or long term complications. As a consequence, 300 million women suffer from pregnancy related health problems and disabilities, including anaemia, uterine prolapse, fistula, Pelvic Inflammatory Disorders (PID), and infertility (3).

Since the early nineties Columbia University School of Public Health mentioned that delayed treatment is the most important factor that affect the outcome of pregnancy. Delay in treatment is the result of many factors. These delays are described as the three phases of delay:

Delay I: Lack of information and adequate knowledge about danger signals during pregnancy and labour; cultural/ traditional practices that restrict women from seeking health care; lack of money.

Delay II: Out of reach of health facilities; poor road, communication network, community support mechanisms

Delay III: Inadequate skilled attendants; poorly motivated staff; inadequate equipment and supplies; weak referral system, procedural guides. The three main delay factors (distance, cost, and quality)are ultimately defined by illness-related behaviour (4).

The fifth Millennium Development Goal (MDG) aims at improving maternal health and targets reducing maternal mortality ratio (MMR) by 75% between 1990 and 2015, it seeks to achieve an expected 5.5% annual decline in MMR from 1990. Although, MMR has decreased annually at the global level from 585, 000 during 2005 to287 000 during 2010, yet to make the achievement of the fifth MDG a reality, MMR will have to decrease at a much faster rate (5).

For monitoring progress towards achievement of maternal mortality reduction, MMR and the proportion of births attended by skilled health personnel are the indicators. However, assessing the extent of progress towards the MDG5 target has been challenging, due to the lack of reliable maternal mortality data particularly in developing-countries where maternal mortality is high (3).

In Iraq, as in other developing countries, maternal mortality was usually underestimated, and the official rates depend on surveys rather than other registrations. Ministry of Health, in its effort to improve their registration system through the cooperation between Maternal and Child Health Section (Directorate of Public Health and Primary Health Care), Department of Health and Vital Statistics (Directorate of Planning and Resource Development) and the World Health Organization (WHO),

implement a special maternal mortality inquiry form for hospital registrations of maternal deaths on the year 2000, and eventually all professionals responsible for registration and prevention of maternal deaths (all over Iraq) were trained to record, supervise and study the deaths one by one. This form was revised and improved later to include more information regarding maternal mortality[6]. Although the registered numbers of maternal death were increasing after implementing the special form, still the numbers are away from the national numbers estimated by previous surveys; 117/ 100000 live births in 1990 according to Harvard University Study, 291/100000 live births in 1999 according to children and maternal mortality survey &193/100000 live births in 2004 according to Iraq Living Condition survey 2004 [7, 8], 84/100000 live births in 2007 according to Iraqi Family Health Survey (IFHS)(9) and 35/100000live births in 2012 according to Iraqi Poverty Map and Maternal Mortality Survey (IPMM)(10)

The objective of this review was to determine the yearly maternal mortality ratio over the period 2010-2012 and the trends of direct and indirect causes in Iraq. The observed trends in this review would help assess progress towards attainment of the millennium development goal on maternal health. Recommendations would then be made for improvement of maternal health. Maternal and neonatal mortality have already declined in the past two decades . the most recent estimates indicating that about 536000 women die every year from pregnancy-related causes demonstrate that, at the global level, maternal mortality has decreased at less than 1% annually between 1990 and 2005 . this is far below the 5.5% annual decline necessary to achieve the millennium Development Goal (MDG) of improving women's health by reducing maternal mortality . Ninety – nine percent of these deaths occur in developing countries

While the right of parents to determine freely and responsibly the number and spacing of their children was first articulated in the 1968 UN International Conference on Human Rights, the right of women to go through pregnancy and childbirth safely was first made explicit only in 1994 , as part of the program me of Action of the UN international Conference on Population and Development (ICPD) .

The definition of reproductive health included the right of access to appropriate health – care services that will enable women to go safely through pregnancy and childbirth and provide couples with the best chance of having a healthy infant .subsequently, three organization-WHO, United Nations Children's Fund (UNICEF) and United Nations Population Fund (UNFPA) declared that:

The right to life is a fundamental human right, implying not only the right to protection against arbitrary execution by the state but also the obligations of governments to foster the conditions essential for life and survival.

Methodology

This report was prepared in the Ministry of Health (MOH) - Iraq, Public Health Directorate, Maternal and Child Health Section. This section is responsible for supervising, planning, implementation, monitoring and evaluation for nearly all the services and programs related to maternal and child health. Reports regarding maternal deaths from all Iraqi governorate; Baghdad, Najaf, Karbala, Muthana, Waset, Mesan, Dewaney, Theeqar, Deyala, Salah el deen, Kirkuik, Basrah, Duhuk, Slemania, Arbil, Mousel, and Anbar during 2010 – 2012 were reviewed and studied.

Data related to number of live births was obtained from Directorate of Planning and Resource Development, Department of Health and Vital Statistic in the Ministry of Health (MOH) to calculate Maternal Mortality Ratio (MMR).

All records of maternal death during (2010-2012),results of autopsy reports from The Institute of Forensic Medicine, Registered deaths of all women in reproductive age group (12-49) year and the results of Rapid Ascertainment of Institutional Death (RAPID) were reviewed during 2013.

