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MATERNAL MORTALITY IN NINEVEH GOVERNORATE 2018-2019

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ABSTRACT

Background: Maternal death due to pregnancy or labor complications is a tragedic end because it is preventable and treatable. **Aim:** Describe women death in childbearing age in Nineveh governorate 2018-2019. **Methods:** A Biometry study used to review a records of 55 deceased mothers during 2018-2019. The study extended from 1st Feb-June 2020, using standardized maternal mortality inquiry forms adopted by Ministry of Health. **Result:** The study showed that 4(12%) of deceased mothers in age less than 20 years and 13(39%) in age more than 35 years were seen during 2019, death of women in age 20-34 years more frequently seen during 2018. Visit to antenatal care was 18% and 49% and no improvement in provision of health services in health institution during 2018-2019 respectively. Delivery in health institution slightly increase from 73% to 79% with minimum increase in percentage of cesarean section 36% during 2018 and 39% during 2019. Death in health institution more frequent during 2019 than 2018 it was 82 % and 73% respectively, and death during puerprum specially in 1st 24 hrs was decrease in 2019 than 2018. Death can be prevented in 17 (77)% and 31(94%) during 2018- 2019. The most common causes of death were hemorrhage, complication of hypertension and PET and pulmonary embolism. **Conclusion:** Although there was increase awareness of deceased women to seeking medical advice during pregnancy but the quality of health care services provided to them were unacceptable. **Recommendation:** Provision of emergency obstetric care in central and remote maternity hospital to reduce maternal mortality.

KEYWORD: Mothers death, women death, deceased women.

INTRODUCTION

Maternal mortality is one of the fundamental component of population changes and a good indicators of a population's standard of living and health care, Women death due to pregnancy or labor complications is a tragedic end because it can be prevented and treated.[1] Maternal death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.[2] The most important indices used to measure women death are maternal mortality ratio (MMRatio)which is divide the number of maternal deaths a given year by live births in that year per 100,000, while maternal mortality rate (MMRate) divide the number of maternal deaths by the number of women of childbearing age in the population per 100,000.[3] Measuring maternal mortality accurately is difficult in absences of comprehensive registration and causes of death, that why using census, surveys or models to estimate levels of maternal mortality to identify maternal deaths, reproductive-age mortality studies coupled with record review and/or verbal autopsy can be used. population-based household surveys using the sisterhood method is very specific but difficult and required time, money and equipment.[4] The most common complications of all maternal deaths are (severe bleeding, infections, high blood pressure during pregnancy, complications from delivery, and unsafe abortion).[5] The main factors that prevent women from seeking care: poverty, distance to facilities, lack of information, inadequate and poor quality services and cultural beliefs and practices.[6] Safe motherhood, sexual and reproductive health is the component of women health services, all women should have access to the information and services provided to him that is the context of primary health care.[7] WHO 2019, reported that worldwide daily mothers death during 2017 approximately 810 from preventable causes, 94% of

mother death occur in low-middle income counties with MMRatio 38%, in developing countries like Uganda was found to be 462 per 100,000 live births whereas the MMRatio for high income countries was 11 per 100,000 live births.[4] Skilled care before, during, and after childbirth can save the lives of women.[8] In Iraq, maternal mortality surveillance has been lacking a systematic approach, to bridge this gap, the Ministry of Health(MoH) took the initiative to form a Technical Committee on Maternal Mortality tasked with creating a national-level system to provide a systematic monitoring with reliable data necessary for the measurement of this essential indicator.[9]

The aim of present study to highlighted on the important point on women death in childbearing age in Nineveh governorate 2018-2019

