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A case control study to assess the risk factors associated with fetal and neonatal death in Kasturba Hospital (KH), Manipal, Karnataka

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"ABSTRACT

The research study titled “A case control study to assess the risk factors associated with fetal and neonatal deaths in Kasturba Hospital (KH), Manipal, Karnataka” was conducted by Miss Ritu Kumari in partial fulfilment of requirement for the award of the degree of Master of Science in Nursing from Manipal College of Nursing, MAHE, Manipal, Karnataka.

The objectives of the study were to a) identify the risk factors associated with fetal deaths through record analysis by using the risk assessment tool for fetal deaths and b) determine the risk factors associated with neonatal deaths through record analysis by using the risk assessment tool for neonatal deaths. The conceptual framework of the study was on the modified Ishikawa model (Fish bone model) for the assessment of potential risk for fetal and neonatal deaths.

A retrospective case control design was used for the study. Complete enumerate sampling and systematic random sampling were used for selecting the cases and controls respectively. The samples included in the present study were all fetuses who were delivered dead/ stillbirth/ intrauterine death (IUD)/ intrauterine fetal demise (IUFD), all neonates who died on or before 28 days of birth and surviving term neonates at KH, Manipal, Karnataka from 01.01.2014 to 31.12.2017. The samples were selected in the ratio of 1:2 (one case: two controls) through record review of fetal deaths (cases), neonatal deaths (cases) and normal surviving term neonates (controls). All the necessary administrative permissions were taken before conducting the present study.

The tools used in the study were demographic proforma, risk assessment tool for fetal deaths and risk assessment tool for neonatal deaths.

The content validity of the tools were established through the eight expert’s suggestions. Pretesting was done by administering the tools to five files of each group of fetal deaths, neonatal deaths and normal surviving term neonates to find out the clarity of the items. The inter-rater reliability coefficient for each tool was demographic proforma (r=1), risk assessment tool for fetal deaths (r=0.86) and risk assessment tool for neonatal deaths (r=0.91).

The pilot study was conducted among 10 medical records of fetal deaths (case), 10 medical records of neonatal deaths (case) and 20 medical records of normal surviving term neonates (controls) of KH, Manipal, Karnataka from the selected hospital numbers and inpatient numbers of 2011-2012, which were available in the Medical Record Department (MRD), Kasturba Hospital (KH), Manipal. The study was found to be feasible.

The study was conducted among 101 medical records of fetal deaths (cases), 168 medical records of neonatal deaths (cases), 202 medical records of normal surviving term neonates (controls) for fetal deaths and 336 medical records of normal surviving term neonates (controls) for neonatal deaths in Medical Record Department (MRD), KH, Manipal from 2014 to 2017. The files were selected in the ratio of 1:2 (one case: two controls) through record

review of fetal deaths (cases), neonatal deaths (cases) and normal surviving term neonates (controls). The data were analyzed using descriptive and inferential (Odds ratio) statistics.

The present study revealed that 48 (47.5%) and 72 (42.9%) of mothers who had fetal and neonatal deaths respectively, were in the age group of 26-30 years. The mean and standard deviation for maternal age was 28.49 + 4.74 among fetal deaths and 27.88 + 4.43 among neonatal deaths. Majority fetal 86 (85.1%) and neonatal deaths 101 (60.1%) were seen in the gestational age of <36 weeks. The fetal 54 (53.5%) and neonatal deaths 78 (46.4%) were higher in primigravida.

Out of 101 mothers who had fetal death cases, 87 (86.1%) had regular antenatal visits, 94 (93.1%) had spontaneous conception, 79 (78.2%) had normal vaginal deliveries, whereas out of 168 mothers of neonatal death cases, 154 (91.7%) had regular antenatal visits, 149 (88.7 %) had spontaneous conception and 69 (41.1%) had normal vaginal deliveries. Most of the mothers with fetal and neonatal death cases had maternal medical and obstetrical complication in the present pregnancy such as 12 (11.9%) with renal disease, 10 (9.9%) with hemorrhagic disease, 3 (3%) of psychiatric upsets after delivery, 47 (46.5%) with hypertension in pregnancy, 35 (34.7%) with antepartum hemorrhage (APH)/ bleeding, 31 (30.7%) with placental abnormalities and 12 (11.9%) with gestational diabetes mellitus (GDM).

The present maternal medical factors related to fetal deaths showed that the odds of having anemia were higher for cases than controls (OR= 9.960; CI: 4.908, 20.211, p<0.001). The odds of having respiratory diseases were higher for cases than controls (OR=6.872; CI: 2.421, 19.508; p<0.001). Compared to controls, cases had higher odds of having gastrointestinal diseases (OR= 69.680; CI: 9.291, 522.562; p<0.001), hemorrhagic diseases (OR= 22.088; CI: 2.786, 175.129; p=0.003), renal diseases (OR= 6.641; CI: 2.095, 21.287; p<0.001), cardiovascular diseases (OR= 5.244, CI: 2.081, 13.211; p<0.001), and gynecological diseases (OR= 2.704; CI: 1.300, 5.623; p=0.008).