In Iraq the process of registering maternal deaths starting from the place of death where the detailed information, history and management notes should be documented in the special form of maternal death. All maternal deaths that took place in hospitals should be notified within 24 hours to hospital authorities and manager of Maternal and Child Health Services Unit at the Directorate of Health. Maternal mortality committee meeting should be held as soon as possible to discuss the event, identify the defects or weakness, if any a plan of action should be discussed at DOH –MDSR Committee to take action and then a detailed report with a copy of case sheet, death certificates and notes of attending obstetrician will be send to the MOH. At MOH each maternal death is discussed by the national committee to identify what can be done more to prevent future similar conditions and to reduce maternal death. Then a feedback should be send to the directorate to take action.

Copies of:-

1. The official maternal mortality form adopted by the Ministry of Health- Iraq is available at Appendix (A).
2. A list of MDSR Committee at Hospital, Directorate of Health, Ministry of Health and Community levels are available at Appendix (B).

3. Case summary form is available at Appendix (C).

Statistical Analysis:-

The data were coded and each questionnaire was assigned a serial identifier number, after that the data was entered by the researcher into the computer using The Statistical Package for Social Sciences (SPSS) version 17.0.

Data were summarized using standard descriptive statistics, tables and graphs of categorical and numerical variables. Associations between categorical variables were assessed via chi-square. In all statistical analyses, a P value <0.05 was considered to be significant.

Operational Definition:-

- ✓ The maternal mortality ratio: is the number of maternal deaths during a specified time period per 100 000 live births during the same specified period.

The maternal mortality ratio is calculated as:

All maternal deaths occurring within a reference period (usually 1 year) X 100000

Total number of live births occurring within the reference period[12]

4. Parity is a technical term that refers to the number of time a female has given birth to a baby.[13]

   A woman who has not given birth before pregnancy before is nullipara.

   A woman who has given birth once before is Primiparous, and would be referred to as a Primip ara or Primip.

A woman who has given birth to two or more times is Multiparous, and is called a Multip.

Grand multipara refers to a (Grand multiparous) woman who has given birth to five or more times.[14]

5. Pregnancy is typically broken into three periods, or trimesters, each of about three months first trimester 1-13 week, second teimester13to28 week, the third trimester 28 to the end of pregnancy, trimester as lasting for 14 weeks, resulting in a total duration of 42 weeks, although the average duration of pregnancy is actually about 40 weeks.[15, 16]

Analysis

Ministry of Health, Iraq in its effort to improve the registration of maternal mortalities follow many pathways to document and investigate every maternal death, assess the health services provided for the deceased woman and identify areas of substandard care aiming to prevent future similar situations and achieving the fifth Millennium Development Goal. To achieve these targets maternal mortalities are registered in Iraq from many sources; from hospitals all over Iraq by specially organized form, from forensic medicine, maternal mortality surveys, maternal mortality rapid assessment and verbal autopsy. During 2010; 281 maternal deaths were registered all over Iraq, this number jumped to 35٨ during 2011 and to 400 during 2012. Maternal Mortality Ratio (MMR) was 23.1 per 100000 live births [(*)]during 2010 increased to 31.1 per 100000 live birth during 2012 (Table (1))

Table (1): Live births, maternal deaths and maternal mortality ratio in Iraq by year of occurrence

Year	Live birth	Maternal deaths	
		No.	Maternal Mortality Ratio (per100000live births)
2010	1216945	281	23.1
2011	1261787	358	28.4
2012	1285280	400	31.1

Reviewing the age distribution of the deceased women revealed thattheir age ranges from 14-49 with the mean age of 31.0 ± 7.57 years during 2010, 30.٨± 7.٣ years during 2011 and 30.3 ± 7.4 during 2012, the median age was 31 during 2010 and 30 during 2011 and 2012. Higher percentage of maternal deaths was among women aged 30-39 (40.2%, 45.0% and 40.8% during 2010, 2011 and 2012 respectively) followed by those aged 20-29 years of age (38.1%, 32.7% and 33.0% during 2010, 2011 and 2012 respectively) (Table 2).

Table (2) Age distribution of the deceased women by year of death

Age in years	Diseased Mothers					
	2010		2011		2012	
	No.	%	No.	%	No.	%
Age groups						
Below 20	18	6.4	24	6.7	31	7.7
20-29	107	38.1	117	32.7	132	33.0
30-39	113	40.2	161	45.0	163	40.8
40 and above	43	15.3	52	14.5	47	11.8
Not recorded	0	0.0	4	1.1	27	6.7
Total	281	100.0	358	100.0	400	100.0
Range	15-49		14 – 48		14 – 47	
Mean age in years ±Sd	31.0± 7.57		30.٨ ± 7.٣		30.3 ± 7.4	
Median	31		3٠		30	

Table 3, figures 1, 2 and 3 showed the numbers of deceased mothers and maternal mortality ratio (MMR) by governorate during 2010, 2011, and 2012. It was found that during 2010 Kerbala was with the highest MMR (36.6/100000 live birth), Kerkuk came in the second place 29.5/100000 live births, Thiqar ranked the third with MMR of 29.1/100000 live birth, and the least registered MMR was in AL-Anbar governorate 5.7/100000 live births.