SUBJECTS AND METHODS

Ethical and scientific approval was received from Nineveh Health Directorate. A Biometry study design was used to review 55 records of deceased mothers 2018-2019. The study extended from 1st Feb-June 2020. All maternal mortality information taken from standardized inquiry forms that adapted by Ministry of Health since 2000, contain the following items: Demographic and personal data (age, residence, occupation, education), obstetric and reproductive history (duration of present pregnancy, no. of children, no. of abortion, previous (obstetric, medical, surgical, drug, family) history, antenatal care, date of (admission, delivery and death), place of (delivery and death), complications that occurred during (pregnancy, delivery, and puerperium), referral and transportation problem, pregnancy out-come, sex of baby, cause of death according to medical record, predisposing factors, sending of deceased mothers, results of post-mortem examination and prevention level. The maternal death committee take part of the information from the death certificate, hospital and medical record, and interview with (parents, relatives, husband, friends, and providers of care during delivery and the postpartum period). Data were tabulated, categorized, and analyzed using SPSS (version 23) software program. Simple percentage were used and put in suitable tables and figures. Using X^2 to study the association between two variable with p- value equal or less than (0.05).

The maternal mortality ratio is calculated as:

$$\frac{\text{All maternal deaths occurring within a reference period (usually 1 year)}}{\text{Total number of live births occurring within the reference period}} \times 100000$$

The maternal mortality rate is calculated as:

$$\frac{\text{All maternal deaths occurring within a reference period (usually 1 year)}}{\text{Total number of women in child bearing age within the reference period}} \times 100000$$

RESULT

Table (1): Deceased mothers by their characteristics.

Category	2018 Total No.(22)		2019 Total No. (33)	
	NO.	%	No.	%
Age group in years				
< 20	2	9	4	12
20-34	14	55	16	49
≥ 35	6	36	13	39
Residence				
Rural	11	41	17	52
Urban	9	50	15	45
Unknown	2	9	1	3
Education				
Illiterate	1	5	6	18
Primary	1	5	7	21
Secondary	1	5	2	6
University and Higher education	0	0.0	1	3
Unknown	19	85	17	52
Occupation				
Employed	0	0.0	1	3
Unemployed	0	0.0	17	52
Unknown	22	100	15	45

Deceased mothers by their characteristics seen in Table 1 as 4(12%) of deceased mothers in age less than 20 years and 13(39%) in age more than 35 years during 2019 death of women in age between 20-34 years more

frequent during 2018. More than four fifth (85%) of deceased mothers their education status was unknown during 2018 if it compeer with 2019 as 52%. Regarding occupational status during 2018, all deceased mother were unknown occupational status while 45% of them during 2019.

Table (2): Percentage distribution of deceased mothers by presence on antenatal care, risk factors and midwife intervention.

Category	2018 Total No.(22)		2019 Total No. (33)	
	NO.	%	No.	%
Presence of antenatal care				
Yes	4	18	16	49
No	2	9	4	12
Unknown	16	73	13	39
Scoring risk factors				
No risk factors	0	0	1	3
Low (0-2)	9	41	18	55
Moderate (3-6)	9	41	14	42
Unknown	4	18	0	0
Midwife intervention				
Yes	3	14	5	15
No	16	73	28	85
Unknown	3	13	0	0

Table 2 showed that presence of antenatal care were 18% and 49%, more than one third of deceased women had moderate risk factors as 41%, 42%. Midwife intervention was 14% during 2018 and15% during 2019.

Table (3): Deceased mothers by parity, place, and type of delivery.

Category	2018 Total No.(22)		2019 Total No. (33)	
	NO.	%	No.	%
Parity				
No child	6	27	10	30
< 4	7	32	8	25
≥ 4	9	41	13	39
Unknown	0	0.0	2	6
Place of delivery				
Health institution	16	73	26	79
House	4	18	2	6
Road	0	0	1	3
No labor	1	5	3	9
Unknown	1	5	1	3
Type of delivery				
Normal vaginal delivery	12	54	16	49
Cesarean section	8	36	13	39
No labor	1	5	3	9
Unknown	1	5	1	3

Deceased mothers who had four and more child 41% , 39%, delivery took place in health institution seen in 73%, 79%, and percentage of cesarean section 36% during 2018 and 39% during 2019. This is seen in Table 3.

