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Original Article

Mortality Causes in Children 1-59 Months in Iran

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Abstract

Background: Mortality rate indicator for children under 5 years old is one of the important indicators in countries' development. Identifying the most common causes of mortality is one of the most important attempts to reduce mortality in children less than 5 years. The purpose of this study was to identify distribution of the mortality causes in Iranian children less than 5 years.

Methods: This cross-sectional study has been carried out based on the results of data from the Child Mortality Surveillance System since 2007 to 2008. To determine the causes of death questionnaires have been designed which include personal data of the deceased child, medical history, and information on procedures at the time of hospitalization or death.

Results: Of 5926 deaths on children under 5 years which the questionnaires were filled out, 63.2% were postneonatal deaths (1-11 month). Totally 60% of mortalities occurred in the rural areas and 52% of them had been among boys. The most common causes of mortality were the congenital and chromosomal abnormalities with 23.4%. The most incidences among diseases were respiratory system diseases.

Conclusions: Carrying out more epidemiologic studies, providing health programs to control and prevent diseases with high incidences and delivering more specialized health facilities and services could be the proper strategies to reduce under 5 mortality rates in Iran.

Keywords: Mortality, Children under 5 years, Surveillance system, Iran

Introduction

Being awareness of mortality status in community and its common causes has an effective role on planning in health and education priorities (1). One of the most important indicators of countries development is the mortality rate of children less than 5 years old (2). The under 5 mortality rate (U5MR) of children is the death rate of children before the age of 5 which is consisted of two stages; from childbirth to 1 month and since 1 month to 59 months (3). Meanwhile the 1 to 50 months mortality should be analyzed in two age groups including postneonatal deaths (1-11 month) and childhood deaths (deaths in children aged 1–4 years (4). The child mortality rate in communities has been decreased due to economic and social developments and carrying out the effective interventions.

According to the fourth Millennium Development Goals (MDG 4), countries of the world were committed to reduce the mortality rate of their children less than 5 years since 1990 to 2015 to 75 percent. However many countries, especially in sub-Saharan Africa and South Asia were not successful in achieving the goals for decreasing mortality rate in children (5). The susceptibility to some diseases and differences on causes of death in this age group with others, has been caused the assessment of mortality in children younger than 5 years is being important (6). In addition it is important to analyze other aspects of death occur-

rence like as the place, season, literacy of mother and etc.
This study aims to identify the causes and related predisposal factors of mortality among children under 5 years in Iran (between 1 to 59 months) during one year of Iranian calendar which was equal to 2007 to 2008.

Methods

This cross-sectional study has been carried out based on results of data from the Child Mortality Surveillance System from 2007 to 2008 (during one year of Iranian calendar 1378 Hijri-Shamsi). In this national study, the acquired information from 346 District Health Networks and more than 700 hospitals via Mortality Surveillance System for children under 5 years old has been gathered. The coverage of this system for the population based on the reports of the Ministry of Health has been estimated to be more than 90%. The child mortality surveillance system is a part of death registration system under supervision of the Department of Child Care with specific focus on deaths of children between 1 to 59 months of age. This system tries to register deaths and determines strategies for prevention of deaths through the control of predisposal factors and accessibilities. This system uses the specific tools and evaluation processes including data sheets, specific checklist which is being filled out by paediatricians and evaluation and decision making processes for prevention which is being conducted through district and university councils.
During the year, the mortality cases of children under 5 years were evaluated by questionnaires, and then the mortality rates were calculated. From the 6935 numbers of deceased registered cases for 5935 cases, the questionnaires were filled out. The questionnaires data were entered to the software. The questionnaires for investigating the death causes were consisted of different parts including the profile of family and health records of deceased child, medical history of deceased child and the history of medical interventions. According to ICD10, the information of mortality causes was collected and presented separately in the provincial level.
The resulting data were recorded in the Death Registration Software and were analyzed using descriptive statistics (mean ± SD).

Results

From 6935 cases of child deaths (1-59 months) in all provinces, 5926 were investigated for the causes of death. According to demographic data of children death via dividing the ages into 5 groups, more than 62% of children deaths were between 1 to 11 months. 2.63% of mortalities is related to postneonatal and the remained mortality of 37% to the childhood period. 52.6% of deceased children were male and 47.4% were female. Based on residence location, 60% of deceased children were residents in rural areas and 40% were from urban communities. Evaluating the mortality causes of children (1-59 months) based on ICD-10 classification showed, the most common causes of death in children (1-59 months) in the country have been presented in Fig. 1.

