VERBAL AUTOPSY AS A TOOL FOR IDENTIFYING THE CONTRIBUTORY FACTORS FOR YOUNG INFANT DEATH IN CHENNAI CORPORATION

Dissertation Submitted to

THE TAMIL NADU DR.M.G.R MEDICAL UNIVERSITY

In partial fulfillment of the regulations

For the award of the degree of

D.M. (NEONATOLOGY)

2010– 2013

MADRAS MEDICAL COLLEGE

THE TAMIL NADU DR.M.G.R.MEDICAL UNIVERSITY

CHENNAI

CERTIFICATE

This is to certify that the dissertation entitled **"Verbal autopsy as a tool for identifying the contributory factors for young infant death in Chennai Corporation"** is a bonafide work done by Dr.N.Muthukumaran during the period between September2012 – January 2013 towards the partial fulfillment of requirement for the award of D.M. (NEONATOLOGY) degree examination to be held in August 2013 by The Tamilnadu Dr.M.G.R. Medical University, Chennai.

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DECLARATION

I solemnly declare that the dissertation entitled **"Verbal autopsy as a tool for identifying the contributory factors for young infant death in Chennai Corporation"** is the original work done by me at the Institute of Child Health and Hospital for Children, Egmore, Chennai during the D.M. course (2010-2013), under the guidance and supervision of Prof.Dr.J.Kumutha, Professor and H.O.D. of Neonatology. The dissertation is submitted to **THE TAMILNADU Dr.M.G.R. MEDICAL UNIVERSITY** towards the partial fulfillment of requirement for the award of **D.M. (Neonatology).**

Place: Chennai.

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I thank the **Commissioner**, Chennai corporation for giving me permission to do the study in Chennai corporation.

Last but not the least, I heartily thank the parents for their kind support and cooperation for successful completion of this study.

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Introduction About 130 million infants are born in the world every year (1). About 4 million infants die in the first 28 days of life in the world every year. 3 million of the infants die in the first week of life. More than 25% of deaths occur in the first 24 hours of life (1,2).. Neonatal deaths account to 40% of deaths under the age of 5 years worldwide. 98% of all neonatal deaths in the world occur in developing countries. Deaths are due to infections (32%), birth asphyxia (29%), prematurity and congenital anomalies (34%). 2.4 million under-5 child deaths occur in India every year. India contribution is 22% of the global burden and nearly half are neonatal death (3,4).Infant mortality is...

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CERTIFICATE OF APPROVAL

To
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Dear Dr.N. Muthukumaran

The Institutional Ethics committee of Madras Medical College, reviewed and discussed your application for approval of the proposal entitled "Verbal autopsy as a tool for identifying the contributory factor for young infant death in Chennai corporation" No.33092012.

The following members of Ethics Committee were present in the meeting held on 13.09.2012 conducted at Madras Medical College, Chennai -3.

1. Dr. S.K. Rajan. M.D.,FRCP.,DSc	-- Chairperson
2. Prof. Pregna B. Dolia MD Vice Principal, Madras Medical College, Chennai -3 Director , Institute of Biochemistry, MMC, Ch-3	-- Member Secretary
3. Prof. B. Vasanthi MD Professor of Pharmacology ,MMC, Ch-3	-- Member
4. Prof. M. Reghu MD Director, Inst. Of Internal Medicine, MMC, Ch-3	-- Member
5. Prof. MD. Ali. MD.DM Prof & HOD of MGE, MMC, Ch-3	-- Member
6. Prof. P. Karkuzhali. MD Director i/c, Prof., Inst. of Pathology, MMC, Ch-3	-- Member
7. Prof. Bavani Shankar. MS Prof of General Surgery, MMC, Ch-3	-- Member
8. Thiru. S. Govindsamy. BABL	-- Lawyer
9. Tmt. Arnold Soulina MA MSW	-- Social Scientist

We approve the proposal to be conducted in its presented form.

Sd/ Chairman & Other Members

The Institutional Ethics Committee expects to be informed about the progress of the study, and SAE occurring in the course of the study, any changes in the protocol and patients information / informed consent and asks to be provided a copy of the final report.

Member Secretary, Ethics Committee

CONTENTS

INTRODUCTION

About 130 million infants are born in the world every year (1). About 4 million Infants die in the first 28 days of life in the world every year. 3 million of the infants die in the first week of life. More than 25% of deaths occur in the first 24 hours of life (1, 2). Neonatal deaths account to 40% of deaths under the age of 5 years worldwide. 98% of all neonatal deaths in the world occur in developing countries. Deaths are due to infections (32%), birth asphyxia (29%), prematurity and congenital anomalies (34%). 2.4 million under-5 child deaths occur in India every year. India contribution is 22% of the global burden and nearly half are neonatal death (3, 4).Infant mortality is not only a health problem but also a social problem. It affects us all. Identification of preventable causes in medical, social, economical, and environment is important. For reduction of infant mortality, delivery of quality services to pregnant women, newborn and families with young children is important. Infant mortality rate is a sensitive indicator of the health status of the community. Reduction of infant mortality is a national priority.

REVIEW OF LITERATURE

As per WHO report, 4 million newborns die every year in the world. Among the 4 million, 3 million newborns die in the first week of life (1).

As per WHO report, in developing countries the risk of death in the neonatal period is six times greater than in developed countries. More newborns die in Asia, because more children are born in Asia. In Asia, over 40% of global neonatal deaths take place (5).

Annual estimate of under-five deaths in India is 1.8 million (6).It had dropped from about 2.4 million in 2000 (7). Early neonatal deaths contribute to four-fifths of neonatal deaths and infant mortality contributes to three-quarters of under five mortality (7).

As per Black RE et al study, India contributes 1.2 million newborn deaths every year (3). As per Dadhich JP et al study, In India early neonatal deaths account to 75% of total neonatal deaths(4).India's neonatal mortality rate had fallen from 49 to 39 between the early 1990s and the early 2000s (8).

As per Sample registration system 2010,for India, the total IMR is 47, rural is 51 and urban is 31.Neonatal mortality rate for India, total is

33,rural is 36 and urban is 19.Early neonatal mortality rate for India, total is 25, rural is 28 and urban is 15.

As per Sample registration system 2010,for Tamilnadu, the total IMR is 24, rural is 25 and urban is 22.Neonatal mortality rate for Tamilnadu, total is 16, rural is 18 and urban is 13.Early neonatal mortality rate for Tamilnadu, total is 13, rural is 15 and urban is 12.

As per Black et al report, under five and infant mortality rates had decreased in recent decades. Neonatal mortality rates have remained relatively unchanged (9).Neonatal deaths accounts to two thirds of the infant deaths. Neonatal deaths accounts to nearly four-tenths of under five deaths in the world (10-12). It will be difficult to reach the MDG goals (2015) without reducing neonatal deaths (5)

Among the neonatal deaths, most of the deaths occur during the early neonatal period. Within the first week more deaths occur during the first three days of life. Within the first three days, most of the deaths occur during the first 24 hours of life.

Nag et al in his study in Vietnam showed that 58.6% of the neonatal deaths occurred in the first twenty four hours of life. Bagui et al in his study in Uttarpradesh India showed that in the first 24 hours of life 32% of the neonatal deaths had occurred. Campbell et at in his study in

Egypt showed that in the first two days of life 50% of the neonatal deaths had occurred.

Khanal et al in his study in Nepal showed that in the first three days of life 58.5% of the neonatal deaths had occurred. Bagui et al in his study in Uttarpradesh showed that in first three days of life 50 % of the deaths had occurred. Several studies showed that maximum deaths occurred in the first three days of life. Intra partum services and immediate newborn care services are important for newborn survival. Intra partum monitoring of all deliveries is important. Even normal labour should be monitered.CTG monitoring of fetal heart rate variability is essential for early detection of perinatal hypoxia .Partogram is also useful for monitoring progression of labour. Fetal Doppler monitoring of high risk pregnancy is useful for early identification of complications .Fetal biophysical profile, amniotic fluid volume assement are essential during the intra partum period.

Socio demographic characteristic like education of the mother, income status of the family, type of the family may affect infant health. Many studies done showed that education of the mother had no influence in reduction of infant deaths.

Turnbull et al in his study in Zambia showed that lower socioeconomic status was associated with high neonatal mortality. In

lower socioeconomic groups, awareness of danger signs of newborns, sanitation, overcrowding are associated

The three major causes of newborn deaths are infection, prematurity and birth asphyxia (13). In recent global estimates, prematurity was the leading cause (28-30%), followed by infection (25-28%) and asphyxia (23-24%) (14, 15, 16).

As per Moss et al study, In developing countries neonatal deaths were due to infections (32%), birth asphyxia (29%), and prematurity (34%) (17).

Nag et al studied neonatal deaths in Vietnam from 2008 to 2010,prematurity (37.8%),birth asphyxia(33.2%),infections(13.0%) and congenital malformation (6.7%) were the four leading causes of death. 58.6% neonatal deaths occurred in the first 24 h of life (18) .Adetola AO et al studied neonatal death in Nigeria and reported that, the leading causes of death were perinatal asphyxia (79.4%), low birth weight (55.9%), and infections (41.2%) (19).

Khanal s et al (2011) studied neonatal death in Nepal, the causes of deaths were infections (41%), birth asphyxia (37.2%) and prematurity (11.5%).58.5% of deaths occurred in first three days of life (20). Turnbull et al studied neonatal deaths in Zambia, 84% of neonatal deaths occurred

in the first week of life. Causes were infections (37%) and prematurity (34%) (21).

In India, sepsis was the cause in 52% of neonatal deaths in rural in the early 2000s (22).In recent estimates for India, sepsis underlie 30% of newborn deaths, birth asphyxia 20% and preterm 17% (7).

In Million Death Study, there were 10 892 deaths in neonates. When these details were projected nationally, the causes were prematurity and low birth weight, neonatal infections, and birth asphyxia and birth trauma (23).

As per WHO report, it is estimated that 26% of newborn infants who die do so as a result of infections that occur around birth (24). As per Bang AT et al study, Infections account for approximately half of newborn deaths at the community level (25).

LBW is associated with many neonatal deaths .It is not considered as a direct cause. Around 15% of the babies are LBW. Low birth weight proportion ranges from 6% in developed countries to more than 30% in some parts of the world. Maternal health and nutrition during pregnancy are important determinants of weight at birth and newborn health.

Multiple pregnancies have greater risk for both the mother and the fetus, when compared with singleton pregnancy. Up to one half of twins

and almost all triplets are born preterm and die at higher rates than term infants (26). Data from Demographic and Health Surveys (DHS) for 1990-2000 (27) show that, in less developed countries, the risk of neonatal death in multiple births was about six times higher in the neonatal period (range 3-15).

More boys than girls are born in the world. The sex ratio at birth 105-106 boys to 100 girls is a natural phenomenon. Mortality rates for boys in the early neonatal period are higher than those for girls (28).

The health of the mother across her life course affects her pregnancy and the pregnancy outcome. The mother is a part of a family, and how that family is structured and functions can affect the well-being of the mother. It in turn affects her pregnancy. The family is affected by the systems and services available within the community.

The more positive supports a mother had during her life course, the more likely there will be a better outcome for the infant. The mother is exposed to risk factors like lack of education, no transportation, poor nutrition, poverty, domestic violence and stress. The mother is exposed to protective factors like education, social support, and access to care, food, and transportation. Maternal health and antenatal care have good effect in reducing perinatal and neonatal mortality (29).

The exact cause of death can be determined by post mortem autopsy. Verbal autopsy is used to determine the possible causes of death. Verbal autopsy term was first used in 1931.After nineties verbal autopsy was widely used (30-35).

Verbal autopsy consists of interviews with the caregivers (mother, or father) to determine the causes of death (36-38). Infant and child verbal autopsy tools have been developed in the last twenty years (39-45).verbal autopsy tools are used in wide range of settings (46-49). The interviewer discuss with the parents with questions to identify the cause of death (50, 51). A clinician then determines the cause of death (52-55). Delays are important contributors to morbidity and mortality. Even minor delays in providing emergency obstetric care at the time of birth can be significant (56). Delays occur at three stages. (1) The decision to seek care, (2) reaching a health facility, and (3) the provision of adequate care (57). Three delays model was used initially in maternal mortality, now it is applied to neonatal death (58, 59).

Social autopsy is used to identify social, economical, behavioural, and health systems contributors to child deaths. It is often combined with a verbal autopsy interview (60).

Study justification;

The IMR of Tamilnadu, 24 per 1000 live birth and urban is 22 per 1000 live birth (SRS 2010). In Chennai City the health care services are provided by, medical colleges, peripheral hospitals, emergency obstetric centres of Chennai Corporation and private hospitals. In spite of geared up services our infant death rate is still high when compared to Kerala. This study was done to identify the various contributing factors for young infant death in Chennai corporation zones and implement strategies for preventing infant death. Verbal autopsy was used to collect data on, social, economical, and medical factors that might contribute to young infant death. This might be useful to improve delivery of quality services for pregnant women, young infants.