The finding of present maternal obstetric factors related fetal deaths showed that compared to controls, cases had higher odds of having antepartum hemorrhage/ bleeding (OR=17.323, CI: 6.974, 43.029; p<0.001), placental abnormalities (OR= 7.012; CI: 3.411, 14.413; p<0.001), polyhydramnios (OR=4.258; CI: 1.251, 14.499; p=0.02), oligohydramnios (OR= 8.575; CI: 3.337, 22.036; p<0.001), hypertension in pregnancy (OR=7.121; CI: 3.945, 12.854; p<0.001), preeclampsia (OR=77.096; CI: 10.304, 576.865; p<0.001), eclampsia (OR=10.469; CI: 1.206, 90.845; p=0.03) and multiple gestation (OR=17.290; CI: 2.131, 140.258; p=0.008).

The findings of fetal risk factors related to fetal death showed that majority of cases which could not survive were males 57 (56.4%). Compared to controls, cases had higher odds of having intrauterine growth retardation/IUGR (OR=14.062, CI: 6.457, 30.623; p<0.001), decreased fetal movement (OR=111.774; CI: 38.096, 327.945; p<0.001), renal disease (OR=3.686; CI: 1.053, 12.902; p=0.04) and cardiovascular diseases (OR= 26.250; CI: 8.992, 76.630; p=<0.001).

The present obstetric complication related to neonatal deaths showed that compared to controls, cases had higher odds of having antepartum hemorrhage/ bleeding (OR=7.969, CI: 3.820, 16.625; p<0.001), premature rupture of membrane (OR=2.117; CI: 1.214, 3.693; p=0.008), polyhydramnios (OR=5.815; CI: 1.823, 18.551; p<0.003), hypertension in pregnancy (OR=3.075; CI: 1.842, 5.132; p<0.001), preeclampsia/ eclampsia (OR=6.6; CI: 2.568, 16.982; p<0.001) and multiple gestation (OR=15.857; CI: 14.657, 53.990; p<0.001).

The findings of fetal factors related to neonatal deaths showed that compared to controls, cases had higher odds of having IUGR (OR=3.383; CI: 1.804, 6.342; p<0.001), birth asphyxia (OR=4.016; CI: 2.344, 6.881; p<0.001) and threatened preterm (OR=13.738; CI: 5.983, 31.548; p<0.001).

The neonatal factors related to neonatal deaths showed that compared to controls, cases had higher odds of having APGAR score < 6 at 5 minutes of observation (OR=167.5; CI: 22.513, 1246.248; p<0.001), neonates on mechanical ventilators (OR=1.854; CI: 1.913, 17.963; p<0.001), low birth weight (OR=19.667; CI: 12.260, 31.547; p<0.001), hypoglycemia (OR= 22.568, CI: 5.208, 97.797; p<0.001), neonatal sepsis (OR= 270.161; CI: 37.066, 1969.107; p<0.001), respiratory disorders (OR= 110.782; CI: 25.672, 460.128; p<0.001), renal disorders (OR= 7.168; CI: 3.157, 16.275; p<0.001), metabolic disorder (OR= 670; CI: 91.684, 4896.314; p<0.001), cardiovascular diseases (OR= 102.309; CI: 40.132, 260.817; p<0.001), hemorrhagic diseases (OR= 70.049; CI: 21.561, 227.580; p<0.001), organomegaly (OR= 42.718; CI: 5.666, 322.074; p<0.001), respiratory distress syndrome (OR= 300.6; CI: 72.266, 1250.378; p<0.001), meconium aspiration syndrome/MAS (OR=6.967; CI: 2.234, 21.696; p<0.001) and congenital anomalies (OR= 18.182; CI: 10.116, 32.679; p<0.001).

The study concluded that the maternal and obstetric characteristics (present maternal medical complications, induced conception and caesarean section delivery), maternal and obstetric factors (antepartum haemorrhage, placental abnormalities, polyhydramnios, oligohydramnios, hypertension in pregnancy and multiple gestation), fetal characteristics (gender and birth weight) and fetal factors (IUGR, decreased fetal movement and cardiovascular disease) were significant risk associated with fetal death whereas maternal characteristics (maternal age, place of delivery), past obstetric complication, present obstetric factors (antepartum haemorrhage, premature rupture of membrane, oligohydramnios, hypertension in pregnancy and multiple gestation), fetal factors (IUGR, birth asphyxia and threatened preterm), neonatal characteristics (age, gender, birth weight, condition of neonates at birth and low APGAR) and neonatal factors (respiratory distress syndrome, meconium aspiration syndrome, sepsis and congenital anomalies) were significant risk associated with neonatal deaths. Awareness of these factors will stimulate appropriate risk assessment geared towards the prevention of fetal and neonatal deaths by clinicians in the health care settings. This study will also provide the insight to health care decision makers to provide good quality of antenatal care which will help to improve the compliance and early detection of unwarranted complications during pregnancy, so that timely action could be taken to save the life of the mother as well as the baby. The identification of risk factors for fetal and neonatal deaths will enable the policy makers as well as service providers to plan and implement targeted activities to reduce fetal and neonatal deaths in the region.

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