Table (4): Deceased mothers by pregnancy outcome and sex of baby.

Category Category	2018 Total No.(22)		2019 Total No. (33)	
	NO.	%	No.	%
Pregnancy out come				
A life	17	78	22	67
Dead	3	13	9	27
Unknown	2	9	2	6
Sex of baby				

Male	11	50	23	70
Female	5	23	7	21
Unknown	6	27	3	9

Table 4 depict that pregnancy outcome with a life baby were 78% and 67%, half and nearly three fourth of pregnancy outcome were male during 2018 and 2019 respectively

Table (5:a): Distribution of deceased mothers by place of death.

*Place of death	2018		2019	
	No.	%	No.	%
Health institution	16	73	27	82
Home	4	18	4	12
Road	2	9	2	6
Total	22	100.0	33	100.0

*Using χ^2 (P-value = 0.730)

Most common place of death was health institution as 73% and 82% with no statistical significant association between year 2018 and 2019, these finding reported in Table 5:a.

Table (5:b): Time of death in relation to delivery.

*Death in relation to delivery	2018		2019		Total	
	NO.	%	No.	%	No.	%
During pregnancy	1	5	3	9	4	7
During labor	1	5	3	9	4	7
During puerprum	20	90	27	82	47	86
Total	22	100.0	33	100.0	55	100

*Using χ^2 (P- value = 0.630)

Table 5:b revealed that time of maternal death in relation to delivery was (86%) during puerprum as 90% occur during 2018 and 82% occur during 2019 . P- value = 0.630

Table (5:c): Time of death in relation to puerprum.

*Death in relation to puerprum	2018		2019	
	NO.	%	No.	%
In the 1st 24 hrs. of puerprum	16	72	20	61
After 24 hrs. of puerprum	4	18	7	21
****Total**	20	90	27	82

*Using χ^2 (P- value = 0.542) ** deceased mother during pregnancy and labor not included

Time of death in relation to puerprum seen in Table 5:c, as 72% and 61% ocuure in 1st 24hrs of purperum, 18% and 21% after 24 hrs of purperum during 2018 and 2019 resepctivly. P-value not statistically significant.

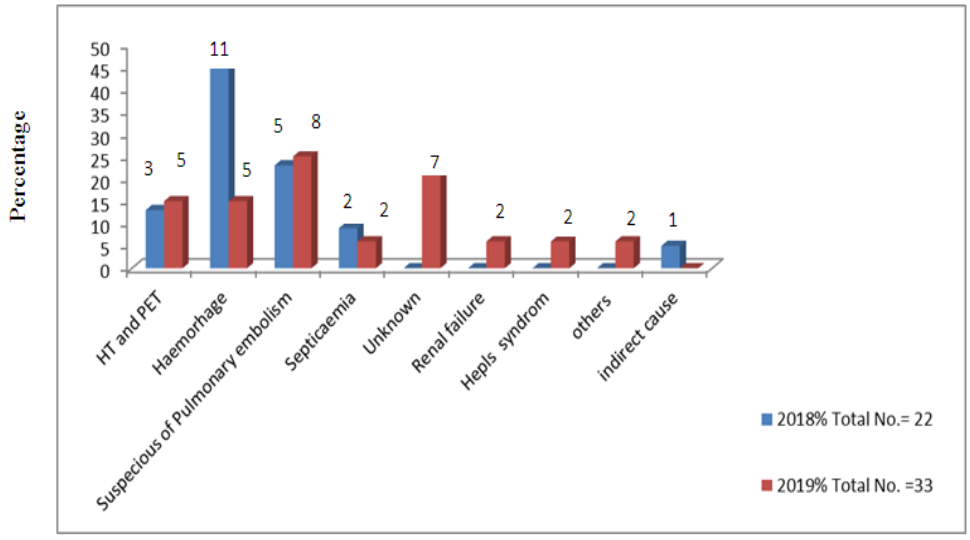

Fig (1): Distribution of deceased mothers by cause of death according to clinical diagnoses.

