

Common causes of child mortality in Sana'a, Yemen

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ABSTRACT

Objective: To study the common causes of child mortality at Al-Thawrah Hospital, Sana'a, Yemen.

Methods: A retrospective study of 639 children aged 0-14 years, who died in the hospital within a 4 year period. This study was carried out at the Al-Thawrah Hospital, Sana'a, Yemen, between January 2000 and December 2003. Children who were admitted to the pediatric/nursery unit and died in the hospital were included in this study. Data were collected from patient's files, hospital register and death certificate to ascertain the cause of death and their percentage.

Results: Out of 4575 admissions to the pediatric unit, there were 639 children deaths (13.96%). Deaths were higher among those <2 years of age. The most common causes of deaths in the pediatric unit were infections

(18.1%) followed by respiratory problems (17.7%), central nervous system diseases (12%), renal (9.7%), malignancy (9.5%), shock (7.9%) and cardiac diseases (7.3%). While in the nursery, out of 4182 admissions in the same period, 823 died (19.67%), among these were pre-maturity (47%), birth asphyxia (23.7%), infections (10.9%), congenital anomalies (8.4%), central nervous system diseases (5.3%) and others (4.7%). Postmortem examination was not carried out in any of the cases.

Conclusion: The percentage of deaths on admission among children is less than it was previously, but remains high. The majority of the causes of death are preventable. Efforts to further reduce the mortality should be directed at prevention and early treatment.

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More than 10 million children die each year in the developing world, the vast majority from causes preventable through a combination of good care, nutrition and medical treatments. The prevalence of childhood mortality in developing countries is very high. In Africa and south Asia alone, it accounts for 90% of the world total.¹ In the Middle East and North Africa, the under 5 years mortality rate was recorded; 77% in 1990 and 54% in 2000 per 1000 live births. One of 6 African children died before 5 years of age;² thus, the district hospital may play an important role in reducing mortality,³ but sometimes resources are often limited and care may be of limited-quality.⁴ Malnutrition increases the risk of deaths, it gives 60% associated with total children deaths under 5

years global, this malnutrition risk increases in children admitted to the hospital and is present with almost very illness.⁵ In the majority of developed countries, the mortality among children is estimated to be 0.02 per 1000 childhood population.⁶ Overcrowding increases the chances of droplet infections.⁷ Malnutrition in a child has been shown to be associated with a history of malnutrition in its siblings.⁸ On the other hand, ignorance, unemployment and low income are important risk factors jeopardizing child survival. Based on the recent experience in Sri Lanka and Kerala state in India, it has been suggested that for every year of normal schooling for girls, a reduction of 10% in infant mortality be reasonably expected.⁹ In Indonesia and Pakistan, the infant mortality rate of

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children whose mothers had 4 years of schooling or more, was 50% of that of infants born to illiterate mothers.¹⁰ The risks associated with childbirth are highest after the fourth child.¹¹ Maternal malnutrition and short stature are also predisposing factors to low birth weight,¹² multiple pregnancy and maternal exhaustion during pregnancy predispose to low birth weight.¹² A study at the Naval Hospital, Naval City, North Carolina, has shown that active duty service women, despite defined limitations of work and ready access to health care, continue to represent a high-risk as preterm labor and premature rupture of membranes.¹³ Maternal urinary tract infections are associated with an increased incidence of disease in the neonate.¹² Malaria may cause abortion, premature labor, low birth weight, anemia or congenital infection.¹⁴ *Falciparum malaria* in non-immune gravidae commonly induces uterine contractions, which may lead to preterm labor.¹⁵ Maternal hepatitis B infection may cause congenital infection in the newborn correlated with prematurity. Prematurity is the most important neonatal risk factor.¹² Breast milk is the best food for the baby for at least the first 6 months of life, because it is safe, economical, ready available, and sterile. It contains colostrum with large amount of immunoglobulins. Breast milk also has an inhibitory effect on the growth of *Escherichia coli* in the intestine.¹² Human milk also protects against allergies (eczema) as well as against coronary artery diseases.¹² Bottle-feed infants have 3 times incidence of diarrhea compared with breast-feed ones.¹⁶ Both the duration and severity, as well as the case fatality of any disease are greatly increased by malnutrition.¹⁷

This study aims to study the common mortality causes among children at the Al-Thawrah Hospital, Sana'a, Yemen.

Methods. A retrospective study of 639 children aged 0-14 years, who died in the hospital within a 4-year period. This study was carried out at the Al-Thawrah Hospital, Sana'a, Yemen, between January 2000 and December 2003. Data were collected from the patient's file, hospital register and death certificate to ascertain the cause of death and their percentage. This study took place at Al-Thawrah Teaching Hospital along with other 3 hospitals in Sana'a, Yemen, which serves a population of approximately 1-2 million.

