Unintentional injuries related mortality and morbidity among children 1-59 months of age in Fars province, Iran

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Abstract

Now a day, unintentional injuries as one of the most important factors of non-communicable diseases play a key role in mortality and morbidity of Iranian 1-59 months of age children. During recent years, several studies have been carried out in different parts of the country but different studies have different results that show the necessity of doing local researches to find local patterns of aforementioned injuries for policy making or intervening in order to solve the injuries problem.

By use of databases of Iranian Ministry of Health and Medical Education, data gathered during 2010 to 2015 has been used for mortality study and in case of morbidity, only data gathered in 2015 has been analyzed.

Of 1578 death events from 2010 to 2014 among the target population, the most important causes of death were “congenital malformation and deformation and chromosomal abnormalities”, “unintentional injuries” and “diseases of nervous system”. In case of unintentional injuries, from 2010 to 2015, among target population, 382 death events have been registered in which the most important causes of death were “Traffic accidents”, “Accidental drowning and submersion” and “Other accidental threat to breathing” respectively. 59.2% of them were male and male victims (52.6%) were living in rural areas.

In case of unintentional injuries related morbidity, 5528 cases have been registered during the year 2015 in which 80.4% were in urban areas. The most vulnerable age group were children between 13-24 months of age. Homes had the greatest share among places of happened injuries. “Exposure to inanimate mechanical forces”, “falls” and “heat and hot substances” are the most frequent mechanisms of morbidity in target population. Traffic accidents as the fourth mechanism of morbidity mostly occurred in children who were on board vehicles.

Keywords: Unintentional injuries; morbidity; mortality.

Introduction

The effect of unintentional injuries on global health situation is uncontroversial. Many studies which have been carried out all around the world, show that unintentional injuries are among the most important causes of mortality and morbidity and considered as a high rank in standing of non-communicable diseases (1)(2)(3)(4)(5)(6)(7)(8)(9)(10)(11). Year after year, the importance of these kinds of injuries are increasing so that in future we will face with the huge changes in significance of unintentional injuries if we insist on our current policies and beliefs (12)(13). In addition,

unintentional injuries are increasingly used as a sign of poverty and deprivation and also socioeconomic disparities besides sexual and ethnical differences (4) (14).

In developed countries, injuries are the leading cause of death among preschool children (14), (11) but developing countries show different pattern. In Pakistan, among children 1-5 years old, unintentional injuries are considered as the third leading causes of death after diarrhea and pneumonia respectively (9). Generally, in Low and Middle-income countries communicable diseases play the main role in creating mortality and morbidity among preschool children. But in high-income countries, epidemiological transition as a result of successful control of communicable diseases along with rapid urbanization and sociodemographic changes cause that NCDs become the main cause of mortality and morbidity in population (1). Now a days, in developing countries, the epidemiological transition is gradually making major changes in causes of death among preschool children and for this reason, injuries are gradually becoming the main cause of mortality and morbidity especially in low and middle-income countries (13).

In Iran, success in control of communicable diseases and other factors mentioned above caused a major shift in main causes of mortality and morbidity among different age groups of population (15) [(4)]. A comparative study in Eastern Azerbaijan province showed a drastic change in mortality rate among children under 5 years old (16) so far as injuries have become the second cause of death in Iranian children under five years old (17) these changes are because of increasing number of unintentional injuries victims along with decreasing number of children who are dying because of other causes (6) (13). Increasing importance of these kinds of injuries causes a tendency in Iranian researchers to sift through epidemiology of unintentional injuries and publish numerous papers on death events in children under 5 years old at different times and areas (10)(13)(15)(16) (17)(18)(19)(20)(21)(22)(23)(24)(25). Now a day, Iranian health delivery system tries to improve health indices by making interventions against health problems (15)(26) like unintentional injuries. It needs precise studies to reveal patterns of external causes of mortality and morbidity in different parts of the country because different studies which have been carried out in different places and times have had different results so that a patchy pattern of external causes of unintentional injuries can be recognizable in various parts of the country. With this regard, this study tried to give its focus on mortality and morbidity of unintentional injuries in 1-59 months of age children in one of the biggest provinces of Iran which has one of the highest statistics of unintentional injuries in this age group of Iranian population.

Material and Method

Iranian health delivery system is based on efforts of 58 Universities of Medical Sciences and Health Services. Each of them covers some part of the country which is not necessarily according to country divisions; for instance, Fars province alone is covered by five independent universities. Shiraz, Fassa, Jahrom, Geraash and Lar University of Medical sciences and Health Services.

In this study, two different data sets were used. The first data set is about non-fatal injuries and the second data set is about fatal events.