RESEARCH HYPOTHESIS

Identification of the contributing factors to young infant (< 2 months of age) death in Chennai corporation zones may help to plan intervention for its reduction.

RESEARCH QUESTION

Are there contributing factors to young infant death in Chennai Corporation?

AIM OF THE STUDY

To identify the contributory factors to young infant deaths in Chennai corporation zones.

Primary objective

Using verbal autopsy as a tool to identify the contributory factors for young infant death in Chennai corporation zones.

Secondary Objectives

To identify delays in getting appropriate treatments like,

Decision to seek care, Transport to health facility, Provision of adequate care at the health facility

METHODOLOGY

STUDY DESIGN

Descriptive study

STUDY PLACE

The study was done in Chennai corporation zones

STUDY PERIOD

September 2012 to January 2013

Data variables

The variables were grouped as maternal characteristics and infant characteristics affecting young infant death. Maternal characteristics had socio demographic variables, pregnancy details and delivery details. Socio demographic variables had religion, community, education of mother, family type, and occupation and below poverty line characters. Pregnancy details had consanguinity, age, birth order, antenatal registration details, number of antenatal visits and maternal illness during pregnancy. Delivery details had place of delivery, type of delivery, birth attendant .Infant characteristics had gender, birth weight, gestational age, age at death, place of death and cause of death variables.

Subjects

Parents who lost their babies within 2 months of age and residing in the service provision area of Chennai Corporation.

The young infant (age < 2months) deaths that occurred in Chennai corporation zone during the period of September 2012 to January 2013 were studied by using verbal autopsy as a tool.

Inclusion Criteria

All young infant deaths (up to 2 months of age) reported from Chennai corporation zone were included.

Study Description

Chennai Corporation delivers maternal and child health services through 10 zones. Each zone has one emergency obstetric centre and satellite urban health posts which feed patients for delivery. The infant deaths are methodically line listed by the health staff as per G. O. No. 418 H & FW (R1) Department dated. 30.12.2009. The urban health nurses helped in identifying the parents of babies who died. The urban health nurses were also present during the study. Parents who satisfied the inclusion criteria were approached at their residence for the study. Written, informed consent was obtained from either parent, who was

willing to participate in the study. The study was done by the principal investigator by using the verbal autopsy questionnaire for investigation of Infant death used by Tamilnadu Government within 14 days of death occurrence.

29295 live births had occurred during the period from September 2012 to January 2013.243 infant deaths and 173 neonatal deaths had occurred during the period. The infant mortality rate was 8.3 per 1000 live births and neonatal mortality rate was 5.9 per 1000 live births.

190 young infant deaths occurred during this period in Chennai corporation zones were studied. Only 184 parents were traceble.6 parents were not traceble.we did not have any parent who refused to participate.

Data collection

Data was collected using the proforma given in the annexure. Baseline data like sex, birth weight, age at death, gestational age were collected. Socioeconomic data like religion, community, education of mother and father, occupation of mother and father, economic status, family type, consanguinity, were collected. Maternal details like age of mother, time of antenatal registration, number of antenatal checkups, maternal illness during pregnancy, birth interval were collected. Intra

partum details like place of delivery, type of delivery, and birth attendant were collected. Symptoms and signs and duration of illness preceding the death were collected. Health seeking behaviour of parents details were collected. Data regarding treatment details and place of death were collected.

STATISTICAL ANALYSIS

All statistical analysis was done by SPSS software 18 for windows (spss inc. Chicago, USA).Standard statistical tests were employed. Categorical variables were analysed with chi square test. Statistical significance was considered at a p value of <0.05.

RESULTS

During the study period, 29295 live births had occurred in the ten Chennai corporation zones.243 infant deaths had occurred during the period.190 young infant deaths had occurred during the period in ten zones of Chennai Corporation. Among the 190 young infant deaths 184 parents were traceable. The parents of 6 young infant deaths were not traceable.

The data were analysed under the following headings

I Maternal characteristics

a) Socio demographic variables

b) Pregnancy details

c) Delivery details

II Infant characteristics

III Analysis of contributing factors

IV Health seeking behaviour

I Maternal characteristics

Table 1: Socio demographic variables (n=184)

		n	%
Religion	Hindu	147	79.9
	Christian	12	6.5
	Muslim	25	13.6
Community	SC/ST	68	37
	BC/MBC	113	61.4
	Others	3	1.6
Education	Upto primary	37	20.1
	Upto HSC	119	64.7
	College	28	15.2
Family type	Nuclear	109	59.2
	Joint	75	40.8
Occupation	Home maker	170	92.4
	Daily labourer	1	0.5
	Private	9	4.9
	Government	4	2.2
Poverty line	Below	150	81.5
	Above	34	18.5

Most of the babies (79.9%) died belonged to Hindu religion as this is the major proportion of the population. 37 % of the babies died belonged to SC/ST community. 59.2 % of the babies were born in nuclear family. Most of the mothers (92.4%) were homemakers.

81.5% of the deaths happened in the below poverty line families. Those families having green colour Ration Card were considered as below poverty line.

Table 2: Pregnancy details (n=184)

		n	%
Consanguinity	Yes	48	26.1
	No	136	73.9
Age of mother	<20 years	38	20.7
	20-35 years	141	76.6
	>35 years	5	2.7
Birth order	1	98	53.3
	2	65	35.3
	3	20	10.9
	>3	1	0.5
AN registration	<12 weeks	138	75
	12-28 weeks	45	24.5
	>28 weeks	1	0.5
No. of AN visits	< 3 visits	6	3.3
	>= 3 visits	178	96.7
Maternal illness	PIH	18	9.8
	Diabetes	6	3.3
	Anaemia	16	8.7
	Liquor abnormality	17	9.2
	Others	14	7.6

26.1% of the babies had consanguinous parent.

20.7 % of the mothers were below 20 years of age (Teenage pregnancy). 53.3% of deaths occurred in first order births .75% of the mothers registered their pregnancy in the first trimester and only 3.3% of the mothers had less than 3 antenatal visits. 38.6% of the mothers had maternal illness during pregnancy and two thirds of the mothers had no maternal illness.

Table 3: Delivery details (n=184)

		n	%
Place of delivery	EOC	30	16.3
	PHC	3	1.6
	Taluk/ GH	2	1.1
	Medical college hospital	117	63.6
	Private hospital	32	17.4
Type of delivery	Vaginal	111	60.3
	Instrumental	1	0.5
	Breech	4	2.2
	LSCS	68	37
Birth attendant	Staff nurse	24	13
	Doctor	160	87
No. of births	Single	157	85.4
	Twins	24	13
	Triplets	3	1.6

Most of the deliveries (87%) were attended by a doctor. 14.6 % of deaths occurred in multiple pregnancies

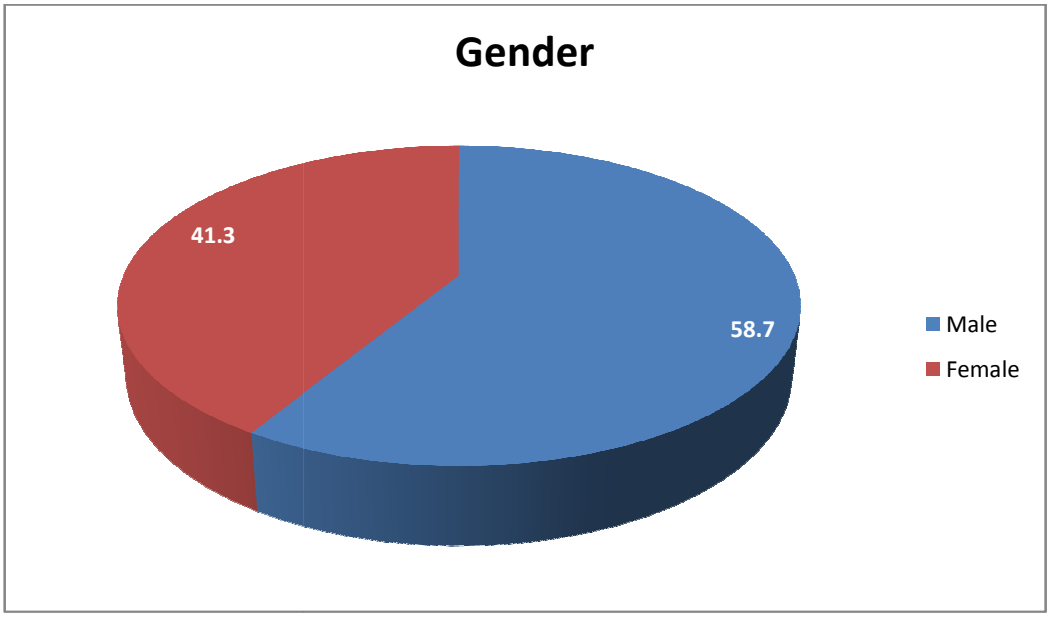
II: Infant characteristics

Table 4: Gender, birth weight and gestational age (n=184)

		n	%
Gender	Male	108	58.7
	Female	76	41.3
Birth weight	<1 kg.	21	11.4
	1-<1.5 kg	41	22.3
	1.5-<2.5 kg	60	32.6
	>=2.5 kg	62	33.7
Gestational age	<28 weeks	20	10.9
	28- <34 weeks	42	22.8
	34-< 37 weeks	38	20.7
	37 -42 weeks	84	45.6

Death in male babies (58.7%) was more than female babies (41.3%). 33.7% babies were VLBW and 66.3% were LBW. Among the 184 deaths studied 33.7% deaths occurred in good weight babies. 54.3% were preterm babies and 45.7% were term babies. Losing 45.7% of the term babies is quite significant as appropriate health intervention might have saved the baby.

Fig 1: Gender distribution



II Table 5: Infant age at death and place of death (n=184)

		n	%
Age at death	<24 hrs	36	19.6
	24-<72hrs	62	33.7
	3 - < 7days	35	19
	7 -< 28 days	37	20.1
	28 -<60 days	14	7.6
Place of death	Home	12	6.5
	Med.colleg.hosp	161	87.5
	Private hosp.	6	3.3
	Taluk /GH	1	0.5
	Transit	4	2.2

53.3 % of deaths happened in the first three days after birth which is directly related to perinatal, intra partum and immediate neonatal care.

6.5% of the babies died at home, 2.2% of the babies died during transit. 91.3% of deaths occurred in hospitals.

Table 6: Timing of death (n=184)

Age	n (%)
Early neonatal (< 7 days)	133 (72.3)
Late Neonatal (7-<27 days)	37 (20.1)
Post neonatal (> =28 days)	14 (7.6)
Total	184 (100)

72.3% of the deaths occurred in early neonatal period.

20.1% of the deaths occurred in late neonatal period.

Table 7: Cause of death (n=184)

Causes	Total
	n (%)
RDS	43(23.4)
Perinatal asphyxia	42(22.8)
Sepsis	37(20.1)
Congenital malformations	18 (9.8)
CHD	15 (8.2)
MAS	9 (4.9)
IEM	3 (1.6)
SIDS	4 (2.2)
Bilirubin encephalopathy	1 (0.5)
IVH	1 (0.5)
Others	11 (6)
Total	184(100)

RDS (23.4%), Asphyxia (22.8%), Sepsis (20.1%), Congenital malformations and CHD (18%) were the major causes of death.

Table 8 : Cause of death in Term and Preterm babies

	Preterm	Term
	n (%)	n (%)
RDS	43 (43)	
Perinatal asphyxia	13 (13)	29(34.5)
Sepsis	18 (18)	19 (22.6)
Con.mal	10 (10)	8 (9.5)
CHD	7 (7)	8 (9.5)
MAS		9 (10.7)
IEM		3 (3.5)
SIDS	1 (1)	3 (3.5)
Bilirubin encephalopathy	1 (1)	
IVH	1 (1)	
Others	6 (6)	5 (5.9)
Total	100 (100)	84 (100)

43% RDS within preterm babies.34.5% asphyxia within Term babies.

Table 9: Age at death and Sex (n=184)

Time	Male	Female
	n (%)	n (%)
<24 hrs	20 (10.9)	16 (8.7)
1-<3 days	42 (22.7)	20 (10.9)
3-<7 days	20 (10.9)	15 (8.2)
7-<28 days	18 (9.8)	19 (10.2)
28-60 days	8 (4.4)	6 (3.3)
Total	108 (58.7)	76 (41.3)

When the mortality was analyzed 44.5% deaths in the male babies occurred within the first 7 days as opposed to 27.8% in the female babies. But it was not statistically significant. (p value=0.059).