During 2011 Deyala was with the highest MMR (62.3/100000 live birth), Dohuk came in the second place 60.3/100000 live births, Thiqar ranked the third with MMR of 44.4/100000 live birth, and the least registered MMR was in Nenawa governorate 11.6/100000 live births.

During 2012 Deyala, although less than the previous year, remained with the highest MMR (42.5/100000 live birth), Basrah came in the second place 41.5/100000 live births, Baghdad ranked the third with MMR of 39.1/100000 live birth, and the least registered MMR was in AL-Muthana governorate 5.7/100000 live births.

The registration in Kurdistan region improved during 2011 and 2012. Still some governorates need to improve the quality of their surveillance.

Table (3): Deceased mothers by governorates and year of death

Governorates		2010			2011			2012		
		No.	Live births	MMR	No.	Live births	MMR	No.	Live births	MMR
Baghdad		**66**	**246370**	**26.8**	**84**	**261018**	**32.2**	**99**	**253061**	**39.1**
Anbar		3	52611	5.7	8	54568	14.7	12	57934	20.7
Babil		10	63337	15.8	19	63649	29.9	16	64027	25.0
Kerbala		16	43719	36.6	10	42603	23.5	16	44304	36.1
Najaf		11	48850	22.5	15	50268	29.8	16	50379	31.8
Salahdeen		12	46817	25.6	8	52278	15.3	16	54791	29.2
Wasit		8	49001	16.3	11	54882	20.0	20	58159	34.4
AL Qadesia		6	40282	14.9	10	41481	24.1	10	41476	24.1
Thiqar		19	65301	29.1	30	67601	44.4	22	65699	33.5
AL-Muthana		6	31526	19.0	7	31722	22.1	2	35177	5.7
Maysan		8	41207	19.4	9	40435	22.3	10	42318	23.6
Deyala		9	55347	16.3	35	56217	62.3	26	61123	42.5
Basrah		28	100195	27.9	26	100631	25.8	42	101326	41.5
Nenawa		36	137765	26.1	17	146040	11.6	36	146866	24.5
Kerkuk		14	47386	29.5	13	50667	25.7	19	54791	34.7
Kurdistan	**Erbil**	4	52605	7.6	15	51067	29.4	14	55467	25.2
	Sulaymania	14	50103	27.9	12	48600	24.7	12	46221	26.0
	Dohuk	11	44523	24.7	29	48060	60.3	12	51960	23.1
Total		281	1216945	23.1	358	1261787	28.4	400	1285280	31.1

