

Epidemiology of Domestic Gas Burns in National Burn Centre in Iran from 2008 to 2013

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Abstract: Burn injuries constitute one of the most important public health concerns particularly in the developing countries. In our country, the natural gas is used as a common source of energy for domestic heating, cooking and etc; consequently the burn accident caused by gas is considerable. The aim of present study was to document the prevalent epidemiologic pattern and outcome of domestic gas burn injuries in Tehran Burn Century in order to provide vital information for advance strategies to reducing the frequency of burns. This retrospective study was performed on patients with domestic gas burns who were admitted to the Motahary hospital, a referral hospital and burn center in Tehran. Demographic and clinical data were gathered from medical records of the patients admitted to this hospital from March 2008 to March 2013 by a predefined questionnaire. Results showed that: A total of 1374 patients included in this study, 1067 (77.7%) were males and 307 (22.3%) were females. The mean age was 33.4±16.3 years (max: 1 and min 87 years old). The mean length of hospital stay was 13.3±11.4 day (range 1-83 days). The overall mortality rate was 21.2% (291 out of 1374). Among all of patients, more frequent cause are caused by town gas (methane gas) with 832 (60.6%), followed by domestic LPG (Liquid Petroleum Gas) with 542 (39.4%). Conclusion: regardless the fact that burns are an important public health point in Iran, there is noticeable imperfection of work place safety regulation, so safe home and kitchen appliance should be provided for consumers.

Key words: Burn • Domestic Gas • Town Gas • LPG

INTRODUCTION

Burns are among the most devastating of all injuries and Burn injuries constitute one of the most important public health concerns particularly in the developing countries [1, 2].

Fire disasters in all communities including developed and developing countries is a medical and psychological problem. Moreover, burns are also among the most expensive traumatic injuries such as long hospitalization and rehabilitation and costly wound and scar treatment [3].

Most burns are caused by thermal energy including scalding and fires with the minimal caused by electricity, chemical and etc [4]. The basic way of control of the epidemiology of burns in a country is necessary to find better public health policies focused in work place safety and home prevention [5]. Data from several countries worldwide have shown that deficit of education are correlated with more severe burns [6, 7].

The worldwide incidence of fire-related burns was estimated to be 1.1 per 100,000 populations, Southeast Asia being the most affected and U.S. the least [8]. In our country, the natural gas is used as a common source of energy for domestic heating, cooking and etc; consequently the burn accident caused by gas is considerable.

The aim of present study was to document the prevalent epidemiologic pattern and outcome of domestic gas burn injuries in Tehran Burn Century in order to provide vital information for advance strategies to reducing the frequency of burns.

MATERIALS AND METHODS

This retrospective study was performed on patients with domestic gas burns who were admitted to the Motahary hospital, a referral hospital and burn center in Tehran. Demographic and clinical data were gathered from medical records of the patients admitted to this hospital

from March 2008 to March 2013 by a predefined questionnaire. This questionnaire included data about gender, age, length of hospital stay, TBSA, grading of burn, mortality rate, motivation of burn, type of domestic gas (towngas, LPG: Liquid Petroleum Gas).

Burns have been classified as a three-grading scale: Grade 1: involvement of superficial thickness of skin, Grade 2: destruction of the full thickness of skin, subcutaneous tissues, fat, Grade 3: destruction of the skin, subcutaneous tissues and muscles and bone. Data were analyzed with SPSS software, version 19.

Descriptive variables were expressed as mean and standard deviation with 95% CI. Chi-square test was used to determine statistical significance between different subgroups of qualitative variables. P-value <0.05 is considered as significant.

RESULTS

A total of 1374 patients included in this study, 1067 (77.7%) were males and 307 (22.3%) were females. The mean age was 33.4±16.3 years (max: 1 and min 87 years old). The mean length of hospital stay was 13.3±11.4 day (range 1-83 days). The overall mortality rate was 21.2% (291 out of 1374).

Among all of patients, more frequent cause are caused by town gas (methane gas) with 832 (60.6%), followed by domestic LPG (Liquid Petroleum Gas) with 542 (39.4%). (Figure 1).

Most of the burns were accidental 1359 (98.9%) and only 15 (1.1%) were intentional. Among the intentional burns, 14 (1%) patients had self-inflict burns (8 cases were men and 6 cases were women) while 1 (0.1%) patient had