(Fig1) revealed that commonest cause of death among mothers by clinical diagnoses during 2018 were hemorrhage 11(50%), suspicious of pulmonary embolism 5 (23%), and complication of hypertension and preeclampsia 3 (13%). Meanwhile the comment cause of death during 2019 were suspicious of embolism 8 (25%), unknown cause 7 (21%), and complication of hypertension, preeclampsia, and hemorrhage were 5 (15%).

Half of deceased women were send to postmortem examination in both years. No referral was more frequent seen during 2919 as 39% while relative refuse referral were more common during 2018 as18%. This is seen in Table 6.

Table (6): deceased mothers by referral to ostmortem examination.

Referral to post-mortem examination	2018		2019	
	No.	%	No.	%
Yes	12	55	18	55
No	6	27	13	39
Refuse	4	18	2	6
Total	22	100.0	33	100.0

*Using χ^2 (P- value = 0.315)

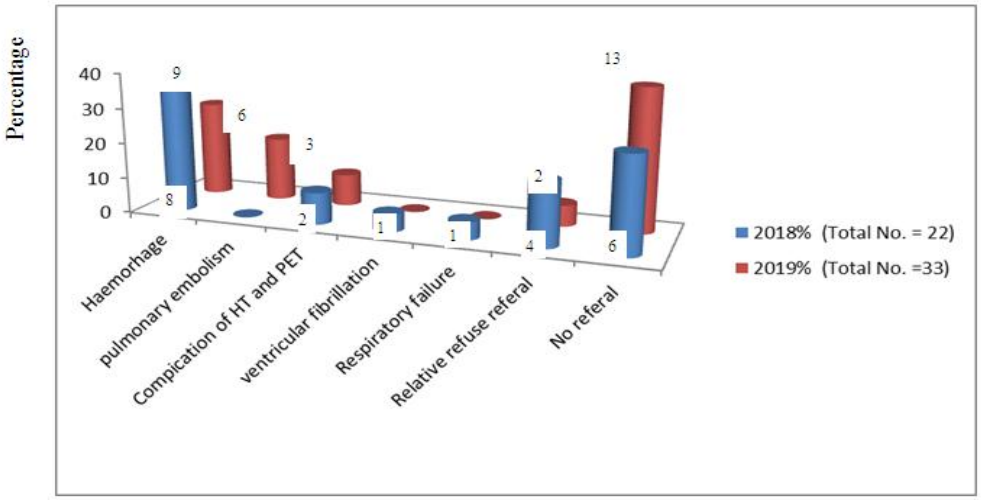

Fig (2): Sending and result of postmortem examination.

Result of post mortem examination was fond in Fig 2. The most common cause of death were 8(36%), 9(27%) hemorrhage, and 2(9%), 3(9%) complication of hypertension and preeclampsia during 2018 and 2019 respectively. Relative refuse referral more frequent 4(18%) during2018 mean while no referral more common 13 (40%) during 2019.