III Analysis of contributory factors

Table 10: Asphyxia and pregnancy details (n=184)

		Asphyxia	others	Total	p value
Antenatal registration	<12weeks	35 (25%)	103 (75%)	138	0.341
	12-28weeks	7 (15%)	38 (85%)	45	
	>28weeks	0	1 (100%)	1	
AN visits	<3visits	0	6 (100%)	6	0.386
	>=3 visits	42 (23%)	136 (77%)	178	
Place of delivery	Level I	16 (48%)	17 (52%)	33	0.001*
	Level II	5 (15%)	29 (85%)	34	
	Level III	21 (18%)	96 (82%)	117	
Type of delivery	Vaginal	22 (19%)	94 (81%)	116	0.103
	LSCS	20 (29%)	48 (71%)	68	
No of births	Single	39 (25%)	118 (75%)	157	0.259
	Multiples	3 (11%)	24 (89%)	27	

*p value significant

The quality of care received by the mothers of the infants who died of asphyxia were analysed. Early antenatal registration and the number of antenatal visits did not prevent the occurrence of asphyxia deaths.

However 48% of the babies who succumbed due to asphyxia had been delivered in level 1 centre (EOC, PHC). Analysis of the place of delivery in relation to asphyxia related death showed a positive correlation with a significant p value of 0.001. The practices especially the intra partum monitoring and neonatal resuscitation skill might prevent the occurrence of asphyxia. It is not enough to make sure that the mothers registered early and attend antenatal clinic the quality of care given during the intrapartum is also crucial in prevention of asphyxia death. However mode of delivery did not show any significant relationship to asphyxia death.

Table 11: Asphyxia and infant characteristics (n=184)

		Asphyxia	others	Total	p value
Gender	Male	30 (27%)	78 (73%)	108	0.056
	Female	12 (15%)	64 (85%)	76	
Birth weight	<1kg	0	21 (100%)	21	0.001*
	1-<1.5	6 (14%)	36 (86%)	42	
	1.5-<2.5	12 (20%)	48 (80%)	60	
	>=2.5	24 (39%)	37 (61%)	61	
Gestational age	<28weeks	0	20 (100%)	20	0.000*
	28-<34weeks	6 (10%)	51 (90%)	57	
	34-<37weeks	6 (24%)	19((76%)	25	
	37-42weeks	30(37%)	52(63%)		

*p value significant

When asphyxia death was analysed in relation to infant characteristics ,the male infants were found to be more vulnerable to asphyxia death(27%) as against 15% in females. But this was not statistically significant.

Looking at the birth weight and asphyxia death, it was highest (39%) in babies who weighed > 2500gm and this was statistically significant(p value -0.001)

The gestational age group analysis showed a significant (p value-0.000) occurrence of Asphyxia death in term babies (37%).

Table 12: Asphyxia and infant characteristics (n=184)

		asphyxia	others	Total	p value
Age at death	<24hrs	10(27%)	26(73%)	36	0.023*
	1-3days	21 (34%)	41 (66%)	62	
	4-7days	5 (16%)	30 (84%)	35	
	8-28days	6 (16%)	31 (84%)	37	
	29-60days	0	14 (100%)	14	
Place of death	Level I	1 (6%)	15 (94%)	16	0.169
	Level II	3 (38%)	5 (62%)	8	
	Level III	38 (24%)	122 (76%)	160	

*p value significant

One third of babies who expired within 72 hours of life had suffered from Asphyxia. This association was statistically significant (0.023).When the level of care giving centres was analysed with asphyxia death it was not significant.

Table 13: Sepsis and maternal education and poverty line (n=184)

		Sepsis	others	Total	p value
Education	Up to primary education	8(21%)	29(79%)	37	0.945
	HSC	21(17%)	98(83%)	119	
	Degree	5(17%)	23(83%)	28	
Poverty line	Below	27(18%)	123(82%)	150	0.807
	Above	7(20%)	27(80%)	34	

Maternal Education and their Economic status showed no statistically significant association with the death due to sepsis.

Table 14: Sepsis and pregnancy details (n=184)

		Sepsis	others	Total	p value
Place of delivery	Level 1	5 (15%)	28 (85%)	33	0.839
	Level II	7 (20%)	27 (80%)	34	
	Level III	22 (18%)	95 (82%)	117	
Type of delivery	Vaginal	26 (22%)	90 (78%)	116	0.072
	LSCS	8 (11%)	60 (89%)	68	
No of births	Single	30 (19%)	127 (71%)	157	0.679
	Multiples	4 (15%)	23 (85%)	27	

The incidence of sepsis related to infant deaths were similar among all levels of institution.

The mode of delivery and multiple pregnancy did not show any significant effect to sepsis related death.

Table 15: sepsis and infant characteristics (n=184)

		Sepsis	Others	Total	p value
Gender	Male	23 (21%)	85 (79%)	108	0.240
	Female	11 (14%)	65 (86%)	76	
Birth weight	<1kg	4 (19%)	17 (81%)	21	0.978
	1-<1.5	7 (17%)	35 (83%)	42	
	1.5-<2.5	12 (20%)	48 (80%)	60	
	>=2.5	11 (18%)	50 (82%)	61	
Gestational age	<28weeks	2 (10%)	18 (90%)	20	0.714
	28-<34weeks	12 (21%)	45 (79%)	57	
	34-<37weeks	4 (16%)	21 (84%)	25	
	37-42weeks	16 (20%)	66 (80%)	82	

About 20% of deaths in all birth weight categories were related to sepsis. The gender did not show any significant relation to sepsis related mortality. Similarly gestation age also did not influence the death due to sepsis.

Table 16 : RDS and pregnancy details (n=184)

		RDS	others	Total	p value
Place of delivery	Level I	2 (6%)	31 (94%)	33	0.008*
	Level II	13 (38%)	21 (62%)	34	
	Level III	28 (24%)	89 (76%)	117	
Type of delivery	Vaginal	31 (26%)	85 (74%)	116	0.160
	LSCS	12 (17%)	56 (83%)	68	
No of births	Single	26 (16%)	131 (84%)	157	0.000*
	Multiples	17 (62%)	10 (38%)	27	

* p value is significant

The death due to RDS was studied in detail. The place of delivery showed a statistically significant relation to deaths due to RDS. This highest death found in babies delivered in level II centres could be attributed to the desirability in the practice of ante natal steroid administration in the centres. Almost one third of deaths in level II, one quarter of death in level III centres were due to RDS. RDS also significantly (p value-0.000) contributes to about two third of deaths in multiple pregnancy. The mode of delivery did not show any significant relation to RDS deaths.

Table 17 : RDS and infant characteristics (n=184)

		RDS	others	Total	p value
Gender	Male	22 (20%)	86 (80%)	108	0.252
	Female	21 (27%)	55(73%)	76	
Birth weight	<1kg	16(76%)	5(24%)	21	0.000 *
	1-<1.5	19(45%)	23(55%)	42	
	1.5-<2.5	8(13%)	52(87%)	60	
	>=2.5	0	61(100%)	61	
Gestational age	<28weeks	17(85%)	3(15%)	20	0.000 *
	28-<34weeks	24(42%)	33(58%)	57	
	34-<37weeks	2(8%)	23(92%)	25	
	37-42weeks	0	82(100%)	82	

*p value significant

The RDS related death were (p value-0.000) significantly more among ELBW babies and preterm babies below 34 weeks of gestation. Gender analysis showed no significant influence. Both birth weight and gestational age showed positive correlation of RDS death with significant p value of 0.000.

Table 18 : RDS and infant characteristics (n=184)

		RDS	others	Total	p value
Age at death	<24hrs	9(25%)	27(75%)	36	0.009 *
	1-3days	21(33%)	41(67%)	62	
	4-7days	10(28%)	25(72%)	35	
	8-28days	3(8%)	34(92%)	37	
	29-60days	0	14(100%)	14	
Place of death	Level I	0	16(100%)	16	0.046 *
	Level II	1(12%)	7(88%)	8	
	Level III	42(26%)	118((74%)	160	

*p value significant

Almost one third of deaths in the first seven days of life was due to RDS and was statistically significant (p value- 0.009). About 25% of deaths in level III institution were due to RDS and it was statistically significant (p value – 0.046).The higher incidence of deaths in Level III Institutions was probably due to the increased number of referrals of sick neonates and inadequate availability of ventilation facilities and surfactant therapy.

Table 19: Mother taking treatment for maternal illness during pregnancy

	Regularly	Irregularly	No treatment	Total
	n (%)	n (%)	n (%)	n (%)
PIH	7 (3.8)	9 (4.9)	2 (1.1)	18 (9.8)
Anaemia	7 (3.8	8 (4.3)	1 (0.5)	16 (8.7)
Diabetes	4 (2.2)	2 (1.1)	0	6 (3.3)

Only 9.8% mothers were taking treatment regularly. In majority they were not taking treatment regularly.

Access to Appropriate Care

Table 20: Duration of illness prior to seeking care

	Neonatal death	Death after 28 days	
<24 hrs	167	11	
1-<3days	2	3	
>=3days	1	0	Pearson chi square=20.122

P value=0.000

This table shows that Neonatal illness becomes severe in very short time and unless intervened immediately the out come could be very bad. Hence, there needs to be greater awareness for health seeking among parents for neonatal illness.

IV Health Seeking Behaviour

Table 21: During the illness that led to the death, did they seek care for the infant?

	n(%)
Seeking care	177 (96.2)
Not seeking care	7 (3.8)
Total	184 (100)

In majority 96.2% of the babies parents sought care for baby's illness. Only minority 3.8% of the babies parents didn't seek care for baby's illness

Table 22: Lack of awareness and Lack of services (n=184)

	n (%)
Family members unaware of danger signs	21 (11.4)
Bad child rearing practices and customs	1 (0.5)
Problems not identified &referred by Health care providers	6 (3.3)
Reaching other referral institutions	1 (0.5)

11.4% of the baby's family members were unaware of the danger signs of the babies. In 3.3% of the babies the sickness of the babies were not identified and referred by health care provider.

Referral babies:

Table 23: Transport mode (n=54)

Transport mode	n(%)
108 Neonatal	35 (64.8)
Two/Three Wheelers	4 (7.4)
Private ambulance	12 (22.2)
Train	1 (1.9)
108 General Ambul.	2 (3.7)

64.8% of the babies were transported in 108 neonatal ambulance services. 22.2% of the babies were transported in private ambulance services.

Table 24: Travelling time (n=54)

Travelling time	n (%)
< 1 hrs	26 (48.1)
1-2 hrs	25 (46.3)
2-3 hrs	3 (5.6)

In 51.9% of the babies the travelling time was more than 1 hour.48.1% of the babies reached the referred hospital within one hour.

Table 25: Antenatal steroids coverage (n=77)

Antenatal steroids	n (%)
Full course steroids given	15 (19.5)
Steroids not given	50 (64.9)
Incomplete course	12 (15.6)

Only 19.5% of the babies born between 24 weeks and 34 weeks of gestation had full course of antenatal steroids. In majority (64.9%) of the

preterm babies born between 24 weeks and 34 weeks of gestation antenatal steroids were not given. In 15.6% of the babies incomplete course was given.

Table 26: Surfactant administration in RDS babies.(n=43 RDS babies)

Surfactant	n (%)
Given	11 (25.6)
Not given	32 (74.4)

Surfactant was given in 25.6% of the babies. In all other babies who died of RDS surfactant was not given.

Table 27: Home death and time of death (n=12)

	n(%)
6am-6pm	2 (16.7)
6pm-12 night	2 (16.7)
12night-6am	8 (66.7)

Most of the home deaths (66.7%) occurred between 12 night to 6am.

Table 28: Death time overall (n=184)

time	n (%)
6am-6pm	93 (50.5)
6pm- 6am	91(49.5)

No difference in death between day and night times in overall deaths was found.

DISCUSSION

In our study, the parents of 184 young infant deaths were interviewed using verbal autopsy as a tool for getting an insight into the causes of infant deaths and their contributory factors. Our observation showed that most of the young infants who died belonged to Hindu religion and this might be because major proportion of population belonged to Hindu religion. Most of the babies belonged to backward community and scheduled castes (98.4 %). when we studied the maternal education 64.7% had studied upto higher secondary level and maternal education did not have any positive correlation with mortality. The same observation was seen by Hoa DP et al in their study in Vietnam. (61) The parents of 81.5 % deaths belonged to below poverty line.

Antenatal data analysis of the mothers who lost their babies showed that the majority of the parents (73.9%) were non-consanguineous and the age of the majority mothers was between 20-35 years. We saw more young infant deaths in the first born (53.3%). When early AN registration and the number of visits were analyzed we found that 75% of the mothers had done early registration (less than 12 weeks) and 96% of the mothers had received 3 or more visits.. Positive effects of AN registration and care on neonatal deaths have been shown in many

studies irrespective of other maternal characteristics like age and parity (62,63) . But both these factors did not have a significant correlation with the mortality (p value 0.479 & p value 0.315) contrary to the popular belief in our study . It goes to show that the quality of care provided during the AN period and intra-partum period is more important than the quantum of care.