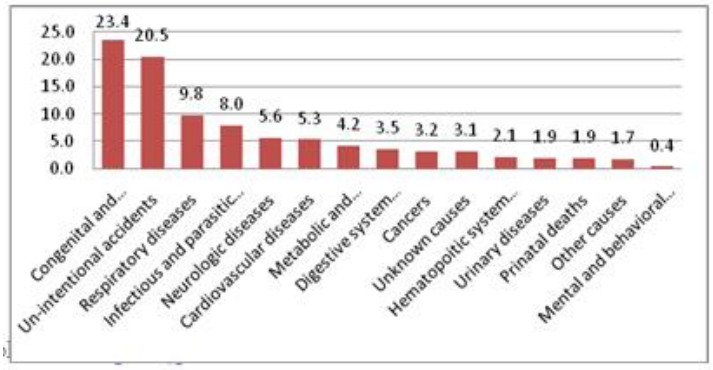

Fig. 1: Causes of death for children aged (1-59 months) from 2007 to 2008 (1387 Hijri- Shamsi- one Iranian year)

Among the places of death occurrence the hospital had the highest proportion of 68.4% for males and 61% for females, and after these units houses had the next score, 25.5% for male and 33% for females. The survey shows that most of

deaths in children aged 1-59 months were related to illiterate mothers (37%). The next scores are related to mothers with primary school enrolment (31%) and with increasing the literacy the percentage of deaths have been decreased, although it is notifiable that these data have not been adapted to the ratio of child bearing for the mothers in different literacy status. According to the statistics 26.9% of the deaths have been occurred in fall which has the highest score in comparison to other seasons.

Table 1: Distribution of mortality in children aged 1- 59 months based on final diagnosis

Diagnosis	Age of mortality			
	Postneonatal		Childhood	
	N	%	N	%
Congenital and chromosomal	1156	30.9	294	13.4
Un- intentional accidents	346	9.2	894	40.8
Respiratory diseases	519	13.9	140	6.4
Infection and parasitic diseases	327	8.8	135	6.2
Cardiovascular diseases	262	7.1	96	4.4
Neurologic diseases	191	5.1	186	8.5
Metabolic and nutritional diseases	188	5.0	55	2.5
Digestive system diseases	163	4.4	77	3.5
Cancers	56	1.5	151	6.9
Hematopoietic system diseases	85	2.3	54	2.5
Urinary diseases	85	2.3	39	1.8
Mental and behavioral diseases	4	0.1	22	1.0
Prenatal deaths	124	3.3	3	0.1
Other causes	90	2.4	23	1.1
Unknown causes	140	3.7	21	0.9
Total	3736	100	2190	100

There was not any meaningful difference in mortality of male and female by cause of death according to final diagnosis, except for infectious and parasitic diseases in which the ratio for the males was more in comparison to females ($P > 0.05$). Data analysis showed meaningful differences for the causes of mortality by season ($P < 0.001$). The highest level of congenital and chromosomal abnormalities has been occurred in fall, unintentional accidents in summer and respiratory and digestive disease in fall.

Discussion

The results revealed that the mortality rate of Iranian children aged (1-59 months) in studied year, was 5.2 per 1000 live births which in comparison with the mortality statistics in previous year (5.9 per 1,000 live births) have been reduced (7). Perhaps, this is for improving community health status, earlier visit of patients and improvement of diagnostic and therapeutic procedures. This finding is compatible with report of Eastern Mediterranean Region (EMRO) WHO. Among countries in this region, the greatest reduction in mortality in children under 5 years is in Egypt and Iran has acquired seventh ranking (8). Based on this study finding, the mortality rate on boys (52%) was more than girls (48%) which are matched with global findings (9, 10). In this relation the cultural issues (less reference for girls) or boys' vulnerability is being mentioned (6).
Meanwhile like the other countries, the children mortality rate in rural areas of Iran is more than

urban areas (1, 3, 7, and 11). This finding should be evaluated in specific studies. Based on figure 5, the distribution of mothers' literacy for 1-59 months deceased children shows that most of deaths are for the children whom their mothers, are illiterate. For a valid deduction in this issue other surveys should be accomplished based on the indictors of mothers' literacy. This was similar to the research has been done by Tanja in Sri Lanka in 2007 (12).

According to table 1, the mortality rate is different in age groups. For the postneonatal period the most common causes of death are congenital and chromosomal abnormalities, respiratory, infectious and parasitic and cardiovascular diseases. Meanwhile un-intentional accidents, neurvous system disorders and cancers are the most common causes in childhood period. These findings are well adapted to pediatrics texts and other studies including Singh in India and Liu L in Bangladesh (13, 14, and 15).

Most of deaths have been occurred in the fall and least of them in the summer. This was not adapted to the survey of Hajian et al. in 2000 (6).

Besides congenital and chromosomal abnormalities (23.4%) and accidents and unintentional injuries (20.5%), the most prevalent causes of mortality among Iranian children under 5 years were respiratory disease (8.9%), infectious and parasitic diseases (8%) and neurological diseases (6.5%). According to WHO reports in various areas of the world, the most common causes of mortality in EMRO were diarrhea (19%), pneumonia (16%) and other causes (14%) which were not similar with common causes in Iran (16). In Africa the most common causes of mortality in children under 5 years were pneumonia (20%), diarrhea (16.3%) and malaria (15.6%) respectively (17) which are not compatible with our country statistics. In the West Pacific region, the most common causes of mortality in children under 5 years were pneumonia (15%), non-communicable diseases (10%) and accidents & unintentional injuries (7%), respectively (18). In the WHO European region, pneumonia is the most common cause of mortality children under 5 years (19) while in South- East Asia region diarrhea and pneumonia are the most common causes for under 5 mortality (20).