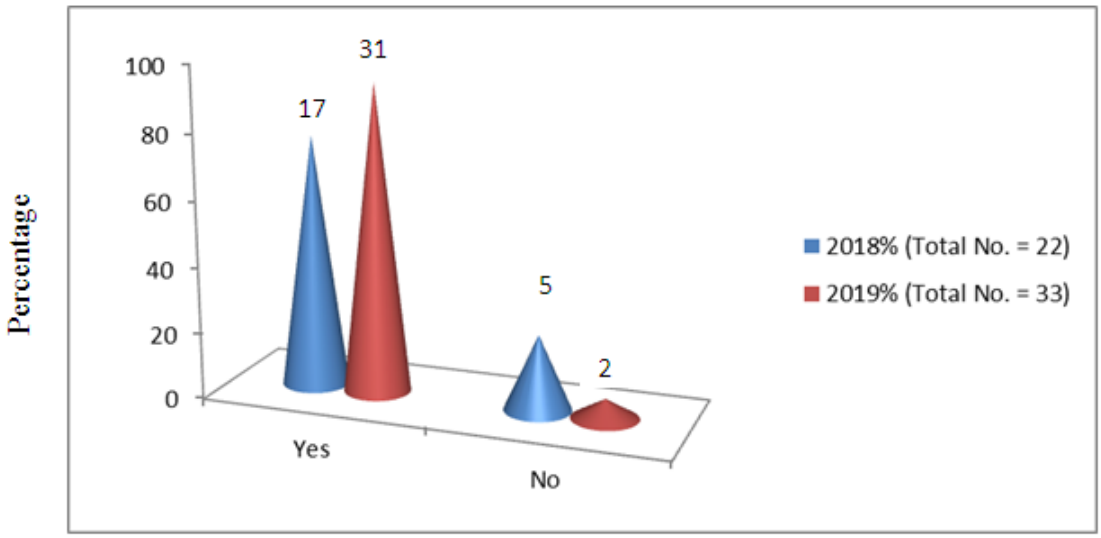

Fig. (3): Prevention of death among deceased women.

Death of deceased mothers can be prevented in 17(77%) and 31 (94%) during 2018 and 2019 respectively. This is seen in Fig 3. *Multiple response.

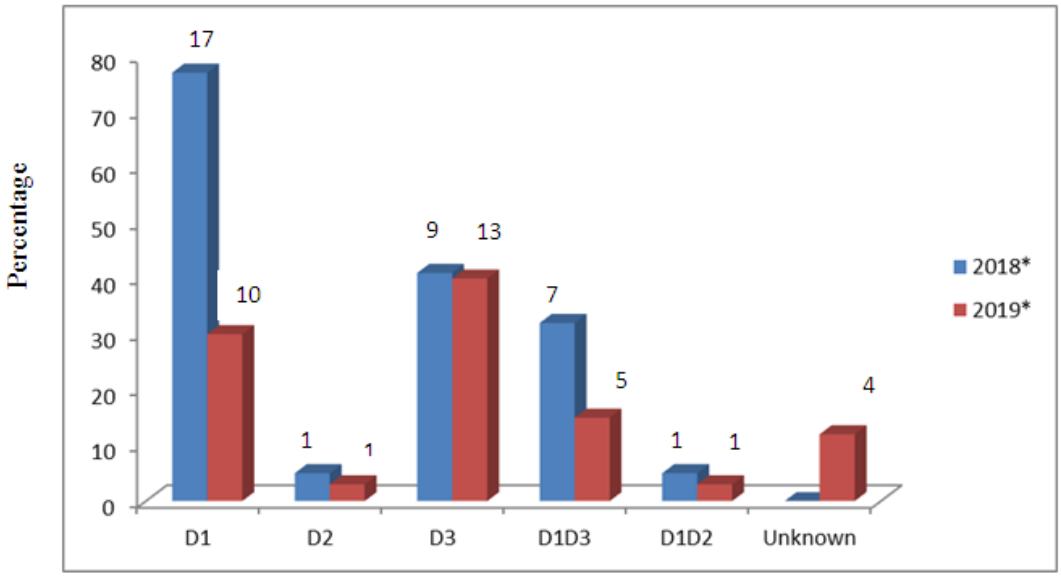

Fig (4): Prevention level.

Delay in seeking medical care due to factors related to mothers, her family and her community, more common 17 (77%)during 2018 if compeer with year 2019 as cause of mothers' death due to delay at d1 level was 10(30%), this is clear in Fig 4. No difference was seen in percentage of mothers' cause of death due to delay in provision of health services in health institution during 2018 and 2019, it was 9(41%) and 13(40%) respectively. Delay at D1D3 more frequently seen during 2018 it was 7(32%) and during 2019 it was 5(15%).