In order to gather data about morbidity related injuries, System of Accident Registry of Ministry of Health and Medical Education was used. This system is based on a form which is comprised of items as follow:

- Age
- Sex
- Responsible university
- City in which injury occurred
- Month in which injury occurred
- The area in which injury occurred (rural or urban)
- Subarea in which injury occurred (home, street and so on)

These forms are gathered monthly and sent to an upper-hand center named University Health Center. Data gathered together based on ACCESS™ software and after some corrections, final version is uploaded to the portal of the Center of Non-Communicable Diseases. This data set is based on ACCESS™ software and in Farsi. It has to be compatible with SPSS software and translated into English. Data gathered during 2015 has been used for research on unintentional injuries related morbidity in the target population.

There is another system for data gathering on fatal events in children 1-59 months of age. Death Registry System uses a bunch of data that is gathered together by University Health Centers and after some corrections, final version is uploaded to MOH portal.

This form comprises items as follow:

- Name of responsible university
- Year of death
- Sex of deceased person
- The nationality of deceased person
- The area in which accident occurred (rural and urban)
- Type of accident

In the field, data is being gathered by EXCEL™ in Farsi, therefore for this study, it was necessary to translate it into English and use suitable computer software (SPSS™ version 22) for further analysis. In this study, data from 2010 to 2015 was used for estimating required variables. For categorizing the type of accidents in both cases, International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) has been used.

For further comparison and also for estimating target population size, data which was gathered and published by Registrar-General for Fars province was used.

On every occasion when we needed to consider the size of the target population especially in the study of mortalities, the formula which has been used was:
$P_n=P_o\ (1+r)^n$ In which:
P_n is estimation of population in desired year
P_o is population estimated by National Census Program accomplished at 2011
R is annual population growth that was considered equal to 0.01179
n is an interval between reference year and the desired year

Results

Mortality

The population of 0-5 years old children in 2011 in Fars province has been reported officially 363,941 that the number of the target population was estimated as 283,093 in which 144,946 males (51.2%) and 138,147 females (48.8%).

The total death events in the result of unintentional injuries which were registered in Ministry of Health Death Registry System was 382. The break down by variables has been estimated as follows:
Sex: 226 were male (59.2%) and 156 (40.8%) were female.

Age: children between 1-12 months of age are the largest group of deceased person in the target population.

Place of death: 50.8% death events have occurred in rural areas that in which 59.8% were male and obviously 40.2% were female. In urban areas, 58.8% of mortalities related to unintentional injuries occurred in young males. Most of death events have been registered in place of accident occurrence (35.4%) (Table 1).

Time: Frequency of death events in springtime was more than other seasons during the years of study.
Causes of death: Totally, the leading cause of death in relation with unintentional injuries were “traffic accidents” (43.6%). The second and third important external causes of death in target population are “Accidental Drowning and Submersion” (17.0%) and “Other Accidental Threat to Breathing” (13.8%).

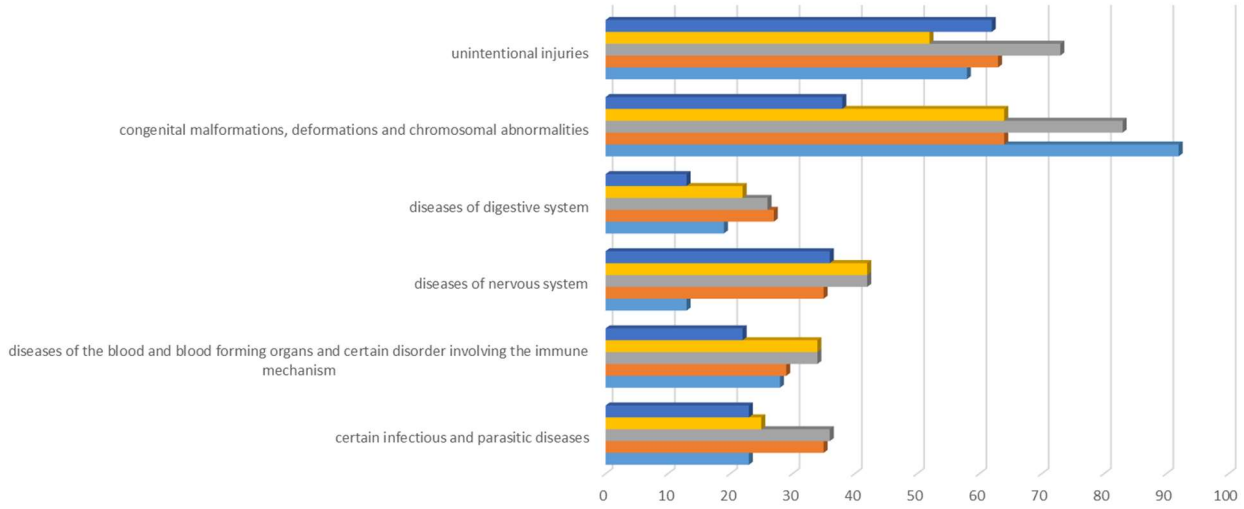
Morbidity

In 2015, according to the Ministry of Health registry system, 5528 suffered from unintentional injuries related morbidity. The break down by variables has been calculated as follows:

Sex: Unintentional injuries related morbidity occurred mostly in male children (60.3%) than 79.9% were living in urban areas (Table 2).

Age: Children between 1-12 months of age are the most vulnerable age group among the target

Fars Province, Iran, 2010-2014



	certain infectious and parasitic diseases	diseases of the blood and blood forming organs and certain disorder involving the immune mechanism	diseases of nervous system	diseases of digestive system	congenital malformations, deformations and chromosomal abnormalities	unintentional injuries
2014	23	22	36	13	38	62
2013	25	34	42	22	64	52
2012	36	34	42	26	83	73
2011	35	29	35	27	64	63
2010	23	28	13	19	92	58

Fig. 1. Distribution of the first six causes of death among children between 1-59 months of age by yeat of occurrence in Fars Province, Iran, 2010-2014

Table1: Place of mortalities related to unintentional injuries in children with 1-59 months of age, Fars province, Iran, 2010-2015

Place of death	**frequency**	**percent**
Just in place	119	35.4
During convey to hospital	38	11.3
In hospital	110	32.7
In home	69	20.5
Total	336	100

Table2: Distribution of unintentional injuries related morbidity by sex and place of

	Male	Female	Total
Urban	2655 (59.9%)	1775 (40.1%)	4430 (80.4%)
Rural	668 (61.9%)	412 (38.1%)	1080 (19.6%)
Total	3323 (60.3%)	2187 (39.7%)	5510 (100%)*

occurrence among children 1-59 months of age in 2015, Fars province, Iran

*Data of 18 cases were not applicable

Table 3: place of occurrence of unintentional injuries in children with 1-59 months of age, Fars province, Iran, 2015

Place of occurrence	Frequency	percent
Homes	4047	73.2
Streets and alleys	803	14.5
Roads and highways	222	4.0
Play grounds	160	2.9
Public places	79	1.4
Work places	32	0.6
Educational places	30	0.5
Others	120	2.2
Not applicable	33	0.6
Total	5526	100

Table 4: Number of death events and death rate among target population during study period, Fars province, Iran, 2010-2015

year	Total population	No of live birth	Total death number (1-59 months of age)	Death rate per 1000 live birth	Mortality related unintentional injuries in target population	Death rate per 1000 live births
2010	4.357.000	81,867	309	3.77	58	0.71
2011	4,597,000	80,848	340	4.21	69	0.85
2012	4,642,000	82,736	378	4.57	77	0.93
2013	4,688,000	82,407	307	3.73	62	0.75
2014	4,735,000	87,264	244	2.80	70	0.80
2015	4,782,000	88,790	263	2.96	46	0.52

population. Fifty percent of all morbidities related to unintentional injuries in the year of study have occurred in children between 1-24 months of age.

Place of occurrence: Most of the morbidities related to unintentional injuries occurred in urban areas (Table 2) and in Homes (Table 3).

Type of accidents: "Exposure to inanimate mechanical forces" is the most frequent mechanisms (27.6%). "Falls" (22%) and "Heat and hot substances" (18.5%) are the second and the third important morbidity mechanism among the target population. Traffic accidents are the fourth morbidity related external causes of the aforementioned injuries in which most of them occurred in children who were on board vehicles.

Discussion

Table 4 shows information about death events in the target population during the study period. Both total death rate and death rate related to unintentional injuries show a slight reduction from 2010 to 2015 in spite of some fluctuations happened in between. The lowest unintentional injuries related mortality rate was in 2015 and the highest was in 2012. Fluctuation in death number related to unintentional injuries is consistent with the total death number of target population during the study period.