Records of all admitted children were analyzed at the end of this study period. No post-mortem examination was carried out for any of the cases. Parents refuse post-mortem examination as being a waste of time and various causes of deaths were expressed as a percentage of the total numbers of deaths. Our data were analyzed manually to calculate the rates and percentages.

Results. From the time of admission, there were 639 children deaths (13.96%) wherein 59.5% were males and 40.5% were females. Out of 4575 children admitted in the pediatric unit and out of 4182 admissions in the nursery, 823 died (19.67%) (males 35.2% and females 64.8%). The various causes of death in the pediatric unit were as follows: infections (116 [18.1%]), respiratory diseases (113 [17.7%]), central nervous system (CNS) problems (77 [12%]), renal (62 [9.7%]), malignancy (61 [9.5%]), shock (51 [8%]), cardiac (47 [7.3%]), malnutrition/anemia (35 [5.3%]), liver diseases (38 [5.9%]), bleeding tendencies (9 [1.4%]), and others 30 cases (foreign body aspiration 8, diabetic ketoacidosis 6, poison 7). While in the nursery, the common causes of their deaths were as follows: prematurity (47%), birth asphyxia (23.7%), infections (10.9%), congenital anomalies (8.4%), CNS diseases (5.3%) and others (4.7%). The children's age-group was between one day to 14 years (the mean age was 7 years). The timing of death at the pediatric unit in 639 children were those that died in the first 4 hours of admission in the 4 years period (127 [19.9%]); those that died in the first day of admission (152 [23.8%]); those died that on the second day of admission (8.3 [13%]) and those that died after the second day of admission (277 [43.3%]). Among the total 639 children death inside the pediatric unit, 66.7% were <2 years of age (group 1), 24% of 2.1-5 years (group 2) and 9.2% were seen in those >5.1 years (group 3).

It has also been noted that, the total children deaths in general emergency, pediatric emergency, pediatric unit and in the nursery in 4 years were 3006 (33.7% in general emergency [mainly due to road traffic accidents, gun shots, general trauma], 27.4% in the nursery, 21.2% in the pediatric unit and 17.6% in pediatric emergency). The mortality rate in our hospital (children unit) is still high, but somewhat declined as compared before in 1990 (26.2%), 1995 (20.1%), and 2003 (23.97%), similarly in the nursery, in 1990 (21.61%), 1995 after inter-country civil war, (40.4%) and in 2003 (16.9%). The children's mortality rate in each year to the total hospital mortality were as follow; on 2000 it was 53.5%, on 2001 it was 56.2%, on 2002 it was 52.8% and on 2003 it was 53.9%.

Discussion. Sana'a is the capital of Yemen, there are 1.2 to 2 million people live in this area. Al-Thawrah hospital is a 500 bedded and it is one of the 4 tertiary hospital in Sana'a, Yemen. The 40 beds' children unit includes 30 beds in the nursery and 10 beds in the pediatric emergency room. The health status of people is closely related to their access to safe drinking water and adequate sanitation facilities. In our country, the poor situation of fresh water sources along with severe shortages in sewerage systems are related to the

emergence and spread of contagious diseases. The connection between water sources and water borne diseases is not currently monitored. Less than half the population has access to safe water and sanitation.¹⁸ Only half of Yemen's water sources are to be considered safe, others need either treatment or should be completely avoided. Access to sanitation is very limited. For defecation, 45% of the population use an open pit or none at all. Although 92% of the urban population have access to some sort of sanitation facility, this is the case for only 43.2% of the rural population.¹⁸ The coverage of primary health care services is not comprehensive. They reach approximately 42% of the population, with a significant gap between urban (75%) and rural areas (24%).¹⁸ In rural areas, they are staffed by inadequately trained personnel, poorly equipped and have insufficient availability of drugs and medical supplies. Out-of-pocket expenses by Yemeni health care consumers are high and prove to be an important constraint to accessing health care. In Yemen, there is one physician for every 4,650 people, one nurse for every 2,913 and only one trained midwife for every 14,465.¹⁸ The system of outreach/emergency activities is insufficiently developed. Monitoring and registering epidemics and spread of leading infectious diseases or disease patterns (malaria, tuberculosis, human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS), Rift Valley Fever, and so forth) needs considerable improvement; furthermore, one-third of all deaths among <5 years occur due to vaccine preventable diseases. An estimated 12% of children suffer from disabilities, and there are few specialized facilities for children with disabilities.¹⁸ The proportion of the dead among children ever born to every-married women aged 45-49 is 0.20, compared with 0.13 for women aged 15-19.¹⁹ The <5-year-old child mortality has dropped from 203 deaths per 1,000 live births during the period of 15-19 years preceding the survey to 105 deaths during the 5 years prior to the survey.¹⁹ Female mortality is higher than male among children aged 1-4 years.¹⁹ The neonatal mortality decreased by 49% and postneonatal by 65%.¹⁹