Analysis of the place of delivery of these deaths showed that the majority of babies had been delivered in the tertiary level care medical college hospital (63.8%) and most mothers had undergone vaginal delivery (63 %)

Our study showed a higher proportion of deaths in males (58.7 %) compared to female infants (41.3 %) and it was not statistically significant. Male deaths were more due to asphyxia (16.3 % vs 6.5%)and sepsis (12.5 % vs 6 %) in our study. But this was not statistically significant. Khanna et al analyzed verbal autopsy reports over a 5 year period in India . They found that there was no sex difference in deaths due to birth asphyxia, sepsis, prematurity and congenital anomalies (64).

Analyzing the time of deaths, maximum deaths were early neonatal deaths (72.3 %).This is comparable to the report by Bapat U et

al(65). Nearly 20% of the deaths were within 24 hours of life. Baqui et al (66) in their study in Uttar Pradesh stated 32% deaths were within the first day. 57.6% of the neonatal deaths occurred within 3 days of life, which was similar to the study by Khanna et al(64) (58.5 % of deaths).So, almost 60% deaths occurred within the first 3 days of life and nearly three fourth of deaths had occurred by the first week in spite of 100% institutional deliveries. This again reiterates the fact that the emphasis has to be on improving antenatal and perinatal care available.

Major causes of death in our study were respiratory distress syndrome (23.4%), perinatal asphyxia (22.8%), sepsis (15.2%) and congenital malformations including congenital heart diseases (18%) in the neonatal period. This is comparable with the other major reports on neonatal deaths in India. The Million death study while analyzing 10892 neonatal deaths in India found prematurity (32%) sepsis (27%) and asphyxia (18%) accounting for nearly 80% of deaths.(23) while the leading causes of neonatal deaths in India as per" Count down to 2015" were prematurity(34%), asphyxia(19%) and sepsis (15%).Kapoor et al from Lucknow reported asphyxia(42.1%),prematurity(14.3%) and sepsis 12.3% as major causes for neonatal death.(67)

The predominant cause of death in term infants was perinatal asphyxia (34%).Sepsis accounted for 22% of the term deaths. RDS was the predominant cause of death among preterm infants (43%) .

Contributory factors to the common causes of death were analyzed. Analysis of asphyxial deaths revealed that delivery at level 1 care centre was associated with higher mortality ($p < 0.001$)compared to level 2 and 3 centres emphasizing the need to improve intrapartum monitoring and neonatal resuscitation skills in these centres. Higher birth weight and gestational age were associated with higher asphyxia deaths. (>2.5 kg -39 %,> 37wks- 37%).There was no significant association between mode of delivery and asphyxial death. Early Antenatal registration and regular antenatal visits (100%) did not reduce perinatal asphyxia . The mode of delivery did not show any significant relationship to asphyxial death .73% of asphyxia deaths occurred within 3 days suggesting severe intrauterine asphyxia in our study . So it is crucial to make sure that quality of care given during the intrapartum period is improved to decrease asphyxia deaths .

While analyzing the contributory factors to RDS related deaths it was found that delivery at level 2 centre and subsequent transfer to higher centre ,multiple births ,lower gestational age and birth weight were

associated with higher mortality. Male gender was not associated with poor outcome in our study. Moreover antenatal steroid had been administered to only 35% of eligible mothers. Only one fourth of babies who died of RDS had received surfactant. Improving antenatal services to recognize mothers prone to preterm delivery, improved antenatal corticosteroid coverage , intrauterine transfer to higher centres with facilities to manage these infants, better neonatal transport of sick preterm infants and improving the availability of ventilators, surfactant and skilled personnel at these referral centres all would contribute to reduce the preterm/RDS related mortality.

Sepsis related deaths had occurred in almost all babies irrespective of the maternal education, the parents being BPL, place of delivery, type of delivery, gestational age, birth weight and gender .This reiterates that risk for neonatal sepsis is omnipresent and strict aseptic delivery and neonatal care practices have to be consistently emphasized and monitored.

96.2% of parents of babies who died had sought medical help. According to Bhandari et al only 57% of mothers had sought medical help for their ill children in Delhi (68). This again emphasizes the importance of improving the care available at the medical facilities and

training the personnel in these centres in early recognition and management of neonatal illnesses.

The relationship to time of day and death was analyzed and there was no significant association.

Strength of the study

It is a community based study identifying contributory factors for young infant death

Weakness of the study

The contributory factors should be analysed with factors in surviving infants.

Future suggestions

The study can be done on large sample size comparing contributory factors in healthy surviving infants and died infants.

CONCLUSION

- Major portion of neonatal deaths occur within the first three days of life
- Major causes of neonatal deaths were respiratory distress syndrome, perinatal asphyxia and sepsis
- More asphyxial deaths occurred in higher gestational age and larger birth weight babies. Level I care deliveries resulted in more asphyxia related deaths. Most of the asphyxia deaths occurred within 3 days
- Lower gestational age, lower birth weight, multiple gestation and delivery at Level II centres were associated with higher mortality in respiratory distress syndrome. Male sex was not associated with poorer outcome in RDS
- Level of parental education, place of delivery, type of delivery, birth weight, gestational age were not significantly influence sepsis related deaths.
- Verbal autopsy as tool to assess the causes and contributory factors of neonatal deaths can help recognize the deficiencies in health care system and delivery and plan remedial measures.

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ANNEXURE – I : STUDY INFORMATION SHEET

Title: Verbal autopsy as a tool for identifing the contributory Factors for young infant death in Chennai corporation

Death analysis by verbal autopsy is used as a proxy to determine the possible causes of death. Verbal autopsy consists of an interview directed to a care giver (usually the mother) close to the deceased subject and then the information about the cause of death is obtained.

Verbal autopsy is used to collect complete data on medical, social, behavioral and environmental causes and contributors to neonatal death and to identify

each factor contributing directly or indirectly to the newborn death.It is used to identify preventable causes and contributors to death, including barriers and system issues to improve quality of care, to improve community systems of delivery of services for pregnant women, newborn and families with young children. When the results of the study are reveled, subjects identity will not be reveled. Participation in the study depends upon your willingness for the study

ANNEXURE – II : CONSENT FORM

I Ms/Mr._____ M/O//F/O, B/O _____

Sex_____resident of_____ I am willing for my child to be enrolled in the study"Verbal autopsy as a tool for identifing the contributory factors for young infant death in Chennai corporation

The doctors have explained to me the nature and the purpose of the study I have given my consent only after completely understanding the details that were explained to me.

I am willing for my baby to be enrolled in this study without any ones compulsion.

I have given this consent to be enrolled in this study with my full consciousness

Signature of the Investigator **Signature of parent**

Date :

Place: Chennai -8.

ANNEXURE – III :

ஆராய்ச்சி தகவல் தாள்

சென்னை மாநகராட்சிக்கு உட்பட்ட பகுதியில் பிறந்து இரண்டு மாதங்களுக்குள் இறக்கும் குழந்தைகளின் இறப்பிற்கான காரணங்களை வெர்பல் அடப்சி என்ற முறையின் மூலம் அறியும் ஆராய்ச்சி சென்னை மருத்துவக் கல்லூரியில் நடைபெறுகிறது.

வெர்பல் அடப்சி என்பது குழந்தையுடன் அருகே இருந்த அம்மா (அ) அப்பா (அ) உறவினர்களிடம் குழந்தை இறப்பதற்கான காரணங்கள் சம்பந்தமான கேள்விகள் கேட்கப்பட்டு அதற்கான பதில்கள் பெறப்படும். குழந்தைகள் இறப்பதற்கு சம்பந்தமான மருத்துவ, சமுதாய, பொருளாதார, மனோரீதியான காரணங்களுக்குரிய கேள்விகள் கேட்கப்படும். அந்த பதில்களை ஆய்வு செய்வதன் மூலம் குழந்தைகள் இறப்பதற்கு சம்பந்தமான காரணங்களை அறிந்தால், எதிர்காலத்தில் குழந்தைகள் இறப்பை குறைக்க தேவையான நடவடிக்கைகள் எடுத்து இறப்பு சதவீதம் குறைக்க உதவியாக இருக்கும்.

ஆராய்ச்சியின் முடிவுகள் அல்லது கருத்துக்களை வெளியிடும்போது அல்லது ஆராய்ச்சியின் போதோ தங்களது பெயரையோ அல்லது அடையாளங்களையோ வெளியிடமாட்டோம். என்பதை தெரிவித்துக் கொள்கிறோம்.

இந்த ஆராய்ச்சியில் பங்கேற்பது தங்களுடைய விருப்பத்தின் பேரில் தான் இருக்கிறது.

ஆராய்ச்சியாளர் கையொப்பம் பங்கேற்பாளர் கையொப்பம்

டாக்டர் ந.முத்துக்குமரன்
சென்னை மருத்துவக்கல்லூரி

இடம் :

தேதி :

ANNEXURE – I V:

ஆராய்ச்சி ஒப்புதல் கடிதம்

ஆராய்ச்சி தலைப்பு : வெர்பல் அடப்சி என்ற முறையை பயன்படுத்தி சென்னை மாநகராட்சி பகுதியில் பிறந்து இரண்டு மாதங்களுக்குள் இறக்கும் குழந்தைகளின் இறப்பிற்கான காரணங்களை கண்டறிதல்.

பெயர் : தேதி :

வயது : ஆராய்ச்சி சேர்க்கை எண் :

பால் :

இந்த ஆராய்ச்சியின் விவரங்களும், அதன் நோக்கங்களும் முழுமையாக எனக்கு விளக்கப்பட்டது.

எனக்கு விளக்கப்பட்ட விஷயங்களை நான் புரிந்து கொண்டு நான் எனது சம்மதத்தை தெரிவிக்கிறேன்.

இந்த ஆராய்ச்சியில் பிறரின் நிர்பந்தம் இன்றி என் சொந்த விருப்பத்தின் பேரில் தான் பங்கு பெறுகிறேன்.

நான் குழந்தைகளின் இறப்பிற்கான காரணங்களை அறியும் ஆராய்ச்சியின் விவரங்கள் கொண்ட தகவல் தாளை பெற்றுக் கொண்டேன்.

நான் என்னுடைய சுயநினைவுடன் மற்றும் முழுசுதந்திரத்துடன் இந்த மருத்துவ ஆராய்ச்சியில் என்னை சேர்த்து கொள்ள சம்மதிக்கிறேன்.

கையொப்பம்

ANNEXURE V:

From

The Deputy Project Coordinator.
District Family Welfare Bureau,
Corporation of Chennai,
Chennai -3.

To

Dr.Muthukumaran,M.B.B.S,
D.M.Neonatology,
Institute of Child Health and
Hospital for children ,Egmore,
Chennai -600 002.

FW & MCH.C.No.Trg./F20/ 2748 /2012.

Date: 30.8.2012.

Sub:- FW & MCH Programme – Training – Permission for Dr. N. Muthukumaran, M.B.B.S., D. M. Neonatology, (ICH, Egmore) to conduct a study titled " Verbal autopsy as a tool for identifying the contributory factors for young infant death (upto 2 months of age) in the community" from September 2012 to February 2013 in all the Health Posts — Permission Orders – Issued - Reg.

Ref: Orders of the Joint Commissioner, (H), dated: 27.8.2012.

****

As per the orders of the Joint Commissioner (H) , permission is accorded to Dr.Muthukumaran, M.B.B.S; D.M.Neonatology ,(ICH, Egmore) to conduct the study titled "Verbal autopsy as a tool for identifying the contributory factors for young infant death (upto 2 months of age) in the community" from September 2012 to February 2013.,in all the Health Posts.,Corporation of Chennai. You are instructed to contact the Zonal Officers and to submit a copy of the findings of the study after completion of study to the District Family Welfare Medical Officer.

30/8/12

District Family Welfare
Medical Officer.

30/8/12

Deputy Project Coordintor.

