Self-burning among young females in Iraqi Kurdistan: proportion and risk factors in a burns unit

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To determine the rate of self-burning among all burns patients admitted to the Burns and Plastic Surgery Centre at Sulaimani University in Iraqi Kurdistan and to identify the risk factors and motives, all burns patients, aged 8 years and over, admitted between 1 September 2009 and 30 April 2010 were surveyed. Of the 200 patients interviewed, 54 (27%) reported self-burns and 146 (73%) reported accidental burns. The risk factors for self-burning included mental illness, female gender and younger age. Almost two-thirds of those who reported self-burns (32, 60.4%) had intended to kill themselves. The most commonly cited reasons for the act were family problems (26, 44%) and marital problems (13, 24%). Burns in the self-burning group were more severe and were associated with a higher mortality rate (34, 63%) than in the accidental burns group (29, 20%).

Self-burning is a violent method of suicide which is associated with high mortality (Laloe, 2004). It is more common in Asia and the Middle East (Laloe, 2004). A number of studies have investigated the phenomenon in this region (e.g. Mabrouk et al., 1999; Panjeshahin et al., 2001; Ahuja & Bhattacharya, 2002; Zarghami & Khalilian, 2002). It has been reported that the majority of these patients are young women (Laloe, 2004). Laloe (2004) reported that self-burns are associated with psychiatric and inter-personal problems and with political motives for the act of self-immolation.

Self-burning among young females in Iraqi Kurdistan has generated concern on the part of non-governmental organisations (NGOs) and has been publicised in the local and international media (e.g. Peraino, 2007). Two published studies were partly related to this condition (Carini et al., 2005; Hanna & Ahmad, 2009). This study aimed to investigate the rate of self-burning, as well as causal factors, in a burns unit in Iraqi Kurdistan (the Burns and Plastic Surgery Centre of Sulaimani).

Method
Settings and study period
The population of Iraq, in mid-2010, was 32.7 million (Haub & Kaneda, 2011). The city of Sulaimani is situated in north-east Iraq. It is administered by the Iraqi Kurdistan Regional Government (KRG). The study was conducted between 1 September 2009 and 30 April 2010.

Sample and data collection
Data were collected by one researcher (N.R.) who visited the centre three times a week. Depending on the availability of the researcher and the clinical state of the patients, all patients aged 8 years and above were approached (8 is the youngest age at which the act has been performed, according to media reports). Verbal consent was obtained from patients, or their parents for those aged 15 years or less. Those who did consent were interviewed once or more as soon as possible after their admission, but data on the interval between admission and interview were not recorded.

A data-collection form (available on request) was specially developed for the study. It covered demographic and clinical variables and motives. It was administered by the researcher (N.R.), in the patients’ native language. Participants were given the choice of either answering directly or selecting from a number of options and their responses were further clarified. Data, including history of mental illness, were based on patients’ self-reports rather than structured instruments. The degree of burns and total body surface area (TBSA) burnt (as a percentage of overall body surface area) were collected from case-notes and the mortality data were obtained from the hospital records.

The sample size was determined on the basis of two risk factors: female gender and younger age. Based on previous research, we estimated that 47% of controls (patients with accidental burns) and 76% of cases (patients who had deliberately burned themselves) (Hanna & Ahmad, 2009) would be female. For a 5% significance level, 80% power and three controls per case, the necessary sample size was calculated to be 29 cases and 87 controls. In relation to the second risk factor, on the basis of previous studies we estimated that 30% of the control group and 75% of the cases (Hanna & Ahmad, 2009) would be aged 15–30 years. This age group was chosen because it covered age groups found to be risk factors in previous studies (Carini et al., 2005; Hanna & Ahmad, 2009). Using the same parameters, the sample size came out to be 12 cases and 36 controls. To adjust for confounding variables, a
A sample size of 50 cases and 150 controls was used. The study was approved by the Research Ethics Committee of the University of Sulaimani.

Data analysis

The dependent variable was burns status (self-burning or accidental burning). Categorical variables in the two groups were compared using the chi-squared test and Fisher’s exact test, while continuous, normally distributed variables were compared using the t-test.

Multivariate conditional logistic regression was used to identify risk factors independently associated with self-burning. The odds ratio (OR) and 95% confidence interval (CI) are reported. The following hypothetical risk factors were entered in the initial models: age group (with two categories: age 15–30 and other age), gender, marital status, residency, ethnicity, religion, financial status, occupation, history of mental illness, family history of mental illness and family history of suicide. The specific diagnoses were not included because of the small numbers. Forward and backward logistic regression models were used. If the same variables remained in the final model, this was taken as a confirmation of the findings. Analysis was performed using SPSS version 15.