Infant mortality has decreased from 186 deaths per 1,000 live births to 75 deaths per 1,000 live births, while children's mortality rate (1-4 years) has decreased from 91 deaths per 1,000 live births during the period 20-24 years preceding the survey to 32 deaths per 1,000 live births during the 5-years preceding the survey.¹⁹ The major risk factors affecting the high mortality rates among our children are residency, mother's education, medical maternal antenatal care, Qat and tobacco smoking, child's gender, maternal age at birth, birth order and birth space. Mortality rates are higher in rural areas than in urban areas. The infant mortality rate is 94

deaths per 1,000 live births in rural areas, compared with 75 deaths per 1,000 live births in urban areas. The <5 mortality rate in rural areas is 128 deaths per 1,000 live births, compared with 96 deaths per 1,000 in urban areas. The <5 mortality rates in the Coastal region were 137, Mountainous were 122, and Plateau and Desert regions were 113 deaths per 1,000 live births.¹⁹ Injuries and deaths due to road accidents and fire arms are particularly high in Yemen, but few reliable statistics are available. As a whole, the low levels of awareness with respect to health and hygiene and public health education is an important need that must be addressed.¹⁸ The infant mortality rate for children born to illiterate mothers was 93 per 1,000 live births and decreased to 62 deaths per 1,000 for children born to mothers who completed primary education and this further drop to 52 deaths per 1,000 births for children born to mothers with secondary or higher education.¹⁹ The <5 mortality rate decreased from 113 deaths per 1,000 live births for children born to mothers who received no medical maternal care to 101 deaths per 1,000 born to mothers who received medical maternal care during either pregnancy or delivery.¹⁹ Al-Barakani et al¹⁹ indicate that 79-84 deaths per 1,000 live births compared with 70 deaths per 1,000 live births occur among mothers who neither chew qat nor smoke tobacco. Infant mortality is higher for boys than for girls (98 versus 80 deaths per 1,000 live births). The pattern reverses slightly in child mortality and shows higher mortality in girls than boys (36 versus 33 deaths per 1,000 live births).¹⁹ This reversal suggests that there may be preference for boys and some tendency to provide greater care for boys than for girls during ages 1-4.¹⁹ Mortality <5 is higher for children born to women in the youngest age group (161 deaths per 1,000 live births) compared with 112-116 deaths per 1,000 for children born to other women.¹⁹ Maternal mortality and morbidity are high because of limited pre-, peri- and post-natal care and also because of exceptionally high fertility, early pregnancy, and low rates of using modern contraceptive. Only 22% of women give birth with the assistance of a skilled birth attendant. There is a serious lack of female medical staff. Because of culturally determined gender roles, women in Yemen can be discouraged from visiting male medical staff.¹⁸ The infant mortality rate is 110 deaths per 1,000 live births for first births, and decreased to 76 per 1,000 for fourth to sixth order births, then increases for birth order 7 or higher.¹⁹ Infant mortality decreases from 124 deaths per 1,000 live births for birth intervals <2 years to 36-55 deaths per 1,000 for birth intervals of ≥ 2 years.¹⁹ The common causes of deaths as the results presented indicate that fever (25%), vomiting (20%), and difficult breathing and convulsions (18-19%) are the most common symptoms during the neonatal period. During the post neonatal period,

the probable causes of child death are fever (69%), diarrhea (58%), vomiting (56%), and cough/difficult breathing (42%). For children >1 year, fever was again the most common symptom, associated with 74% of all deaths in that age group.¹⁹

This study has shown that children's mortality rate was 14% in the pediatric unit and 19.7% in the nursery. This result is variably higher than a study which was carried out in Port Harcourt Hospital, Nigeria between January 2000 to December 2000, which was 5.1% and the common of children mortality were birth asphyxia 20.4%, malaria 10.2%, anemia 10.2% and tetanus 9.2%,²⁰ compared to our study in the pediatric unit; infections 18.1%, respiratory 17.7%, CNS 12% then renal 9.7% and in the nursery was pre-maturity 47%, birth asphyxia 23.7%, infections 10.9% and congenital anomalies 8.4%. This mortality rate is also higher comparatively to a similar study which was recorded in Ilorin-Western Nigeria, which was 11.6%²¹ and very much higher compare to causes of deaths in infants and children in the United States of America which were mainly due to congenital heart defects and was 0.02 per 1000 population.

We do not have any reliable recorded data of pediatric human immunodeficiency virus or AIDS infections causing mortality among our children and even no prevalence record inside our community. To compare our country's neonatal mortality rate with other nearby countries which was carried out by United States Agency for International Development (USAID) population health and nutrition global programed, medium-term trends in neonate mortality, in Yemen 1990 the neonate mortality rate per 1000 lives births was approximately 48, in Egypt 1995 was approximately 35, in Tunisia 1988 was 30 and in Jordan 1995 was 23.

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