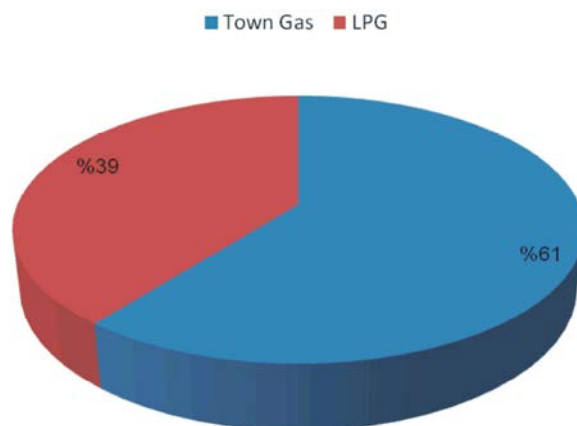


Fig. 1: Distribution of Patient According to Type of Domestic Gas

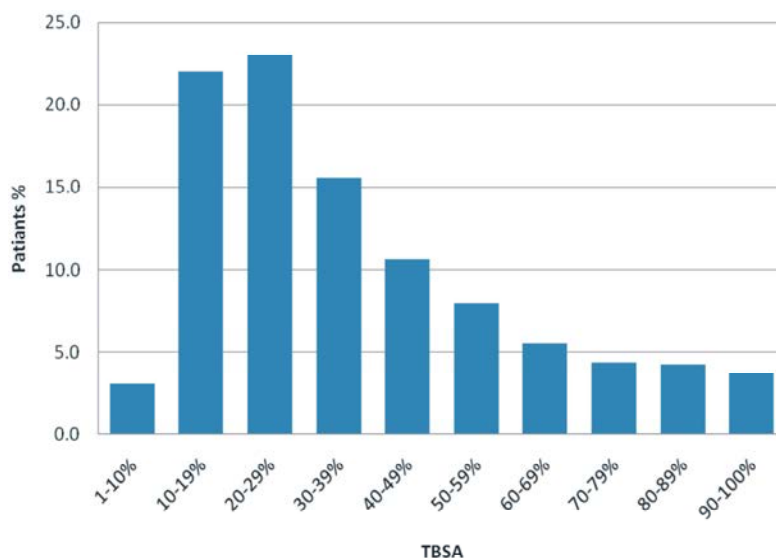


Fig. 2: Distribution of Patients According to TBSA

Table 1: Mortality Distribution by Motivation of Burns

Motivation	Mortality			Pv
	Total	yes	No	
Accidental	1359	281(20.7%)	1078(79.3%)	
Self-inflicted	14	9(64.3%)	5(35.7%)	
Assault-related	1	1(100%)	0(0.0%)	0.000
Total	1374	291(21.2%)	1083(78.8%)	

Table 2: Mortality Distribution by Grade of Burn

Grade	Mortality			Pv
	Total	yes	No	
I	6	1(16.7%)	5(83.3%)	
II	680	35(5.1%)	645(94.9%)	
III	688	255(37.1%)	433(62.9%)	0.000
Total	1374	291(21.2%)	1083(78.8%)	

assault-related burns. There were a relationship between mortality rate and motivation of patients (Table 1) (P=0.000).

Patients were divided into three groups according to burning grade. There were 6 cases (0.4%) in grade 1, 680 cases (49.5%) in grade 2, 688 cases (50%) in grade 3. As seen as Table 2, there were 291 deaths among patients according to burning grade. (p=0.000).

The range of total body surface area (TBSA) is shown in (Figure 2). The majority of Burns is between 20%-29% in 316 cases (23%).

DISCUSSION

The epidemiological factors observed in the burn unit, Shahid Motahary hospital reflect the actuality of our country. In our study, male were more than female patients and mean age was 33.4 years that confirms to previous study [2, 5, 9].

In our series, majority of intentional burns were self inflicted patients. Self inflicted is a major social and medical problem. In Iran burns are responsible for 22% of all suicidal attempts and 17% of suicidal death [10]. Maghsoudiet al. demonstrate that domestic rigorousness against women is the basic detecting factors for suicidal burns [11-13].

In our study, the range of TBSA was obvious in 1%-100% and the majority of patients were in range: 20-29% and the main group of patients (50%) had full thickness burns (grade III) consequently patients should be accepted to a referral and specialized burn centre for management.

Aghakhani et al studied Epidemiology of occupational burn injuries and its effect on patients. They studied 522 patients with occupational burn injuries (male: 515, female: 6). they found that 7.1% of patients were injured by gas explosion. This study confirmed that more economically active populations are susceptible to these injuries so sufficient educations must be provided for high risk group [14].

The overall mortality in our study was 21.2% which is relatively high compared to other study [2, 3 and 9]. It seems poor pre-hospital care is the major cause of high mortality rate in our country.

The major component of LPG is propane that is a highly flammable gas which burns at higher temperature compared to urban gas (methane) which burns at 200°C [9]. The most evident cause of the gas leakage is from incorrect gas hose and pipelines connections.

As the usage of town gas and LPG is becoming in more popular in Iran, therefore a national burns prevention program should be started and standard of domestic gas pipeline connection and safety valves should be considered.

CONCLUSION

We concluded that regardless the fact that burns are an important public health point in Iran, there is noticeable imperfection of work place safety regulation, so safe home and kitchen appliance should be provided for consumers.

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