Table (7): Maternal mortality ratio and rate in Nineveh governorate.

Years	No. of deceased mothers	No. of women in childbearing age	No. of live birth	Maternal mortality ratio/100000	Maternal mortality rate/100000
2018	22	886533	89274	24.6	2.4
2019	33	886533	84434	39.0	3.7

Table (7) revealed that maternal mortality ratio increase from 24.6 to 39.0 per 100000 live birth and maternal mortality rate increase from 2.4 to 3.7 per 100000 women in childbearing age during 2018-2019 in Nineveh governorate.

DISCUSSION

Mothers play a big role in the health of family members, caring for her has a role in the health of society in general.[10] Maternal deaths in childbearing age reflects the low health status, which can be avoided by setting up strategies and arrangements in cooperation with various sectors of society.[11]

The present study revealed that the age of deceased mother more among age less than 20 years and more than 35 years during 2019 it was 4(12%) and 13(39%) respectively, while death of women in age between 20-34 years more frequent during 2018. More than one third of deceased women have moderate risk factors no differences between 2018 and 2019. Half of deceased mother have antenatal care during 2019 if compare with 2018 as only 18%.

Age is one of the contributing factors of maternal deaths by WHO 2018, women in their twenties tend to have fewer complications during pregnancy than younger or older women in presence of adequate health services in quantity and quality. The greater chance when the age under 15 and above 35 years.[12] In Kurdistan region 2015, the percentage of death among younger females was 11 % for women aged less than 24 year.[13] In spite of 95% of births occurred by well-trained health personnel. [14]

Probability of mothers death during pregnancy labor and puerprum increase with increasing scoring risk factors, maternal death surveillance and response Iraq 2013, revealed that women with more than 30 years, multigravida, low educational status, inadequate antenatal care were at risk to die.[15] A similar finding was seen a study in low and moderate income countries 2015, showed that most common risk factors were mothers' age more than 35 years, had no formal education, had more than 2 children and inadequate antenatal care.[16] A household survey maternal in select districts of Iraq 2018, revealed that women death more common among women with young age, no or low education, lack or inadequate antenatal care, low quality of antenatal care and among rural women.[14]

WHO 1996, define antenatal care visit any pregnant women attend at least once during pregnancy by trained health personal for reason related to pregnancy.[17] Ministry of Iraqi Health/ maternal and child health department recommended on the important of at least 4 visit during pregnancy,[18] and reported the coverage percentage of 4th antenatal visit in Iraq it was 50% according to MICS$_4$ 2011,[18] and 49.6% by WHO 2014, this might be due to the lack of awareness about the importance of antenatal visits and/or lack of confidence in PHC services,[19] while in Erbil city 2015, prenatal health care was accessible to 100 % of women and 73 % to postnatal care.[13] The birth assessed by health personnel was 100% in Erbil and it was 85% in Al-Sulaymania.[14] In Mosul city 2017, damaging most PHCCs specially in right sided of the city lead to very low coverage percent of 4th antenatal visit, it was 6% in 2018.[20]

In the present study there was midwife intervention 14% during 2018 and 15% during 2019.

Maternal death surveillance and response Iraq, showed that mean percent of traditional birth attendance(TBA) interference was 25.1% during 2010-2012,[15] and increase to be 34% according to annual report of maternal mortality in Iraq 2013-2015.[9] WHO1996, insisted on the importance role of TBS in lowering MM if there were supervise, train, monitor and evaluate health services provided by them.[17] Trained TBAs in sub-Sahara Africa 2013, have positive impact on reducing maternal, because TBAs can help to break socio-cultural barriers on intervention on reproductive health programmes.[21] Another among 78 low-moderate level country 2014, found that midwifery with family planning could avert a total of 83% of all maternal deaths.[22]

Delivery and death of women took place in health institution were more frequent in 2019 than 2018. Death during peurprum specially in 1st 24 hrs. more common during 2018.