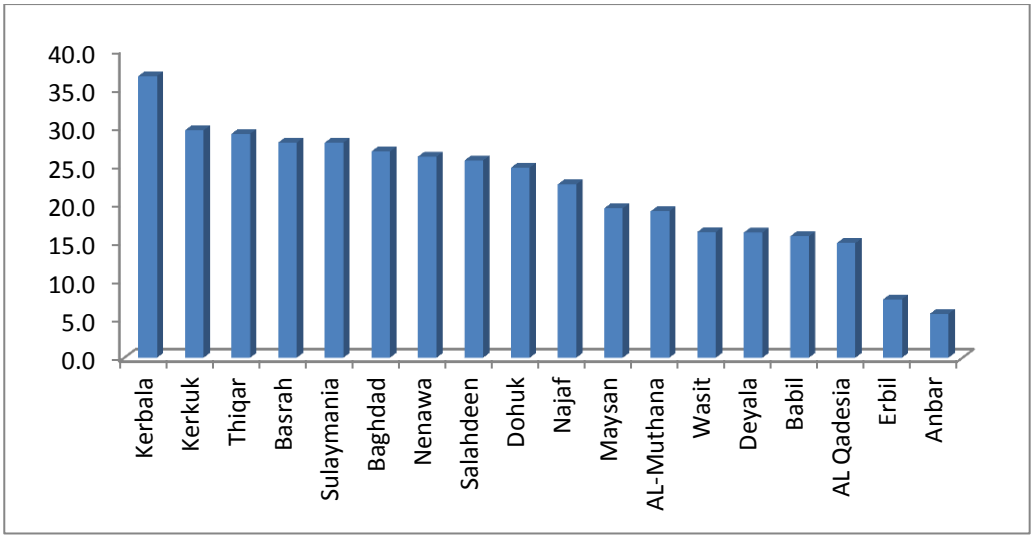

Figure 1:Maternal Mortality Ratio by governorates during 2010

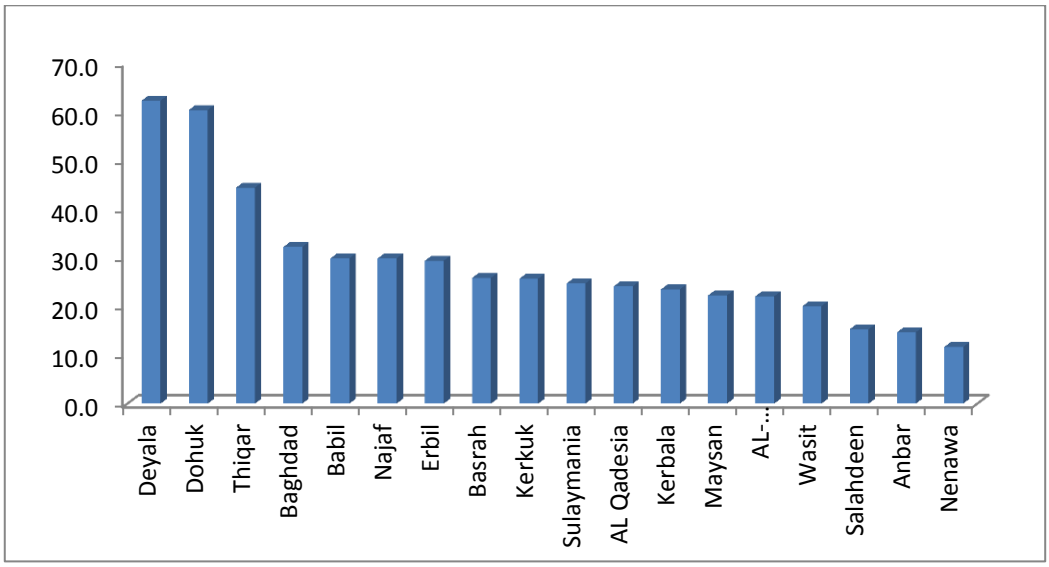

Figure 2:Maternal Mortality Ratio by governorates during 2011

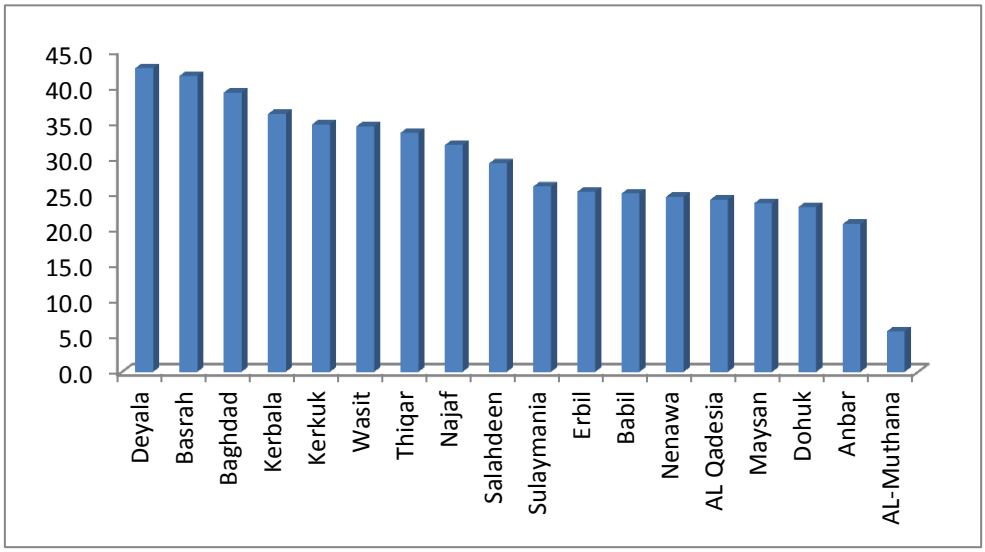

Figure 3:Maternal Mortality Ratio by governorates during 2012

ANC attendance, type of delivery, birth attendance and pregnancy outcome

Regarding attending ANC services during their current pregnancy, although this information was not registered for all deceased women (not mentioned in 13.5%, 1.4% and 12.5% during 2010, 2011and 2012 respectively) yet table 3 showed that the percentage of attending ANC services was increasing from 36.3% during 2010 to 48.5% during 2012. Type of delivery was also not found in all forms but during 2010 the rate of CS (43.8%) was more than the rate of NVD (34.1%) among the deceased women, whereas the opposite was true during 2011 and 2012 as the rate of NVD (42.7% during 2011, 36.0% during 2012) were more than the rate of CS (25.4% during 2011, 25.7% during 2012) for both years. (Table 4).

Traditional birth attendance interference was found in 18.4% during 2010 increased to 29.0% during 2011, showed slight reduction during 2012(28.5%), and live baby was the outcome of only 34.8% during 2010, 39.1% during 2011 and 33.4% during 2012 (Table 4).

Table (4): Deceased mothers by ANC attendance, type of delivery, birth attendance and pregnancy outcome

Variable	Diseased Mothers					
	2010		2011		2012	
	No.	%	No.	%	No.	%
ANC attendance						
Yes	102	36.3	170	47.5	194	48.5
No	141	50.2	183	51.1	156	39.0
Not mentioned	38	13.5	5	1.4	50	12.5
Total	281	100.0	358	100.0	400	100.0
Type of delivery						
NVD/Assisted VD	96	34.1	153	42.7	144	36.0
CS	123	43.8	91	25.4	103	25.7
No delivery	37	13.2	79	22.1	119	29.8
Not mentioned	25	8.9	35	9.8	34	8.5
Total	281	100.0	358	100.0	400	100.0
TBA interference						
Yes	45	18.4	81	29.0	80	28.5
No	80	32.8	125	44.8	189	67.2
Not mentioned	119	48.8	73	26.2	12	4.3
Total	244	100.0	279	100.0	281	100.0
Pregnancy outcome						
Live baby	85	34.8	109	39.1	94	33.4
Dead baby	68	27.9	75	26.9	64	22.8
Not mentioned	91	37.3	95	34.0	123	43.8
Total	244	100.0	279	100.0	281	100.0

Gravidity

During the three years most of the deceased women have 1-4 pregnancies (43.3%, 45.5%, 46.5% during 2010, 2011 and 2012 respectively) and 5 and above (38.4%, 24.9%, 6.7% 2010, 2011 and 2012 respectively).Information about gravidity was not available in up to 12.5% during 2012 (Table 5).