ANNEXURE : VI PROFORMA

1	Name of the infant						
2	Sex						
3	Name of Mother and Father	**Mother:**			**Father:**		
4	Mother's residence address at the time of death with Ph. No: District						
5	Permanent address with Ph.No District						
6	Date and time of death	Date :		Time: AM/ PM			
7	Place of Death	1) Home	2) HSC	3) PHC	4) Urabn Health Post / Mat. Centre	5) Taluk / Non Taluk Hosp.	
		6) Dist.HQR Hospital	7) Govt. Med. College Hosp.	8) Pvt. Medical College	9) Private Nursing Home/Hospital	10) Transit	11) Others
8	Age at the time of death	Days:		Hours(if less than one day):			

SOCIO-ECONOMIC DETAILS

1	Religion	1) Hindu	2) Muslim	3) Christians	4) Others	
2	Community	1) SC	2) ST	3) BC	4) MBC	5) Others
3	Education status(MOTHER)	1) Literate		2) Non-Literate		

4	Education status(FATHER)	1) Literate	2) Non-Literate
5	Whether BPL Family?	1) Yes	2) No
6	Family type	1) Nuclear	2) Joint
7	Consanguineous marriage	Yes	No

D. **ANTE NATAL AND NATAL DETAILS**

1	AN Registration	1) Below 12 weeks		2) 12- 28 weeks		3) Above 28 weeks	4) Not Registered	
2	No. of AN check ups received	1) 1	2) 2	3) 3	4) 4	5) 5	6) 6 & above	7) Not known
3	Duration of pregnancy	1) 20-28 weeks	2) 29-37 weeks		3) Above 37 weeks	4) Not known		
4	Whether mother had following illness during pregnancy?							
	1) Diabetes	2) Heart disease	3)Anaemia	4)Epilepsy	5)PIH	6)Others (specify)		
4.1	Was the mother taking treatment for these illnesses?	1) Regularly	2) Irregularly	3) Never	4)Not Known			
5	Date and time of delivery	Date :		Time: AM/ PM				
6	Place of delivery	1) Home	2) HSC	3) PHC	4) Urban Health Post / Mat. Centre	5) Taluk / Non Taluk Hosp.		

		6) Dist.HQ R Hospital	7) Govt. Med. College Hosp.	8) Private Medical College Hospital	9) Private Nursing Home / Hospital	10) Transit	11) Others
7	Delivery conducted by	1) TD / UTD	2)VHN/ANM/ Mat Asst.	3) Staff Nurse	4)Doctors	5) Others	6) Not known

8	Type of delivery	1) Normal		2) Caesarian	
		3) Assisted	a) Yes	b) No	c) Not Known
9	Was the baby single or multiple birth?	1) Single		2) Multiple	
10	Whether mother had birth companion during labour?	1) Yes	2) No	3) NK / NA	
11	Birth interval	1) Below 12 months	2) 12- 23 months	3) 24-35 months	4) 36 months & above / 5) Not Applicable
12	Birth order details	Para:_____	Total Still Birth : ___	Order of Live birth : _____	
13	No. of living children	Male:		Female:	
14	Age of mother at the time delivery				
15	Birth Weight in gms(If taken)				

15.1	If Not weighed, was the baby Very small?	1) Yes	2) No	3) Don't know
16	HIV status of mother (do not ask this question directly to the respondent)	1)Positive	2) Negative	3) Not ascertained

.INFANT CARE

1	Feeding practices	1) Exclusive Breast Feeding (upto 6 months)	2) Exclusive artificial feeding	3) Mixed	4) Not applicable	5) Not known
1.	If artificial feeds given by	1) Bottle	2) Paladai	3)Combination	4) Others	5)Not Known
2	No. of PN visits given within 10 days of birth (only for NND)					
3	Any other illness prior to the current illness	1) Yes	2). No	3) Not known	4) Not applicable	
4	Who identified the current illness?	1) Parents	2) AWW	3) VHN	4)MO (PHC)	5) MO (GH/ Med. College)
		6) Medical Officer (Private Nursing Home)			7) Others	8) Not known
5	Treatment provided by whom	1)HSC	2) PHC	3) Urban Health Post	4) Taluk / Non Taluk Hospital	5) Dist. Head Quarters Hosital.
		6) Govt. Med. College Hospital	7) Private Nursing Homes	8)ISM	4) *Traditional Healers*	10) Quack

6	Was the infant referred?	1) Yes	2). No	3) Not known	4) Not applicable	
6.	If Yes, Did the infant attend the referral unit?	1) Yes	2). No	3) Not known	4) Not applicable	
7	Did the infant have normal milestones		1) Yes		2) No	
8	Was the baby attending the ICDS center (only for baby > 6 months)	1) Regularly	2) Sometimes		3) Never	
9	Immunization for age as per UIP	1)Appropriatel y immunized	2)Partially immunized	3) Not immunized	4) Not known	5)Not Applicable

.HEALTH SEEKING BEHAVIOR

1	How long was the illness that led to the infant's deaths?		1) Below 24 hrs	2) 1-3 days	3) Above 3 days	4) Not known
2	During the illness that led to the death, did they seek care for the infant?		1) Yes	2) No	3) Not known	4) Not applicable
2.1	**If "Yes," sought care from**					
	1) HSC	2) PHC	3) Urban Health Post	4) Taluk / Non Taluk Hospital	5) Dist. Head Quarters Hosital.	
	6) Medical College Hospital	7) Private Nursing Home	8) ISM	9) Traditional Healers	10) Quack	
2.2	***If "NO",*** " the reasons for not seeking care?" (MULTIPLE CODES APPLY)					

a)	**Lack of awareness**				
	1)Family members unaware of danger signs	*2)Reaching wrong referral institutions*	*3)Quackery*	*4)Bad child rearing practices & customs*	*5) Ignoring referral by the family members*
b)	**Lack of Transport**				
	1)No Transport facility	*2)Delay in getting transport from one institution to other*		*3)Lack of funds for mobilizing transport*	
c)	**Lack of Services**				
	1) Problem not identified & referred by Health Care Providers	*2) Infant's condition not stabilized before referral*	*3) Substandard care in institution*	*4) Lack of supplies in the Hospitals*	*5) Non availability of Specialists in the Hospital*
d)	**Lack of mobilizing funds (Specify)**				
	1) For transport	2) For treatment	3) For other expenses	4)	5)

FOR NEONATAL DEATHS)

1	Was the delivery complicated?	1) Yes	2) No	3) Not known
2	**If yes, circle the below mentioned cause of death based on criteria given.**			
2.A	***Birth Asphyxia***			
	1) Labour pain – delivery interval > 12 hr	2)Convulsions	3)Mal presentation	
	4)APH	5)Cord around the neck	6) Meconium stained liquor / baby	

2.B	**Neonatal Sepsis**				
	1) Foul smelling liquor		2) Maternal fever	3) Membrane rupture – del. Interval > 18 hours	
3	Labour pain – delivery interval in actual hours				
4	Membrane rupture – delivery interval in actual hours				
5	***Birth Injury***	Were there any bruises or marks of injury on the baby's body at birth?	1) Yes	2) No	3) Not known
6	***Birth Asphyxia***	1)The baby did not cry Immediately at birth .	2)The baby cried after resuscitation	3)The cry was weak	4) Was the baby not able to suck in a normal way after birth?
7	***Hypothermia***	1)The baby was left uncovered	2) The baby was cold to touch at abdomen, axilla palms and soles		
8	***Sepsis***	1)The baby stopped sucking in a normal way	2)The baby had spasms or convulsions	3) The baby became unresponsive / unconscious	4)The baby had bleeding from nose and mouth
		5)The baby had petechea (***Sevapu***)	6) The baby had redness or oozing or bleeding /pus from the umbilical cord	7)The baby had areas of skin that were red and hot	8)The baby had skin rash with pustules
9	***Diarrhoea***	1)The baby had loose or liquid stools	2) Felt that this represented more loose or liquid stool than usual for the baby	3)There was visible blood in the stools	4)Baby lethargic / unresponsive at the time of loose stools
10	***Jaundice***	The baby's eyes, palms and soles were yellow			
11	***Resp. Distress (Pneumonia)***	1)The baby had fast breathing	2) Severe in drawing of chest	3) Grunting / Nasal flaring	

12	***Congenital Malformation /Congenital heart disease***	1)The baby had major malformations at birth	2)The baby vomited / Regurgitated after every feeds	3)The baby choke after every feeds
13	Can you assign any other cause other than the ones given above?			1) Yes / 2) No
14	If yes, then write diagnosis here			

FOR POST NEONATAL DEATHS)

1	Whether the infant had fever?		1) Yes	2) No	3) Not known
2	If yes, how many days did the fever last?			. . . . . days	
2.1	**Malaria**	1)Chill present during the episode of fever	2) It is an endemic area for malaria	3) No focus of sepsis identified	4) The infant was unconscious
2.2	Did the infant have cough?		1) Yes	2) No	3) Not known
	Pneumonia	If Yes, for how many days did the cough last?		. . . . . days	
		1)The infant had difficulty in breathing	2)The infant had fast breathing	3)The infant had chest in drawing	4)Grunting/nasal flare
2.3	**TB**	1) There was cough for > 1 month		2) There was failure to gain weight / grow	4) There was history of contact with TB
2.4	***Meningitis***	1)The infant experienced generalized convulsions	2)The infant was unconscious	3)The infant stopped responding to voice	4)The infant stopped following movements with the eyes
		5)The infant had a stiff neck during the illness (Demonstrate a stiff neck)			6) The infant had bulging fontannels during the illness

2.5	Did the infant have skin rashes?		1) Yes	2) No	3) Not known
	Measles	If Yes, Where was the rash?	1) Face		2) Body
			3) Arms / legs		3) Not known

		How many days did the rash last?	_____days	
2.6	**Sepsis**	The infant had bleeding into the skin or from any body opening		
3	**Diarrhoea**	1) The infant had frequent liquid, watery or loose stools	2) The child was lethargic/ unconscious during this episode of diarrhea	3) There was visible blood in the liquid / watery stools
4	***Malnutrition***	The infant was very thin and wasting of muscles noticed during the months before the death		
5	***Anaemia***	The infant had swollen legs or feet during the illness	The infant had pale palms and nails during the illness (***Sogai***)	
6	Was there any history of bite/sting		1) Yes	2) No / 3) Not known
7	Can you assign any other cause other than the ones given above?		1) Yes	2) No
7.1	If yes then write diagnosis here			

PROBLEMS FACED BY THE PARENTS IN GETTING TREATMENT IN THE HEALTH FACILITY

S. No	Details	First Health Facility	Referral Institution I	Referral Institution II	Referral Institution III
1	Date and time of referral				
2	Date and time of reaching referral institution				
3	Type of the Institution (1-PHC, 2- Tk/Non Tk. GH, 3-Dist. HQR GH, 4- Govt. Med. College Hosp. 5- Private Hospitals)				

4	Type of treatment received in the institution (Multiple code apply) (1-Nil,2-Warmth,3- IV fluids, 4-O2, 5 – Others, 6- Not known)					
5	Specify the reasons for going to next institution (Multiple code apply) (1- Lack of specialists, 2- lack of lab personnel, 3- lack of investigative & diagnostic equip. , 4 – Others(specify), 5- Not known)					
6	Transport	Mode (1-Ambulance, 2-Cycle , 3-two/three wheelers 4-bus/car etc, 5-Others 6.Not known)				
		Distance in KMs				
		Amount spent (in Rs.)				
7	If baby was taken to any institution other than referred	State the reasons (1- No funds, 2- Distance, 3- Belief, 4-No support, 5- Not known)				
		Who decided (1-self , 2- family, 3- Neighbour, 4- elders, 5- Others)				
8	Was the treatment Initiated soon after reaching the Institution? (Yes/ No)					
	If no, due to (Multiple code apply) (1-Informal payment, 2- Mobilizing specialists, 3- Mobilizing equipments, 4-Lab personnel, 5- Others)					
Antenal Steroids						

surfactant	
PROBABLE MAIN CAUSE OF DEATH (Only one cause alone should be written)	ASSOCIATED FACTORS (More than one factors can be given) including social factors