Considering to differences between the causes of mortality in Iran and other regions it seems specific interventions are needed to achieve to the millennium development goals. Meanwhile the differences of mortality rate and specific causes for it among different provinces with different socioeconomic situations need different strategy for interventions. A more accurate death registration system is the first step for planning in this issue.

Ethical considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc) have been completely observed by the authors.

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References

1. UNICEF (1999). *The state of the world's children.* 1st ed. United Nations Children's Fund, New York, pp.: 7-93.
2. Lornajad H (2009). *Death Registration System for the children 1- 59 months of Iran in 2008.* 1st ed. Ministry of Health and Medical Education, Iran, P.:11.
3. Bradshaw D, Masiteng K, Nannan N (2000). Health Status and Determinants. In: *South African Health Review 2000.* Ed, Ntuli. 1st ed, Health System Trust. Durban, pp. 97-98.
4. Rajaratnam JK, Marcus JR, Flaxman AD, Wang H, Levin-Rector A, Dwyer L, et al. (2010). Neonatal, postneonatal, childhood, and under-5 mortality for 187 countries: a systematic analysis of progress towards

Millennium Development Goal 4. *Lancet*, 375(9730): 1988–2008.
5. Black RE, Cousens S, Johnson HL, Lawn JE, Rudan I, Bassani DG, et al. (2010). Global, regional, and national causes of child mortality in 2008: a systematic analysis. *Lancet*, 375(9730): 1969-87.
6. Hajian K , Savadkoohi R, Hamedi M, Moshtaghian S (2000). Causes of death for children less than 5 years in Amirkola hospital of Babol. *Research in Medicine*, 24(3): 199-204.
7. World Health Organization (2011). Mortality estimates by cause, age, and sex for the year 2008. Geneva WHO. Available from: www.whoint/healthinfo/global_burden_disease/en.
8. World Health Organization (2008). Under-five and infant mortality rates in the Eastern Mediterranean Region by country. Available: www.emro.who.int/entity/statistics/data-and-statistics.html
9. Fazzio I, Mann V, Boone P (2011).Temporal trends (1977-2007) and ethnic inequity in child mortality in rural villages of southern Guinea Bissau. *BMC Public Health,* 11:683.
10. Humphrey L, Bello S, Rousham E (2012). Sex differences in infant mortality in Spitalfields, London. *J Biosoc Sci,* 44(1):95-119.
11. Salway SM, Nasim SM (1994). Levels, trends and causes of mortality in children below 5 years of age in Bangladesh: findings from a national survey. *J Diarrhoeal Dis Res,* 12(3):187-93.
12. Houweling TA, Jayasinghe S, Chandola T (2007). The social determinants of childhood mortality in Sri Lanka: timetrends & comparisons across South Asia. *Indian J Med Res, 126*(4):239-48.
13. Singh M, Deorari AK, Paul UK (1990). Causes of neonatal death in Delhi. In: *Nelson essentials of pediatrics*. Eds, Behrman R, Kliegman R, Nelson WE. 3rd ed, Saunders. Philadelphia, p.157.
14. 14.Liu L, Li Q, Lee RA, Friberg IK, Perin J, Walker N, Black RE (2011). Trends in causes of death among children under 5 in Bangladesh, 1993-2004: an exercise applying a standardized computer algorithm to assign causes of death using verbal autopsy data. *Popul Health Metr*, 9:43.
15. Singh Ms, Deorari AK, Paul VK, Murali MV, Mathur M (1990). Primary causes of neonatal deaths in a tertiary care hospital in Delhi: an autopsy study of 331 cases. *Ann Trop Pediat*, 10(2):151-7.
16. WHO Statistical Information System (2008). Major causes of death in neonates and children under-five in the Eastern Mediterranean Region. WHO publications. Available from: www.who.int/gho/publications/world_health_statistics/Corrigenda_20080521.pdf
17. World Health Organization (2008)**.** Major causes of death in neonates and children under-five in the African Region. Available from: www.who.int/maternal_child_adolescent/media/CAH_death_u5_neonates_afro_2008.pdf
18. World Health Organization (2008). Major causes of death in neonates and children under-five in the Western pacific Region. Available from: www.who.int/child_adolescent_health/media/CAH_death_u5_neonates_afro_2008.pdf
19. World Health Organization (2008). Health status 2008. Available: www.euro.who.int/en/where-we-work/member-states/turkey/facts-and-figures/health-status
20. World Health Organization (2005). Maternal and Child Health Maternal, Newborn and Under-five Child Health in the South-East Asia Region Volume 9 Number 1, 2005. Available from: www.searo.who.int