Table (5): Deceased mothers by gravidity

Gravidity	Deceased Mothers					
	2010		2011		2012	
	No.	%	No.	%	No.	%
Primi	47	16.7	72	20.1	57	14.3
(2-4)	122	43.3	163	45.5	186	46.5
5 and above	108	38.4	89	24.9	107	26.7
Not available	4	1.6	34	9.5	50	12.5
Total	281	100.0	358	100.0	400	100.0

Place of delivery

More than half the deceased mothers delivered at health facilities (51.6%) during 2010, increased to 66.7% during 2011 and to 75.4% during 2012, although in more than a quarter of the cases (27.5%) place of delivery was not mentioned during 2010, yet this was decreased to 11.8% during 2011 and to 0.4% during 2012 (Table 6).

Table (6): Deceased mothers by place of delivery

Place of delivery	Deceased Mothers					
	2010		2011		2012	
	No.	%	No.	%	No.	%
No delivery (during pregnancy)	37	13.2	79	22.1	119	29.8
Home /Nurse/ Midwife/ TBA	51	20.9	60	21.5	68	24.2
Health facilities	126	51.6	186	66.7	212	75.4
Not mentioned	67	27.5	33	11.8	1	0.4
Total	244	100.0	279	100.0	281	100.0

Time of death

Higher proportion of deaths took place during puerperium (56.6%, 44.1% and 48.0% during 2010, 2011 and 2012 respectively), death during pregnancy increased from 11.7% during 2010 to 25.3% during 2012,

during labor it was 4.6% during 2010 increased to 26.0% during 2011 and decreased to 17.0% during 2012 (Table 7), and 61.6% of the cases died in health facilities during 2010, 76.3% during 2011 and 70.8% during 2012, whereas death outside health facilities showed slight reduction from 18.5% during 2010 to 16.2% during 2012 of them 5.7% died on the road before reaching the health facilities during 2010, increased to 6.4% during 2011 and reduced to 3.2% during 2012 (Table 8).

Table (7): Deceased mothers by time of death

Time of death	Deceased Mothers					
	2010		2011		2012	
	No.	%	No.	%	No.	%
During pregnancy	33	11.7	92	25.7	101	25.3
During Labor	13	4.6	93	26.0	68	17.0
During puerperium	159	56.6	158	44.1	192	48.0
Abortion	76	27.1	15	4.2	39	9.7
Total	281	100.0	358	100.0	400	100.0

Table(8): The deceased mothers by place of death

Place of death	Deceased Mothers					
	2010		2011		2012	
	No.	%	No.	%	No.	%
Home	36	12.8	42	11.7	52	13.0
Road	16	5.7	23	6.4	13	3.2
Health facilities	173	61.6	273	76.3	283	70.8
Not mentioned	56	19.9	20	5.6	52	13.0
Total	281	100.0	358	100.0	400	100.0

Cause of death

Postpartum hemorrhage was the first cause of death during the three years (29.9%, 24.3% and 21.0% during 2010, 2011, and 2012 respectively) followed by pulmonary embolism (16.7%, 14.8% and

18.5% during 2010, 2011, and 2012 respectively), and the third place was left for hypertension (15.3%, 11.0%) during 2010 and 2012 respectively whereas heart problem occupied the third place among causes of death (11.4%) during 2011 and the forth place (5.8%) during 2012. APH (6.1%) was the 4th cause of death during 2010 and hypertension (10.9%) was the 4th cause during 2011, leaving the 5th place for sepsis (5.7%, 6.4% and 4.2%) during 2010, 2011 and 2012 respectively. Still a considerable number of deaths remained without definite cause (Table 9).

Table (9):Maternal deaths by cause of death as documented in the registration forms and forensic medicine reports during 2010-2012

Causes of death	Deceased Mothers					
	2010		2011		2012	
	No.	%	No.	%	No.	%
Post-partum hemorrhage	84	29.9	87	24.3	84	21.0
Pulmonary embolism	47	16.7	53	14.8	74	18.5
Hypertension	43	15.3	39	10.9	44	11.0
Sepsis	16	5.7	23	6.4	17	4.2
Obstructed labor/ rupture uterus	11	3.9	20	5.6	12	3.0
Bleeding during early pregnancy (before 22 weeks)	2	0.7	5	1.4	8	2.0
Ante partum hemorrhage	17	6.1	19	5.3	11	2.7
Renal disease	5	1.8	7	2.0	11	2.7
Heart problems	15	5.3	41	11.4	23	5.8
Liver disease/ failure	7	2.5	10	2.8	8	2.0
Others	12	4.3	23	6.4	39	9.8
Unknown/ (Forensic Medicine)	22	7.8	31	8.7	69	17.3
Total	281	100.0	358	100.0	400	100.0

Maternal deaths due to direct obstetrical causes decreased from 84.9% during 2010 to 75.8% during 2011 and 2012 whereas maternal deaths due to indirect causes increased from 15.1% during 2010 to 24.8% during both 2011 and 2012 (figure 4).