Our results show that in 2010 the first three important causes of mortality among target population are "congenital deformation, malformation and chromosomal abnormalities", "unintentional injuries" and "diseases of blood and blood forming organs". This situation faced with a change in 2011 that in which both "certain infectious and parasitic disease" and "diseases of nervous system" took the third place of important external causes of death. Although during 2012 and 2013 a stability in situation could be seen in which "congenital deformation, malformation and chromosomal abnormalities", "unintentional injuries" and "diseases of nervous system" were the first three external causes of death in target population, in 2014 position of the first and second external causes of death changed (fig. 1) which is similar to the result of a study carried out in 2001 in Fars province among same target population (22). All

in all, it can be claimed that of 1578 death events during period 2010 to 2014, the first three causes of death among target population are “congenital deformation, malformation and chromosomal abnormalities”, “unintentional injuries” and “diseases of nervous system”, respectively that is different from some other studies which considered the situation all around the country (17) (27). Other causes of death among target population comprise “diseases of blood and blood forming organs”, “certain infectious and parasitic diseases” and “diseases of digestive system” as the fourth to sixth important causes of death, respectively. Contradictions in results of different researches in time and place can be seen not only in country setting but also in local settings. In Zabol, a city which is situated in the south east of Iran, the most common causes of death have been “unintentional injuries” (27%), “respiratory diseases” (18.3%) and “diseases of digestive system” (15.2%) (28). Unlike Zabol, in Ardabil province which is located in North West of Iran, death pattern among children with 1-59 months of age was “congenital deformation, malformation and chromosomal abnormalities”, “unintentional injuries” and “infections”, respectively (18). In east and north of Tehran most of death events in same target population were because of “congenital deformation, malformation and chromosomal abnormalities” (17.5%), “unintentional injuries” (15.4%) and “cancers” (11.2%) (25). These changes in main causes of death among children 1-59 months of age in different parts of the country and at different times can also be seen in important external causes of death. Of course pattern of external causes of death in our study shows a deep difference with findings of previous studies. In the west of Iran among children under 6, the most common external causes of death are “falls” and “road traffic accidents” (21). Iranian Legal Medicine Organization have shown that from 1996 to 1999 “traffic accidents” and “burn” have comprised more than 70% of death events among children under 12 years old in Tehran (23). Trauma fatality in 100 hospitals of Tehran showed that “traffic accidents”, “burns” and “others” are the three main external causes of death among 1-4 years old children (10). Another study which is carried out in north and East of Tehran showed that 70 percent of all death in children 1-59 months of age have occurred in result of “traffic accidents” (29.1%), “falls” (15.5%), “other accidental threat to breathing” (15.5%) and “accidental drowning and submersion” (13.6%) (19). These are totally different from our study results which showed “traffic accidents”, “accidental drowning and submersion” and “other accidental threat to breathing” as the first three important external causes of death in target population. Of course like any other studies, young boys are the most vulnerable sex group in the target population. Generally, most of the unintentional injury-related morbidities are in result of home injuries and the largest group, in this case, are children under 5 years old. This pattern is similar to patterns seen in other countries (24). Our study also shows that approximately 80% of 5528 cases of unintentional injuries related morbidity have been registered in urban areas and most of them have occurred in homes. Majority of the victims were children 1-12 months of age. But like mortality studies, results of morbidity researches in different parts of the country show different results. In north of Iran “traffic accidents” are the most frequent cause of hospitalization among children 6-11 years old, compare to other age groups of population, “falls” have frequently occurred in children with 1-5 years of age therefore three main causes of morbidity among children 1-5 years old are “traffic accidents”, “falls” and “others” (13) on the contrary in Mazandaran one of the three northern Iranian provinces “falls”, “burns” and “traffic accidents” are the most important external causes of morbidity among children under 6 years old (20). In Ahvaz, a city located in south west of Iran, it has been claimed that prevalence of morbidity related unintentional injuries among children under 5 years old was 40% and frequent external causes of death comprised “falls”, “other accidental threat for breathing”, “contact with heat and hot substances” and “accidental poisoning by exposure to noxious substances” (29). These findings are entirely different from ours that in which the most frequent external causes of morbidity among target population are “exposure to inanimate mechanical forces”, “falls” and “heat and hot substances”.

Conclusion

Unintentional injuries are the most important causes of mortality and morbidity among Iranian population for this reason every effort to promote health status of the community especially about children with 1-59 months of age would not be successful without considering unintentional injuries. Rifling through references and sifting through their results shows that a patchy pattern of external causes of mortality

and morbidity can be discernible all around the country, therefore, making any policy or any approach in order to solve the problem of injuries in certain part of the country needs precise study in the same time and space. This study shows the distribution of unintentional injuries related mortality and morbidity by sex, age, place of accident occurrence and mechanism. It not only reveals gradual changes in causes of mortality and morbidity in children with 1-59 months of age from time to time but also shows the importance of unintentional injuries in the health status of children in the Iranian context.

Conflict of interest

None

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