In Mosul during 2019, WHO and other health partners are working tirelessly hard with health authorities to restore, rehabilitate and rebuild the health system and

infrastructure.[23] Caesarian section is one of method should be done to safe mother and fetus but in life saving condition used to save any one of them,[24] leading to increase percentage of cesarean section up to one third which un acceptable by WHO as maximum should be not exceed 15% of delivery.[6] WHO 2009, reported the direct risk of death due to pulmonary embolism usually associated with CS in 1st few hours.[6] this finding agreed by maternal death surveillance and response Iraq 2013,[15] another study done in low- and middle-income countries 2015.[16] An active surveillance system in Pakistan 2015, showed that as current levels of antenatal care and the quality of obstetric care is less effective in saving the lives of women due to delay in seeking medical advice and starting of un reversible pathological changed since pregnancy.[25] one way to reduce maternal mortality is by improving the availability, accessibility and quality of services for the treatment of complication that arise during pregnancy and child birth.[6] Such services if provided universally can reduce MM by 90% or even more.[11]

The most common cause of death diagnosed by post mortem examination were hemorrhage, and complication of hypertension and preeclampsia during 2018. Hemorrhage and pulmonary embolism during 2019.

According to annual report in MM in Iraq for a period 2013-2015, 70% of death due to direct cause. The main cause of direct cause of death were hemorrhage, pulmonary embolism and complication of hypertensive disorder, the mean percent were 20% ,16% , 9% respectively.[9] WHO 2014, systematic analysis found that the hemorrhage, hypertensive disorders, and sepsis were responsible for more than half of maternal deaths worldwide. More than a quarter of deaths were attributable to indirect causes.[5]

The present study revealed that there is increase awareness of mothers, families and community in general regarding seeking medical advice in 2019 than 2018 at the same time no improvement in health care services in health institution provided for them and there is an increased maternal mortality ratio from 24.6 to 39.0 /100000 live birth during 2018 and 2019 respectively.

During 2019, it was seen increase activity of maternal and child health in DoH in Mosul by establishment of refreshment sessions, work shop for health care worker who were working in antenatal care unit in PHCs, in addition to the supervisory visits to them, printing and publishing educational brochures for women who were visiting PHCCs to increase health awareness regarding importance of regular antenatal and postnatal care and insistence of delivery to took place with health personnel,[26] resulting to increase coverage of 4th antenatal care visit from 6% to 10% during 2018 and 2019 respectively.[20,27] During war liberation of Mosul 2017, 90% of health institution were damaged replacement were very slow until now, suffering from severe shortage of surgical and laboratory supplies, deficit of antibiotics, and lifesaving emergency services.

This findings were consistence with a repots of maternal death surveillance and response 2010-2012, and maternal mortality in Iraq 2013-2015, as delivery and death occurs in health institution.[9,15] At the same time the increase maternal mortality ratio and rate based on the improvement of registration of deceased women and quality of postmortem examination in Mosul city 2019 than 2018.

CONCLUSION

The study concluded that although there was increase awareness of deceased women to seeking medical advice during pregnancy, but the quality of health care services provided to them during labor and peurprum specially in 1st 24 hrs were unacceptable as both maternal mortality rate and ratio were increase. Death was completely due to direct cause in 2019 while three fourth due to direct cause during 2018 and in both years more than four fifth can be prevented due to hemorrhage, complication of hypertension and PET and pulmonary embolism.

Recommendation

1-Health education to increase family and community awareness regarding importance of utilization of antenatal care and postnatal care services in PHCCs.
2- Increasing number of labor rooms exist at the PHCCs providing care to non-complicated deliveries in remote and peripheral areas.
3- Improve availability, accessibility and quality of services for both central and remote hospitals for mother care around time of delivery specially the first 24 hrs.

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Conflict of Interest

The authors of this study declares no conflict of interest.

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