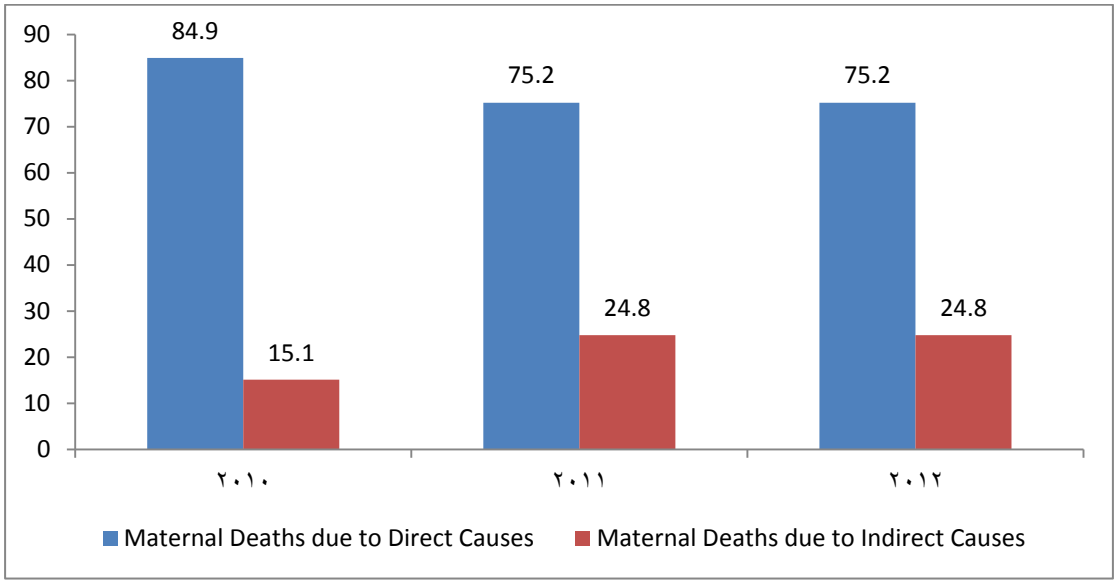

Figure 4: Distribution of Maternal Mortality by Direct and Indirect Causes during 2010-2012

Table (10), showed the association between causes of death and gravidity, although hypertension was higher among primi (15.3%) than gravid 1-4 (14.3%) and gravid five and more (10.7%), APH was higher among gravid five and more (33.3%) than both primi (22.7%) and gravid 1-4 (22.4%), yet among all, PPH was the first cause, PE was the second cause and hypertension was the third cause and the association was statistically significant ($\chi 2=40.7$, df=30, P=0.004) (table 10).

Table (10) Distribution of the deceased by Gravidity and cause of death

Causes of death	Gravidity**						Total*
	Primi		Gravida2-4		Gravida 5 and more		
	No.	%	No.	%	No.	%	
Bleeding during pregnancy	1	0.6	9	2.1	4	1.7	14
APH	7	4.3	14	3.2	18	7.7	39
PPH	37	22.7	97	22.4	78	33.3	212
Obstructive labor/rupture uterus	5	3.1	21	4.8	12	5.1	38
Hypertension	25	15.3	62	14.3	25	10.7	112
Sepsis	9	5.5	29	6.7	12	5.1	50
Pulmonary embolism	34	20.9	90	20.7	46	19.7	170
Renal disease	5	3.1	9	2.1	7	3.0	21
Heart diseases	19	11.7	44	10.1	19	8.1	82
Liver diseases	10	6.1	10	2.3	2	0.9	22
Others	11	6.7	49	11.3	11	4.7	71
Total	163	**100**	434	**100**	234	**100**	831

*Cases in which the gravidity and /or cause of death was not recorded were excluded

**($\chi 2$=40.7 ,df=30, P=0.004).

Table (11) showed the association between age groups and causes of deaths; among those aged less than 20 years the highest cause was postpartum hemorrhage was the first cause of death among all age groups (31.3% among those below 20 years of age, 26.8% among deceased women aged 20-29, 23.8% among 30-39 years and 26.2% among deceased women aged 40 years and more. Hypertension was the second cause of death among deceased women aged less than 20 years (21.3%) while pulmonary embolism was the second cause among older age groups (19.6%, 22.2%, and 22.2% for deceased women aged 20-29, 30-39 and 40+ years respectively). The association between age and the cause of deaths was statistically significant ($\chi 2$=51.9, df=27, P=0.008).

Table (11); Distribution of the deceased by age* and cause of death

Cause of death	Age Groups								Total
	Below 20		20-29		30-39		40 and above		
	No.	%	No.	%	No.	%	No.	%	
Bleeding early during pregnancy /APH	2	3.3	15	5.2	23	6.2	13	10.3	53
PPH	13	21.3	78	26.8	88	23.8	33	26.2	212
Obstructive labor / rupture uterus	1	1.6	7	2.4	24	6.5	5	4.0	37
Hypertension	13	21.3	36	12.4	57	15.4	10	7.9	116
Sepsis	4	6.6	22	7.6	19	5.1	7	5.6	52
Pulmonary embolism	7	11.5	57	19.6	82	22.2	28	22.2	174
Renal disease	4	6.6	6	2.1	11	3.0	2	1.6	23
Heart disease	4	6.6	14	4.8	4	1.1	1	0.8	23
Liver disease	3	4.9	27	9.3	36	9.7	17	13.5	83
Others	10	16.4	29	10.0	26	7.0	10	7.9	75
TOTAL	61	**100**	291	**100**	370	**100**	126	**100**	848

*Cases in which the age and /or cause of death was not recorded were excluded

** Statistically significant association ($\chi 2=51.9$, df=27, P=0.008)

Figure 4 showed that referral to Forensic Medicine Institute was increased from 8% during 2010 to 18% during 2012.