ANNEXURE VII : MASTER CHART

slno	Sex	pldeath	ageatdehrs	ageatdeday	religion	community	ednMo	BPL_fam	Fam_typ	Can_mar	AN_reg	No_Ancheck
1	1	16		5	2	3	2	1	2	2	2	5
2	2	1		14	1	3	2	1	1	2	2	3
3	1	16		13	1	4	6	1	2	1	1	6
4	1	12	12		1	3	3	1	2	2	1	6
5	2	13	6		2	3	2	1	1	1	1	5
6	1	16		1	1	3	1	1	1	1	1	4
7	2	13		8	1	3	3	1	2	2	3	2
8	2	1		51	1	1	6	2	2	2	1	5
9	1	16	1		1	3	2	1	2	1	1	3
10	1	17	3		2	3	3	1	1	2	1	5
11	1	14		19	1	4	2	1	2	2	1	6
12	1	15		1	1	4	6	1	2	2	1	6
13	1	14		5	3	1	3	1	1	2	1	6
14	1	1		25	1	1	3	1	1	2	2	3
15	1	12		50	1	4	6	2	1	2	1	6
16	2	13		1	1	3	3	1	2	2	1	6
17	1	13		5	1	3	6	2	1	2	1	6
18	2	12		7	1	1	4	1	2	2	1	6
19	1	15		1	1	1	2	1	1	2	2	4
20	1	14		2	1	1	3	1	1	1	1	6
21	2	13	4		2	3	3	1	2	2	2	6
22	2	16	16		2	1	2	1	1	2	1	3
23	2	1		38	2	1	3	1	1	2	2	6
24	2	14		21	1	1	4	1	1	1	2	5
25	1	7	14		1	3	3	1	1	2	1	6

slno	Mo_ill_Durpreg	Mo_takeTr	pldel	del_cont	Typ_del	single_mul	Birt_interval	order_LB	AgeatMO	Bwt_gms	illnes_inf_death
1	5	2	16	4	2	1	5	1	19	2250	1
2			16	4	1	1	5	2	24	1750	1
3			16	4	1	1	5	1	23	3000	1
4			4	4	2	1	5	1	27	2400	1
5			13	4	2	1	5	1	32	2400	1
6	3	2	16	4	1	1	5	1	20	1550	1
7			13	4	1	1	5	1	23	1250	1
8			9	4	1	1	2	2	31	3500	1
9	7		16	4	2	1	4	2	29	2000	1
10	12		17	4	2	1	2	2	23	2000	1
11			14	4	1	1	5	1	23	2015	2
12	8		4	4	2	1	5	1	22	2800	1
13	3	2	14	4	2	1	4	2	28	3500	1
14	3	2	4	3	1	1	4	2	22	2250	3
15	5	2	9	4	2	1	4	2	29	900	1
16	9	1	13	4	1	2	5	1	22	1060	1
17	11		13	4	1	1	3	1	24	1200	1
18	3	2	7	4	1	1	5	1	22	2500	1
19			9	4	1	1	2	2	20	1400	1
20	5	1	14	4	1	1	4	3	30	1700	1
21			13	4	1	1	3	3	24	930	1
22			16	4	1	1	5	1	20	1700	1
23			4	4	2	1	3	2	21	1800	1
24			14	4	1	1	5	1	20	2000	1
25			7	4	2	2	4	3	21	1030	1

slno	Durill_seek_care	if_NO_lkofaware	if_NO_lkser	combdiag	Transport_mode	ansteroids	surfactant	occmother	occfather	gestage	pnwarddeath
1	**2**	1		14				1	2	35	1
2	**2**	1		15				1	2	34	
3	**1**			6				1	2	39	
4	**1**			12	1			1	3	38	
5	**2**	1		14				1	3	39	1
6	**1**			6				1	2	32	
7	**1**			11		3	2	1	2	32	
8	**1**			12				3	3	39	
9	**1**			12		2	2	1	2	30	
10	**1**			13		2	2	1	2	35	
11	**1**	1	1	8		2	2	1	2	32	
12	**1**			6	3			1	2	38	
13	**1**			6				1	2	39	
14	**1**	1		15				1	2	38	
15	**1**			8	7	1	1	3	3	28	
16	**1**			11		2	2	1	2	31	
17	**1**			11		2	2	3	5	31	
18	**1**			6	1			1	2	40	
19	**1**			11	7	2	2	1	2	31	
20	**1**			13		2	2	1	2	34	
21	**1**			12		2	2	1	2	28	
22	**1**			11		2	2	1	2	35	
23	**2**	1		14		2	2	1	2	35	
24	**1**			6				1	2	38	
25	**1**			6				1	2	35	

slno	time_B	ampm	Travelhrs	Govt_holiday	Timeofdeath	time_death
1	9	pm		2	2	1
2	3	am		2	3	1
3	4	pm		2	1	1
4	12	am	1	2	3	1
5	6	pm		2	2	1
6	12	am		1	3	1
7	7	am		2	1	1
8	11	am		2	1	2
9	6	pm		2	1	1
10	3	pm		2	1	1
11	3	pm		2	1	1
12	10	am	1	2	1	1
13	12	am		2	3	1
14	5	am		1	3	1
15	5	pm	2	2	1	2
16	10	pm		2	2	1
17	11	pm		2	2	1
18	10	pm	3	2	2	1
19	5	am	1	2	3	1
20	10	pm		2	2	1
21	10	am		2	1	1
22	3	pm		2	1	1
23	11	pm		2	2	2
24	7	am		2	1	1
25	2	am		2	3	1

slno	Sex	pldeath	ageatdehrs	ageatdeday	religion	community	ednMo	BPL_fam	Fam_typ	Can_mar	AN_reg	No_Ancheck
26	2	13		7	1	4	3	2	2	1	1	6
27	2	9		2	2	3	6	2	2	2	1	6
28	2	17		35	3	3	2	1	2	2	1	6
29	1	13	8		1	4	1	1	2	1	1	5
30	1	1		45	1	1	3	1	1	2	1	3
31	1	12		2	1	1	3	1	1	1	2	4
32	2	13		3	1	1	3	1	1	1	1	5
33	1	13		1	2	3	3	1	1	2	1	5
34	2	13		2	1	4	3	1	1	2	1	5
35	1	13		1	1	1	6	1	1	2	1	6
36	1	13	11		1	3	6	1	2	2	1	6
37	2	13		2	1	4	3	1	1	2	1	6
38	1	14		13	1	4	3	1	1	1	1	5
39	1	16		7	1	1	2	1	2	1	2	4
40	2	10		59	1	3	3	1	1	2	1	5
41	1	12		2	1	3	3	1	1	2	1	6
42	1	13		1	1	1	3	1	1	2	2	3
43	1	13		2	1	1	3	1	1	2	2	3
44	1	12		7	3	3	3	2	1	2	1	6
45	1	13		1	1	3	6	1	2	2	2	6
46	2	13	20		1	1	4	1	2	2	1	6
47	1	12		1	2	3	3	1	2	2	1	6
48	1	13		4	3	3	3	1	1	2	1	4
49	1	12		1	1	1	2	1	1	2	1	5
50	1	12		3	2	3	3	1	2	2	1	6

slno	Mo_ill_Durpreg	Mo_takeTr	pldel	del_cont	Typ_del	single_mul	Birt_interval	order_LB	AgeatMO	Bwt_gms	illnes_inf_death
26			13	4	1	1	5	1	23	2230	1
27	8		9	4	2	1	5	1	25	1800	1
28			17	4	2	1	4	2	28	2600	1
29	7		13	4	1	1	3	2	25	1700	1
30	7		17	4	2	1	5	1	23	3200	2
31			4	4	2	1	4	1	22	3360	1
32	5	2	13	4	2	1	5	1	38	1100	1
33	7		13	4	1	1	4	2	22	1300	1
34	5	1	13	4	2	1	3	2	27	2100	1
35			13	4	2	2	5	2	36	1400	1
36			13	4	2	1	5	1	22	3000	1
37	5	1	13	4	2	1	4	2	37	1740	1
38			14	4	1	1	5	1	20	2100	2
39			16	4	1	1	5	1	20	1750	1
40	3	2	17	4	1	1	4	2	34	2000	1
41			4	3	1	1	5	1	19	2000	1
42			13	4	1	2	2	3	23	1400	1
43			13	4	1	2	2	3	23	1440	1
44	1	2	9	4	5	2	5	1	40	1400	1
45	1	1	13	4	1	1	4	2	31	3100	1
46	5	2	13	4	5	1	5	1	32	2350	1
47			3	3	1	2	3	2	25	1800	1
48			13	4	3	1	5	1	29	800	1
49			4	3	1	1	5	1	26	2700	1
50			3	3	1	2	3	2	25	1920	1

slno	Durill_seek_care	if_NO_lkofaware	if_NO_lkser	combdiag	Transport_mode	ansteroids	surfactant	occmother	occfather	gestage	pnwarddeath
26	**1**	1		13				1	2	38	
27	**1**			6	7			1	5	35	
28	**1**			8				1	2	39	
29	**1**			12				1	2	34	
30	**1**	1		9				1	2	40	
31	**1**			16	1			1	2	40	
32	**1**			11		2	2	2	2	31	
33	**1**			13		2	2	1	2	31	
34	**1**			6				1	2	40	
35	**1**			11		1	2	1	2	33	
36	**1**			6				1	2	36	
37	**1**	1		14				1	2	34	1
38	**1**			8				1	2	36	
39	**1**			8		2	2	1	2	33	
40	**1**			13				1	2	35	
41	**1**	1		6	3			1	2	38	
42	**1**			6				1	2	35	
43	**1**			6				1	2	35	
44	**1**			8	1			1	5	36	
45	**1**			12				1	3	38	
46	**1**			13				1	5	39	
47	**1**			11		2	2	1	2	34	
48	**1**			11		3	2	1	3	26	
49	**1**			6				1	2	39	
50	**1**			11		3	2	1	2	34	

slno	time_B	ampm	Travelhrs	Govt_holiday	Timeofdeath	time_death
26	9	pm		2	2	1
27	1	am	1	2	3	1
28	5	pm		1	1	2
29	12	am		2	3	1
30	5	am		2	3	2
31	7	pm	2	2	2	1
32	9	pm		2	2	1
33	8	pm		2	2	1
34	7	pm		2	2	1
35	6	pm		2	2	1
36	7	pm		2	2	1
37	6	am		2	1	1
38	4	am		2	3	1
39	11	am		2	1	1
40	8	pm		2	2	2
41	5	pm	2	2	1	1
42	11	am		2	1	1
43	11	pm		2	2	1
44	11	am	2	2	1	1
45	8	am		2	1	1
46	6	am		2	1	1
47	8	pm		2	2	1
48	3	pm		2	1	1
49	2	pm		2	1	1
50	3	pm		2	1	1

slno	Sex	pldeath	ageatdehrs	ageatdeday	religion	community	ednMo	BPL_fam	Fam_typ	Can_mar	AN_reg	No_Ancheck
51	2	13	18		1	3	6	1	1	2	1	6
52	1	12		1	1	1	3	1	2	1	1	6
53	1	13	5		2	3	3	1	2	2	2	5
54	1	14		2	1	1	3	1	1	2	2	5
55	2	10		44	1	3	3	1	2	2	1	6
56	1	13		1	1	1	3	1	1	1	1	5
57	2	15		12	2	3	3	1	1	2	2	2
58	2	13		2	1	1	3	1	1	2	1	5
59	1	14		42	1	1	2	1	1	2	1	5
60	2	16		7	1	1	3	1	1	2	1	5
61	1	13		2	1	1	2	1	2	2	2	3
62	1	9	18		1	1	4	2	1	2	1	5
63	1	12	9		1	3	3	1	2	2	1	4
64	1	12		30	1	1	3	1	2	2	1	6
65	2	13		6	1	4	3	1	1	1	2	3
66	1	13		17	1	1	3	1	2	2	1	5
67	2	12		6	2	3	6	2	1	1	1	5
68	1	13		27	3	3	6	2	1	2	1	5
69	2	12		11	1	4	3	1	2	1	2	4
70	2	13		5	1	3	3	1	2	2	1	6
71	1	12		37	1	1	3	1	1	2	2	6
72	1	13		4	2	3	4	1	1	2	1	6
73	2	13		17	1	4	3	1	1	2	2	5
74	1	13		1	1	1	3	1	1	2	2	6
75	2	12		8	1	3	2	1	1	2	1	5

slno	Mo_ill_Durpreg	Mo_takeTr	pldel	del_cont	Typ_del	single_mul	Birt_interval	order_LB	AgeatMO	Bwt_gms	illnes_inf_death
51	9	1	13	4	1	1	3	2	32	3600	1
52			4	3	1	1	4	2	22	2600	1
53	1	1	13	4	1	1	5	1	18	1700	1
54			14	4	1	1	3	3	34	3500	1
55	3	2	13	4	1	2	5	1	23	1500	1
56	5	2	13	4	1	1	4	2	34	800	1
57			4	3	1	1	2	2	19	2750	1
58	12		13	4	1	1	5	1	22	1900	1
59			14	4	1	1	3	2	30	2000	1
60	3	2	16	4	1	1	5	1	20	1120	1
61			13	4	1	2	5	1	25	1240	1
62	5	2	4	3	1	1	3	2	25	2900	1
63	13		9	4	1	2	3	1	19	900	1
64			9	4	2	1	3	2	30	2300	1
65	3	2	13	4	3	2	3	2	26	1000	1
66			13	4	1	1	5	1	34	1400	1
67			16	4	1	1	5	1	22	1000	1
68			13	4	1	1	4	2	33	1420	1
69			16	4	1	1	5	1	20	2600	1
70			13	4	1	1	5	1	29	1240	1
71			16	4	2	1	4	2	29	2800	2
72			13	4	1	1	5	1	24	2650	1
73	3	2	13	4	5	1	3	3	24	2450	1
74			13	4	1	1	3	2	24	2800	1
75			9	4	1	1	3	2	22	2100	1

