

Sudden Unexpected Natural Death in the Youth; an Iranian Single Center Investigation

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ABSTRACT

Background: Sudden unexpected natural death (SUND) has not been studied in Iran. Herein we investigated its main causes in our country.

Methods: Records of 80 cases registered to a single referral center were investigated to determine the distribution of sex, age, and etiology of death.

Results: Fifty eight (72.5%), 6 (7.5%), 6 (7.5%) and 4 (5%) of our cases have died due to various types of heart diseases, cerebral events, pulmonary emboli and gastrointestinal bleeding (GIB), respectively. Moreover, men are victims of SUND more than women (83.7% vs.16.3%, respectively).

Conclusion: Policies should be planned by the governments to prevent youth mortality in societies. These attempts should especially target ischemic heart disease.

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► *Implication for health policy/practice/research/medical education:* Sudden Unexpected Natural Death in the Youth

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1. Introduction:

The crude death rate is the total death number per 1000 people per year and is one of the critical indexes of the development in each society. Besides, according to the crucial role of young adults in countries, youth mortality is great concern (1). Therefore, determination of main factors resulting to youth mortality

can be considered as one of the fundamental duties of governments.

Sudden unexpected natural death (SUND) is one of the causes of youth mortality and is defined by the world health organization (WHO) as a death in an apparently healthy young individual after 24 hours from when symptoms began. Sudden death can be attributed to a broad range of disorders and comprises sudden cardiac and non-cardiac death (2, 3).

In 1984, Sarkioja and Hirvonen studied the causes and incidence of sudden and/or unexpected death in 77 cases. They found ischemic heart disease (IHD),

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subarachnoid hemorrhage (SAH) and alcoholism as the most frequent etiologies for unexpected sudden death (4). Additionally, Siboni and Simonsen in 1986 have performed autopsies on 78 cadavers who met the criteria of sudden unexpected natural death in the age group 2-30 years. They found a large number of cases with history of epilepsy, alcoholism, gynecologic problems and drug addiction (5).

As no such study has been conducted in Iran, we attempted to investigate the incidence and main reasons of SUND in cases referred to a single center in Iran so that further preventive plans are implemented.

2. Materials and Methods:

After approval of the institutional board for ethics, from all 9936 death records registered to Kahrizak research and educational center (affiliated to Tehran University of Medical Sciences, Tehran, Iran) and over one year (March 2008 – March 2009), the 406 cadavers with SUND were considered for the study. Cases with unnatural death causes have not been enrolled and thus, 124 cases with 15-35 years of age were found to meet the inclusion criteria. According to the below

mentioned equation, however, sample size of 80 cases was determined (4, 6).

Equation 1: calculation of required sample size

$$N = z_{1-\frac{\alpha}{2}}^2 P(1 - P)/D$$

Confidence interval (CI)=95%, P=75%, $\alpha=0.05$, D=10% and $z=1.96$

This amount of cases was selected from the 124 match records with the use of random number table. Afterwards, file number, sex, age, and reason for death (achieved from necroscopic, pathologic, toxicological and clinical studies) was recorded and analyzed by SPSS 12 software regarding descriptive values.

3. Results:

Sixty (75%) cases were within 30-35 years of age, 14 (17.5%) within 25-29, 5 (6.25%) within 20-24 and one (1.25%) was within 15-19 years of age. There were 50, 11, 5 and 1 male(s) in each age group, respectively. Ten females were in 30-35 and three were in 25-29 age groups (Table 1).

As demonstrated in table 2, 58 (72.5%) of our cases have died due to heart diseases of various types. Cerebral events, pulmonary emboli and gastrointestinal bleeding (GIB) were the main causes of death in the rest 6 (7.5%), 6 (7.5%) and 4

Table 1: Number of cases in each cause-of-death category divided to age groups

age group	15-19			20-24			25-29			30-35		
	male	female	total									
ICH	-	-	-	-	-	-	-	-	-	38	5	43
Cardiomiopathy	-	-	-	1	-	1	3	1	4	2	2	4
VHD	-	-	-	-	-	-	1	-	1	2	3	5
pulmonary emboli	-	-	-	1	-	1	1	1	2	3	-	3
epilepsy	-	-	-	1	-	1	1	-	1	-	-	-
SAH	-	-	-	-	-	-	3	1	4	-	-	-
GIB	-	-	-	-	-	-	1	-	1	3	-	3
unknown	1	-	1	2	-	2	1	-	1	2	-	2
total	1	-	1	5	-	5	11	3	14	50	10	60

IHD: ischemic heart disease; VHD: valvular heart disease; SAH: subarachnoid hemorrhage; GIB: gastrointestinal bleeding

Table 2: Number and percentage of cases in each cause-of-death category

	male		female		total	
	frequency	percent	frequency	percent	frequency	percent
ICH	38	56.7	5	38.6	43	53.7
cardiomiopathy	6	9	3	23	9	11.2
VHD	3	4.4	3	23	6	7.5
pulmonary emboli	5	7.5	1	7.7	6	7.5
epilepsy	2	3	0	-	2	2.6
SAH	3	4.4	1	7.7	4	5
GIB	4	6	0	-	4	5
unknown	6	9	0	-	6	7.5
total	67	100	13	100	80	100

IHD: ischemic heart disease; VHD: valvular heart disease; SAH: subarachnoid hemorrhage; GIB: gastrointestinal bleeding

(5%) of our cases. Noticeably, 6 (7.5%) persons have died due to unknown reasons.

4. Discussion:

The definition of the term sudden death varies from 15 minutes, one hour, and six hours and up to 24 hours from onset of symptoms (7). In this study, however, we have considered the definition proposed by WHO defined as death up to 24 hours after initiated symptoms (4).

We necropsied 80 cadavers which had best fit the inclusion criteria of SUND in our referral center. We found ischemic heart disease (IHD), cardiomyopathies and valvular heart disease (VHD) responsible for death in 43%, 9% and 6%, respectively. This is similar to reports of other investigators who have found heart disease as the most leading cause of sudden death in the youth (8, 9). After cardiac etiologies, pulmonary emboli (6%), subarachnoid hemorrhage (SAH) (4%), gastrointestinal bleeding (GIB) (4%) and epilepsy (2%) were the top causes of death in our study population.

Additionally, cerebral causes were found in 4.3% and 16.9% of Danish and Australian cases, respectively. In the mentioned countries, pulmonary emboli were responsible for 17.7% and 21.3% of death, respectively (4-6).

In our society alcoholism is rare and therefore no such evidence have found in our cases. However, according to the stressful style of living, poor food habits as well as air pollution and smoking, heart diseases are predictable to play a significant role in occurrence of SUND within Iranian individuals.

Therefore, it is mandatory to consider effective action in preventing IHD more than just control of the classical risk factor of coronary heart disease. This is actually the duty of governments to support scientific studies and moreover develop educational and cultural programs by which life style of people are justified.

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