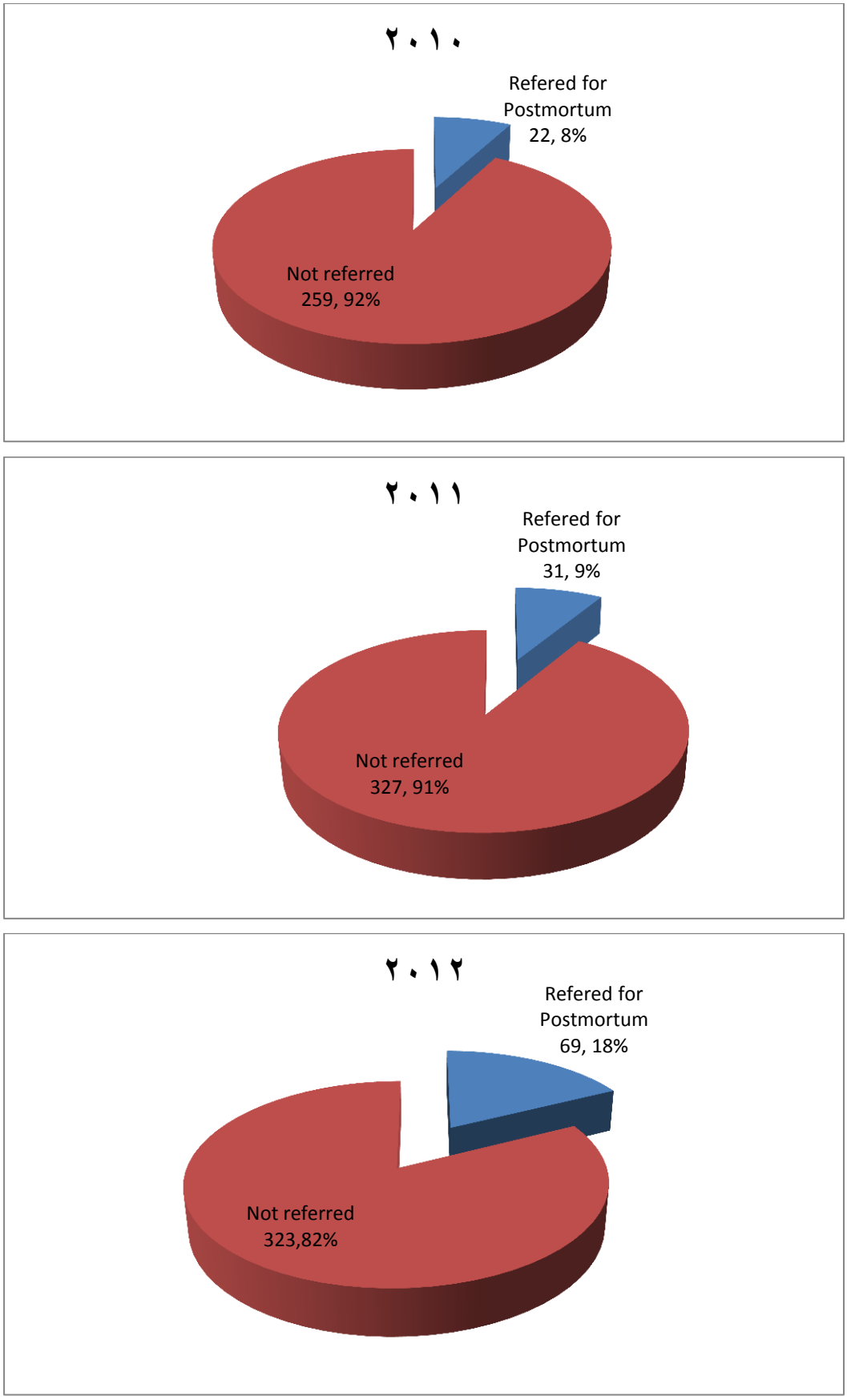

Figure 4: Deceased mothers by referral to post-mortem examination

Conclusions

While early declines in maternal mortality were achieved in most counties in western Europe and North America in the first half of the 20th century, similar downward trend in maternal and neonatal mortality did not occur in countries of the developing world . It was not until the late 20th century that maternal mortality started to be recognized as public- health concern . The International Safe Motherhood Initiative, Launched in 1987 , gave a huge input

6. Maternal mortality ratio in Iraq reached 31.1/100000 live birth during 2012 nearly approaching the ratio obtained by Iraqi Poverty Map &Maternal Mortality (IPMM) survey 2012.
7. During 2010; the highest MMR was registered in Karbala governorate (36.6/100000 live birth), whereas during 2011 and 2012 the highest MMR was registered in Deyala governorate (62.3/100000 live birth& 42.5/100000 live birth during 2011 and 2012 respectively).
8. Maternal deaths from direct causes contribute to nearly three quarters of cases during 2011 and 2012 leaving one quarter for the indirect causes
9. Regarding the direct causes of death:
10. Postpartum haemorrhage remained the first cause of death during the period 2010 -2012
11. Pulmonary embolism took the second place during the studied period
12. Hypertensive disorders of pregnancy ranked three among the commonest causes of death during 2010 and 2012 whereas during 2011 it was preceded by heart disease which is one of the indirect causes of death.