slno	Durill_seek_care	if_NO_lkofaware	if_NO_lkser	combdiag	Transport_mode	ansteroids	surfactant	occmother	occfather	gestage	pnwarddeath
51	**1**			13				1	5	36	
52	**1**			6	1			1	2	40	
53	**1**			8		1	2	1	2	32	
54	**1**			6				1	2	40	
55	**2**	1		23		1	1	1	2	32	
56	**1**			11		2	2	1	2	26	
57	**1**			13	1			1	2	39	
58	**1**			12				1	2	38	
59	**1**			8		2	2	1	2	32	
60	**1**			11		2	2	1	3	28	
61	**1**			11		3	2	1	2	32	
62	**1**			6	7			1	5	39	
63	**1**			11	1	2	2	1	3	26	
64	**1**			13	3			1	3	37	
65	**1**			11		1	2	1	5	32	
66	**1**			6		2	2	1	2	34	
67	**1**			8	1	2	2	3	4	29	
68	**1**			8		1	2	1	3	31	
69	**1**			8	1			1	3	39	
70	**1**			8		1	2	1	2	36	
71	**1**	1	1	8				1	2	38	
72	**1**	4		8				1	3	39	
73	**1**			17				1	2	38	
74	**1**			13				1	5	40	
75	**1**	1		10	8			1	2	34	

slno	time_B	ampm	Travelhrs	Govt_holiday	Timeofdeath	time_death
51	7	am		2	1	1
52	1	pm	1	2	1	1
53	1	pm		2	1	1
54	9	am		2	1	1
55	11	pm		2	2	2
56	9	pm		1	2	1
57	5	am	1	2	3	1
58	5	pm		2	1	1
59	6	pm		2	2	2
60	11	am		2	1	1
61	2	pm		2	1	1
62	1	pm	2	2	1	1
63	11	pm	2	2	2	1
64	2	pm	2	2	1	2
65	2	pm		1	1	1
66	1	pm		2	1	1
67	1	am	2	2	3	1
68	2	am		2	3	1
69	9	pm	2	2	2	1
70	11	am		2	1	1
71	1	pm		2	1	2
72	1	am		2	3	1
73	12	pm		2	1	1
74	10	pm		2	2	1
75	6	am	2	2	1	1

slno	Sex	pldeath	ageatdehrs	ageatdeday	religion	community	ednMo	BPL_fam	Fam_typ	Can_mar	AN_reg	No_Ancheck
76	1	13		17	1	3	3	1	2	2	1	5
77	2	13		11	1	1	3	1	2	2	2	5
78	1	13		2	1	4	4	1	2	1	2	6
79	1	17		6	1	4	3	1	2	1	1	6
80	2	12		1	1	4	3	2	2	1	1	5
81	1	10		38	1	3	3	2	2	2	1	6
82	1	5	4		1	4	3	1	1	2	1	6
83	1	12		1	1	3	4	1	1	2	1	6
84	2	12		1	1	4	3	2	1	1	1	5
85	1	12		13	1	3	1	1	2	2	1	6
86	1	13		9	1	4	4	1	1	1	2	5
87	1	14		2	1	3	2	1	2	2	1	5
88	2	13	19		1	1	1	2	1	2	2	3
89	2	13	8		1	1	1	2	1	2	2	3
90	2	16		2	1	1	2	1	1	2	1	3
91	2	1		22	1	1	3	1	1	2	1	6
92	1	12		5	2	3	6	2	2	1	1	6
93	2	12		6	1	4	3	2	2	1	1	5
94	1	12		1	1	1	3	1	1	2	1	5
95	2	16	1		1	1	3	1	2	2	1	2
96	2	12		15	1	3	3	1	1	2	1	6
97	1	12		22	1	3	3	1	2	1	1	5
98	1	16		6	1	5	3	1	1	2	2	6
99	2	12	12		1	4	6	2	1	2	1	6
100	1	12	13		1	4	6	2	1	2	1	6

slno	Mo_ill_Durpreg	Mo_takeTr	pldel	del_cont	Typ_del	single_mul	Birt_interval	order_LB	AgeatMO	Bwt_gms	illnes_inf_death
76			13	4	2	2	4	2	27	2100	1
77	5	2	13	4	1	2	5	1	20	1210	1
78			13	4	1	1	5	1	18	1700	1
79	10	1	17	4	1	1	5	1	18	1800	1
80			9	4	2	3	5	3	21	980	1
81			8	4	1	2	2	2	20	1980	2
82			5	3	1	1	5	1	25	1500	1
83			4	3	1	1	5	1	19	2000	1
84			9	4	2	3	5	2	21	1100	1
85			13	4	2	1	5	1	29	2000	1
86			13	4	1	1	5	1	23	1000	1
87			14	4	1	1	5	1	20	2250	1
88	7		13	4	1	2	3	2	28	820	1
89	7		13	4	1	2	3	2	28	890	1
90	3	2	16	4	1	1	3	3	25	1200	1
91			16	4	1	1	3	3	22	1500	1
92			9	4	1	1	4	2	25	4450	1
93			9	4	2	3	5	1	21	1050	1
94			4	4	5	1	4	2	21	3000	1
95	8		16	4	2	1	4	2	29	1900	1
96	5	2	16	4	2	1	5	1	27	3200	1
97	1	2	9	4	2	1	3	2	28	2500	1
98	3	2	16	4	1	1	3	3	28	2800	1
99	13		9	4	1	1	5	1	30	1000	1
100	9		9	4	1	2	5	1	30	980	1

slno	Durill_seek_care	if_NO_lkofaware	if_NO_lkser	combdiag	Transport_mode	ansteroids	surfactant	occmother	occfather	gestage	pnwarddeath
76	**2**			14				1	3	37	1
77	**1**			18				1	2	35	
78	**1**			11		2	2	1	2	33	
79	**1**			11		2	2	1	5	34	
80	**1**			11	7	1	1	1	5	28	
81	**1**	1	1	8		2	2	1	5	34	
82	**1**		1	11		2	2	1	2	33	
83	**1**			6	1	2	2	1	2	34	
84	**1**			11	7	1	1	1	5	28	
85	**1**			8				1	3	35	
86	**1**			8		2	2	1	3	28	
87	**1**			16				1	2	40	
88	**1**			11		3	2	1	5	26	
89	**1**			11		3	2	1	5	26	
90	**1**			12		2	2	1	2	32	
91	**2**	1		14		2	2	1	2	32	
92	**1**			6	7			1	5	39	
93	**1**			11	7	1	1	1	5	28	
94	**1**			6	3			1	2	39	
95	**1**			12				1	2	36	
96	**1**			8	1			1	2	39	
97	**1**			13				1	5	40	
98	**1**			8				1	2	40	
99	**1**			11	1	2	2	1	2	28	
100	**1**			11	1	2	2	1	2	28	

slno	time_B	ampm	Travelhrs	Govt_holiday	Timeofdeath	time_death
76	6	am		1	1	1
77	12	pm		2	1	1
78	8	pm		2	2	1
79	5	am		2	3	1
80	7	pm	1	2	2	1
81	6	pm		2	2	2
82	5	pm		2	1	1
83	7	am	1	2	1	1
84	6	am	1	2	1	1
85	10	am		2	1	1
86	5	pm		2	1	1
87	5	am		2	3	1
88	2	pm		2	1	1
89	3	am		2	3	1
90	4	am		2	3	1
91	5	am		1	3	1
92	4	pm	2	1	1	1
93	12	pm	1	2	1	1
94	7	pm	1	1	2	1
95	8	pm		1	2	1
96	3	pm	1	2	1	1
97	8	pm		2	2	1
98	2	am		2	3	1
99	7	am	1	2	1	1
100	8	am	1	2	1	1

slno	Sex	pldeath	ageatdehrs	ageatdeday	religion	community	ednMo	BPL_fam	Fam_typ	Can_mar	AN_reg	No_Ancheck
101	1	12		6	1	1	4	1	1	1	1	6
102	1	12		8	1	3	2	1	2	2	1	5
103	1	12		2	1	3	3	1	1	2	1	6
104	1	12		52	1	3	3	1	1	1	1	6
105	1	12		11	1	2	3	1	1	2	1	5
106	2	12		1	1	2	3	1	1	1	1	6
107	2	1		21	1	4	3	1	1	2	1	6
108	1	10	2		1	3	4	1	2	1	1	6
109	1	13		6	2	3	3	1	2	2	1	6
110	2	13	6		1	3	1	1	1	1	2	4
111	2	12		9	1	3	3	1	1	2	1	6
112	2	12		27	2	1	3	1	2	1	1	6
113	1	14		1	2	3	2	1	2	2	1	5
114	2	7		2	1	1	4	1	1	1	2	5
115	1	12		7	1	1	6	2	2	2	1	5
116	2	12	13		1	1	2	1	1	2	1	5
117	2	7		23	3	1	3	1	1	2	2	2
118	1	13	1		1	1	3	1	2	2	2	5
119	2	1		20	1	4	3	1	1	2	1	6
120	1	12		6	1	4	3	2	2	1	1	6
121	2	13		4	1	1	3	1	2	1	2	6
122	1	13	18		1	1	3	1	1	1	2	5
123	2	13		4	3	1	3	1	2	1	1	6
124	1	13		9	1	1	4	1	1	2	1	6
125	2	12	19		1	3	2	1	2	1	1	6

slno	Mo_ill_Durpreg	Mo_takeTr	pldel	del_cont	Typ_del	single_mul	Birt_interval	order_LB	AgeatMO	Bwt_gms	illnes_inf_death
101			3	3	1	1	2	3	30	2800	1
102			4	3	1	1	5	1	26	3200	1
103			4	3	1	1	5	1	24	2600	1
104			4	3	1	1	5	1	24	2750	1
105			4	3	1	1	5	1	19	2100	1
106			4	4	2	1	5	1	19	3600	1
107			14	4	1	1	3	2	21	4500	1
108			3	3	1	1	4	2	27	2600	1
109	3	2	13	4	1	1	5	1	25	1630	1
110			13	4	1	1	4	3	27	1140	1
111			5	4	2	1	5	1	25	2600	1
112	8		16	4	2	1	5	1	20	2860	1
113			14	4	2	1	4	2	32	3600	1
114	9	1	7	4	2	1	2	1	20	2800	1
115			9	4	1	2	5	1	22	1200	1
116			3	3	1	1	3	4	25	2800	1
117			7	4	1	2	5	1	21	1400	1
118			13	4	2	1	5	1	23	1800	1
119			9	4	2	1	4	2	30	3250	1
120			9	4	1	1	4	3	29	2600	1
121	14	1	13	4	2	1	4	2	30	1500	1
122			13	4	5	1	3	3	24	3300	1
123			13	4	2	1	4	2	30	1550	1
124			13	4	1	1	5	1	20	1400	1
125	3	2	4	4	2	1	5	1	24	2800	1

slno	Durill_seek_care	if_NO_lkofaware	if_NO_lkser	combdiag	Transport_mode	ansteroids	surfactant	occmother	occfather	gestage	pnwarddeath
101	**1**			17	1			1	5	39	
102	**1**			6	1			1	2	40	
103	**1**			6	1			1	2	40	
104	**1**			19				1	2	40	
105	**1**			8	1			1	2	38	
106	**1**			6	1			1	2	38	
107	**2**	1		15				1	2	39	
108	**1**		2	6	1			1	2	38	
109	**1**			12				1	2	35	
110	**1**			12		2	2	1	2	29	
111	**1**			6	9			1	5	39	
112	**1**			8	1			1	2	39	
113	**1**			13				1	2	39	
114	**1**			16				1	2	40	
115	**1**			8	1	2	2	1	3	30	
116	**1**			6	1			1	2	38	
117	**1**			8		2	2	1	2	34	
118	**1**			6				1	3	38	
119	**2**	1		14				1	3	40	
120	**1**			20	1			1	5	39	
121	**2**			14		2	2	1	2	33	1
122	**1**			17				1	2	39	
123	**1**			6		2	2	1	3	33	
124	**1**			8		2	2	1	2	31	
125	**1**			6	1			1	2	39	

slno	time_B	ampm	Travelhrs	Govt_holiday	Timeofdeath	time_death
101	6	am	3	1	1	1
102	10	am	1	1	1	1
103	10	am	1	1	1	1
104	3	am		2	3	2
105	7	am	2	1	1	1
106	2	am	1	1	3	1
107	4	am		2	3	1
108	10	pm	2	2	2	1
109	5	pm		2	1	1
110	5	pm		2	1	1
111	9	am	2	2	1	1
112	9	pm	2	2	2	1
113	6	am		2	1	1
114	5	pm		2	1	1
115	11	am	1	2	1	1
116	1	am	3	2	3	1
117	1	pm		2	1	1
118	10	pm		2	2	1
119	11	pm		2	2	1
120	5	am	2	2	3	1
121	8	pm		2	2	1
122	5	am		2	3	1
123	8	pm		2	2	1
124	6	pm		2	2	1
125	3	pm	2	2	1	1