13. Regarding the indirect causes of death; the commonest causes were:
14. Heart diseases: which rank the third cause of death among all during 2011
15. Renal diseases: which increased from 1.8% during 2010 to 2.7% during 2012
16. Liver diseases: which ranged from 2.5% during 2010 to 2% during 2012
17. Regarding the age most of the deceased were among 30-39 years age
18. Muligravidal mother are at high risk of death
19. Stage of death; postpartum death contribute higher percent of maternal deaths
20. Place of death mostly in health facility.

Recommendations

Further reduction in maternal mortality is likely to be contingent on the continued strengthening of health systems and improving the knowledge and capacity of women to maintain their health. The 2009 NMMS report makes a range of recommendations for improving antenatal care, referral linkages, hospital management, pre-service and in-service training of health providers, and management of obstetric emergencies. It also recommends actions to ensure that women and their families are better informed about the importance of family planning and antenatal care, and to ensure that they recognize and act on complications during pregnancy and delivery.

The Ministry of Health is committed to implementing the recommendations of the 2009 NMMS to continue to revise and review

medical training, preventive programs, and maternal health services, as part of its continuing efforts to further reduce maternal mortality in Iraq

Preventing and reducing maternal deaths is not the responsibility of Ministry of Health alone, it needs the collaboration of all involved sectors, so the recommendations will be directed to all sectors:

1st -Higher Policy Level:-

--Political Commitment; after the approval of Maternal – Child and Reproductive Health (MCH-RH) Strategy (2013 -2017) strong political commitment is needed to support the implementation of the strategy on the ground.

--Establishment of National Maternal Death Surveillance and response committee; chaired by his Excellency the Prime Minister and members from all Deputy Ministers in all relevant Ministries, aiming to accelerate the process of preventing and reducing maternal deaths to achieve the fifth Millennium Development Goal (MDG 5).

2nd -Health System

--Sharing the Report of Iraqi Maternal Death Surveillance and Response (IMDSR) with the Iraqi Program of Health System Modernization (IPSM), to enhance the already existing **services and established the needed services to improve maternal health.**

3rd -Service delivery

--Postnatal care; as most of maternal deaths occur during post natal period, it is important to support the establishment of a post-delivery wards and mandatory stay of delivered mothers for at least 24hrs in NVD and 48hrs in CS, and serve them with medical, nutritional and counselling care.

4th -Protocols Referring to the previous maternal Mortality Report, protocols on the management of important conditions causing maternal deaths were established by MOH, and training courses were conducted, yet these are not used properly by all health care providers. Proper monitoring and supervision is important to put them in action.

5th----Criteria for referral and referral routs must be strengthen to be utilized appropriately in all facilities including emergency transport facilities. This will achieved by availability of well-equipped ambulances with communicating devices and trained staff, together with the implementation of **Shout for Help group** to be prepared for receiving emergency cases aiming to prevent the delay in timely accessing health services.

6th---Adopting mother friendly health facilities to improve maternal health care services.

MD Measurement

1-Continue to develop and adapt tools to measure matemal death . Impact tools are meet to be adapted according to the particular context and unique needs of a country or programme . the tools are new ; so they (and the resulting data) will become stronger as they are refined and used in a variety of different setting and for different purposes .

2-Estimate maternal death using data from different sources . New analytical methods should be developed to combine information about maternal deaths from different sources , while, taking into account geographic or socio- economic differences in populations and imperfections in the data sources .

3-Develop models to identify effective safe motherhood strategies .

Decision- makers and those in charge of allocating resources need to know which strategies are most likely to reduce maternal deaths in their countries . safe motherhood programmers are usually complex and their results strongly depend on the conditions of the country or area in which the program me is carried out . these factors make it difficult to drow general conclusions from an evaluation of one program me and – use the information to design future programmes . However ,Impact has begun to develop a model which incorporates important (contextual) Information to identify which strategies will be most likely to reduce maternal deaths in different settings .

4-Focus on levels of maternal death within countries and not only national Ievels .To most effectively target human and financial resources, attention must be directed at groups and areas that are most at risk of maternal death . information on the distribution of maternal death within countries, comparing urban and rural areas, for example, will point decision- makers to the areas in greatest need .

5-Use partnerships to improve the quality and availability of maternal death data . The current demand for estimates maternal mortality provides renewed momentum to improve routine information systems and enhance existing measurement methods and tools .

Meeting the demands for better maternal death measurement requires partnering at multiple levels and among the various groups working on data collection, programme planning, and policy development .

*Three barriers- financial, physical, and functional- to one of the key indicators of progress . Was to scale up coverage of deliveries by midwives, working in teams in health centres .

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