slno	Sex	pldeath	ageatdehrs	ageatdeday	religion	community	ednMo	BPL_fam	Fam_typ	Can_mar	AN_reg	No_Ancheck
126	2	17		18	1	1	1	1	2	2	1	6
127	1	12		1	1	3	3	1	2	2	1	5
128	1	12		13	1	1	3	1	2	2	1	6
129	1	1		24	3	1	3	1	1	2	1	6
130	2	12		5	1	3	3	1	2	2	1	5
131	1	12		4	1	1	3	1	1	2	1	6
132	1	14	18		2	3	2	1	2	2	1	5
133	2	13		2	1	4	4	1	2	2	1	6
134	2	9		5	3	1	2	1	2	2	1	5
135	1	13		1	1	3	1	1	1	2	1	6
136	2	1		21	1	1	2	1	1	2	1	5
137	2	12		50	1	4	3	1	2	1	1	6
138	2	13		4	1	5	2	1	1	1	2	6
139	1	13		3	1	3	2	1	1	2	1	5
140	1	13		3	1	3	6	1	1	2	1	6
141	1	1		5	1	3	2	1	2	2	1	6
142	2	14	1		1	1	6	1	2	2	1	6
143	2	1		20	1	3	3	1	1	2	1	5
144	1	12		1	1	3	4	2	1	2	1	5
145	1	12		54	1	1	3	1	1	2	1	6
146	1	12		19	1	1	4	1	2	1	1	5
147	2	13		6	1	3	2	1	1	2	1	6
148	2	14		2	1	1	3	1	1	2	2	4
149	1	13		2	1	1	6	1	1	1	2	5
150	2	13		2	1	1	3	1	2	2	2	6

slno	Mo_ill_Durpreg	Mo_takeTr	pldel	del_cont	Typ_del	single_mul	Birt_interval	order_LB	AgeatMO	Bwt_gms	illnes_inf_death
126			17	4	1	2	5	1	23	1500	1
127	8		9	4	2	2	5	1	32	700	1
128			13	4	1	1	5	1	24	3350	1
129			4	3	1	1	4	2	24	2750	1
130	8		9	4	2	2	5	1	32	650	1
131			4	3	1	1	4	2	23	2500	1
132	10	1	14	4	2	1	5	1	21	3750	1
133			13	4	1	1	4	2	26	875	1
134			9	4	2	1	3	3	24	3000	1
135	3	2	13	4	4	1	5	1	22	2100	1
136			9	4	1	1	4	2	22	2500	1
137	3	2	4	3	1	1	5	1	22	2500	1
138			13	4	1	1	4	2	28	640	1
139			13	4	5	1	5	1	23	3600	1
140			13	4	2	1	5	1	23	3600	1
141			4	3	1	1	5	1	24	2700	1
142	5	2	14	4	1	1	5	1	27	1200	1
143			16	4	1	1	5	1	20	2800	1
144			9	4	5	1	4	2	32	2500	1
145			9	4	2	1	4	2	30	3600	1
146			4	4	2	1	5	1	23	2700	1
147	7		13	4	2	1	4	2	29	1850	1
148	7		14	4	1	1	4	2	24	2600	1
149	5	2	13	4	2	1	4	3	32	1400	1
150	5	2	13	4	2	1	5	1	26	1250	1

slno	Durill_seek_care	if_NO_lkofaware	if_NO_lkser	combdiag	Transport_mode	ansteroids	surfactant	occmother	occfather	gestage	pnwarddeath
126	**1**			11		2	2	1	2	32	
127	**1**			11	1	2	2	1	3	26	
128	**1**			8				1	3	38	
129	**1**	1	1	8				1	2	39	
130	**1**			11	1	2	2	1	3	26	
131	**1**			8	1			1	2	40	
132	**1**			6				1	2	39	
133	**1**			8		2	2	1	3	31	
134	**1**			8				1	2	39	
135	**1**			16				1	2	40	
136	**1**	1	1	8				1	2	39	
137	**1**			8	1			1	2	38	
138	**1**			11		1	2	1	3	25	
139	**1**			6				1	2	38	
140	**1**			6				1	2	40	
141	**2**	1		8				1	3	38	
142	**1**			6		2	2	1	3	34	
143	**2**	1		15				1	2	39	
144	**1**			11	7	2	1	1	2	35	
145	**1**			21				1	2	39	
146	**1**			6	1			1	2	40	
147	**1**			6		3	2	1	2	34	
148	**1**			22				1	2	35	
149	**1**			11		3	2	1	2	32	
150	**1**			11		3	2	1	2	32	

slno	time_B	ampm	Travelhrs	Govt_holiday	Timeofdeath	time_death
126	7	pm		2	2	1
127	5	am	2	2	3	1
128	9	am		2	1	1
129	10	am		2	1	1
130	7	pm	2	1	2	1
131	5	am	1	2	3	1
132	5	am		1	3	1
133	12	pm		2	1	1
134	3	am		2	3	1
135	1	am		2	3	1
136	5	am		2	3	1
137	5	pm	1	2	1	2
138	5	am		2	3	1
139	3	pm		2	1	1
140	3	pm		2	1	1
141	5	am		2	3	1
142	10	am		2	1	1
143	4	am		2	3	1
144	8	pm	2	2	2	1
145	11	am		2	1	2
146	9	am	1	2	1	1
147	12	pm		2	1	1
148	3	pm		2	1	1
149	9	pm		2	2	1
150	7	am		2	1	1

slno	Sex	pldeath	ageatdehrs	ageatdeday	religion	community	ednMo	BPL_fam	Fam_typ	Can_mar	AN_reg	No_Ancheck
151	1	13	10		1	1	3	1	1	1	2	6
152	1	12		2	2	3	3	1	1	2	1	6
153	1	12		2	1	3	3	1	1	2	2	5
154	2	13		1	1	4	4	1	2	1	2	2
155	2	13		7	1	3	3	1	1	2	1	5
156	2	12		26	1	3	3	1	2	1	1	6
157	2	12		3	1	3	5	2	1	2	1	6
158	1	12	20		2	3	3	1	1	2	2	6
159	2	13		1	2	3	4	2	1	2	1	6
160	1	7		3	1	3	2	1	1	2	1	6
161	2	13	1		1	3	3	2	1	2	1	6
162	1	12		3	1	3	6	2	1	2	1	6
163	1	12		14	1	1	3	1	2	2	2	5
164	2	13	18		1	1	3	1	1	2	1	5
165	1	13	9		1	5	3	2	2	1	2	6
166	2	13	18		1	1	3	1	1	2	2	2
167	1	13		3	2	3	2	1	1	2	1	5
168	1	13		1	1	3	3	1	1	2	1	6
169	1	13		1	3	3	6	2	2	2	1	6
170	1	13		2	2	3	3	1	1	2	1	4
171	1	13	10		1	3	2	1	1	2	2	4
172	1	13		6	1	3	3	2	1	2	1	6
173	1	13		5	1	4	5	2	2	1	1	6
174	1	12		4	3	3	3	1	1	1	1	6
175	2	13		5	1	4	3	1	2	2	1	5

slno	Mo_ill_Durpreg	Mo_takeTr	pldel	del_cont	Typ_del	single_mul	Birt_interval	order_LB	AgeatMO	Bwt_gms	illnes_inf_death
151	12		13	4	2	1	3	3	24	3500	1
152			4	4	2	1	5	1	24	2750	1
153			9	4	2	1	3	2	22	2400	1
154	5	2	13	4	1	1	5	1	24	825	1
155			13	4	5	1	4	3	37	2200	1
156			3	3	1	1	3	2	21	2300	1
157	5	2	9	4	2	1	5	1	24	1600	1
158			4	3	1	1	5	1	26	2800	1
159	5	2	13	4	1	1	5	1	21	1500	1
160			3	3	1	1	5	1	20	2900	1
161	7		13	4	1	1	4	2	28	1400	1
162	8		9	4	1	1	4	2	30	1250	1
163			16	4	1	1	5	1	24	1400	1
164			13	4	1	1	2	2	28	750	1
165			13	4	2	1	3	2	27	2100	1
166	3	2	13	4	1	1	5	1	25	1300	1
167			13	4	1	1	5	1	23	1500	1
168	1	2	13	4	3	1	5	1	25	3100	1
169	1	1	13	4	1	1	2	2	32	900	1
170	12		13	4	2	1	4	2	24	2800	1
171			13	4	1	1	5	1	25	3500	1
172	8		13	4	2	1	5	1	23	2600	1
173			13	4	2	1	5	1	25	3100	1
174			4	4	2	1	5	1	24	2500	1
175			13	4	1	1	3	3	27	1100	1

slno	Durill_seek_care	if_NO_lkofaware	if_NO_lkser	combdiag	Transport_mode	ansteroids	surfactant	occmother	occfather	gestage	pnwarddeath
151	**1**			12				1	2	38	
152	**1**			6	1			1	2	40	
153	**1**			6	7			1	5	38	
154	**1**			11		2	2	1	4	29	
155	**1**			16				1	3	40	
156	**1**			16	1			1	3	40	
157	**1**			11	7	2	1	3	4	32	
158	**1**			16	1			1	5	40	
159	**1**			6				1	3	35	
160	**1**			6	9			1	2	39	
161	**1**			12		1	2	1	4	31	
162	**1**			11	1	3	1	4	3	31	
163	**1**			8	1	2	2	1	2	32	
164	**1**			11		2	2	1	2	26	
165	**1**			6				1	4	40	
166	**1**			12		2	2	3	5	33	
167	**1**			11		1	1	1	2	32	
168	**1**			12				1	2	39	
169	**1**			11		2	2	4	3	27	
170	**1**			13				1	2	36	
171	**1**			12				1	2	39	
172	**1**			12				1	5	40	
173	**1**			16				3	5	40	
174	**1**			12	1			1	2	36	
175	**1**			11		3	2	1	5	28	

slno	time_B	ampm	Travelhrs	Govt_holiday	Timeofdeath	time_death
151	11	pm		2	2	1
152	1	am	2	2	3	1
153	10	am	1	2	1	1
154	2	pm		2	1	1
155	3	pm		2	1	1
156	1	pm	2	2	1	1
157	9	pm	1	2	2	1
158	10	pm	1	2	2	1
159	7	pm		2	2	1
160	10	am	2	1	1	1
161	3	pm		1	1	1
162	8	pm	2	2	2	1
163	6	pm	1	2	2	1
164	3	pm		2	1	1
165	6	am		2	1	1
166	9	pm		1	2	1
167	12	am		2	3	1
168	6	am		2	1	1
169	4	am		1	3	1
170	6	am		2	1	1
171	12	am		2	3	1
172	5	pm		2	1	1
173	3	pm		2	1	1
174	11	am	2	2	1	1
175	6	pm		2	2	1

slno	Sex	pldeath	ageatdehrs	ageatdeday	religion	community	ednMo	BPL_fam	Fam_typ	Can_mar	AN_reg	No_Ancheck
176	2	13		3	1	3	3	1	1	2	1	5
177	1	13		5	1	1	3	1	1	2	1	5
178	1	13	18		2	3	4	1	2	1	1	6
179	1	13		3	1	4	5	2	2	2	1	4
180	1	13		10	1	1	4	1	1	2	1	6
181	1	9		2	1	3	6	2	1	2	1	6
182	1	9		1	1	3	5	2	1	2	1	6
183	2	8		3	3	4	6	2	2	2	1	6
184	2	9		3	1	3	6	2	1	2	1	6

slno	Mo_ill_Dur preg	Mo_takeTr	pldel	del_cont	Typ_del	single_mul	Birt_interval	order_LB	AgeatMO	Bwt_gms	illnes_inf_death
176			13	4	2	1	5	1	24	1500	1
177			13	4	1	1	5	1	25	980	1
178			13	4	1	1	5	1	20	1900	1
179			13	4	1	1	3	2	23	2700	1
180			13	4	3	2	5	1	27	1400	1
181			9	4	1	1	5	1	23	2600	1
182	5	1	9	4	1	1	5	1	23	2500	1
183			8	4	1	1	5	1	24	1500	1
184			9	4	2	1	4	2	26	2400	1

slno	Durill_seek_care	if_NO_lkofaware	if_NO_lkser	combdiag	Transport_mode	ansteroids	surfactant	occmother	occfather	gestage	pnwarddeath
176	**1**			11		2	2	1	2	32	
177	**1**			11		2	2	1	2	29	
178	**1**			11		3	1	1	2	34	
179	**1**			13				1	4	39	
180	**1**			11		1	2	1	2	30	
181	**1**			6				4	4	40	
182	**1**			8				3	3	39	
183	**1**			13		1	1	4	4	32	
184	**1**			16	7			3	3	40	

slno	time_B	ampm	Travelhrs	Govt_holiday	Timeofdeath	time_death
176	1	am		2	3	1
177	10	am		2	1	1
178	12	pm		2	1	1
179	5	am		2	3	1
180	5	pm		1	1	1
181				2	1	1
182				2	2	1
183				2	1	1
184			1	2	1	1