Results

During the study period, 642 patients were admitted to the unit, of whom 462 were aged 8 years and over. Two hundred of these patients were interviewed. Patients were not interviewed if they were clinically unfit to be interviewed or if they refused to give consent; some patients were discharged from hospital and some died before they could be interviewed. Burns were categorised as accidental (139, 70%), self-induced (54, 27%) or caused by others (7, 4%). Patients whose burns were caused by others were combined with those with accidental burns to form the control group (all those for whom the burns were not self-inflicted).

The mean age of patients in the self-burning group was 27 years (s.d. = 12.6) compared with 30.6 (s.d. = 16.7) in the control group (t = 1.671, P = 0.09). Demographic and clinical characteristics are shown in Table 1. The burns in the self-burning group were more extensive (mean TBSA burnt 52.4%, s.d. = 26.2%) than in the accidental burns group (mean TBSA 28.7%, s.d. = 20.2%) (t = –6.01, P < 0.001).

The reasons cited by the patients for the self-burning were family problems (24, 45%), marital problems (13, 24%), psychiatric illness (9, 17%), financial problems (3, 6%), physical health

| Variable                  | Self-burning (n = 54) | Accidental (n = 146) | P   |
|---------------------------|----------------------|----------------------|-----|
|                           | n        | %         | n        | %         |     |
| Female gender             | Female   | 44        | 81.5     | 89        | 61.0 | 0.006*
|                           | Male     | 10        | 18.5     | 51        | 39.0 | <0.001*
| Age group 15–30 years     | 40       | 74.1      | 72        | 49.3      |     |
|                           | 14       | 25.9      | 8         | 5.5       |     |
| Marital status            | Single   | 22        | 40.7      | 51        | 35.2 | 0.574*
|                           | Married  | 20        | 37.0      | 87        | 60.0 | <0.001*
|                           | Separated/divorced | 2    | 3.7       | 2         | 1.4  |     |
|                           | Widowed  | 1         | 1.9       | 5         | 3.4  |     |
|                           | Husband married to another woman | 4 | 14.3 | 7 | 11.5 | 0.736*
| Have children             | Yes      | 23        | 37.5      | 79        | 53.3 | <0.001*
|                           | No       | 21        | 38.8      | 61        | 42.5 | <0.001*
| Ethnicity                 | Kurdish  | 44        | 81.5      | 109       | 74.7 | 0.624*
|                           | Turkmen  | 4         | 7.4       | 14        | 9.6  | 0.624*
|                           | Arab     | 10        | 18.5      | 34        | 23.3 |     |
|                           | Other    | 1         | 1.9       | 5         | 3.4  |     |
| Residence                 | City     | 37        | 68.5      | 95        | 65.1 | 0.674*
|                           | District | 11        | 20.4      | 38        | 26.0 | <0.001*
|                           | Village  | 6         | 11.1      | 13        | 8.9  |     |
| Religious attitude        | Atheist  | 0         | 0         | 1         | 7.0  | 0.603*
|                           | Believer, not practising | 18 | 33.3 | 36 | 24.7 |     |
|                           | Believer, practising | 36 | 66.7 | 109 | 74.7 |     |
| Religion                  | Muslim   | 54        | 100       | 144       | 98.6 | 1*
|                           | Kakay    | 0         | 0         | 2         | 1.4  |     |
| Education                 | Illiterate | 17    | 31.5      | 29        | 20.7 | 0.68*
|                           | Primary school | 25 | 46.3 | 58 | 39.7 |     |
|                           | Secondary school | 8 | 14.8 | 35 | 24.0 |     |
|                           | University or technical institute | 4 | 7.4 | 14 | 9.6 |     |
| Occupation                | Employed | 6         | 11.1      | 44        | 30.1 | 0.006*
|                           | Unemployed| 48        | 88.9      | 102       | 69.9 |     |
| Financial status          | Poor/very poor | 26 | 48.1 | 62 | 42 | 0.03*
|                           | Intermediate | 22 | 40.7 | 86 | 58.9 |     |
|                           | Good/very good | 6 | 11.1 | 18 | 12.3 |     |
| Alcohol use               | Yes      | 1         | 1.9       | 3         | 2.1  | 0.1*
|                           | No       | 0         | 0         | 0     |     |
| Substance misuse          | Yes      | 0         | 0         | 0     |     |
|                           | No       | 0         | 0         | 0     |     |
| Mental illness            | Yes      | 14        | 25.9      | 8        | 5.5  | <0.001*
|                           | No       | 40        | 74.1      | 72       | 94.6 |     |
| Diagnosis                 | Depression | 4 | 7.4 | 3 | 2.0 | 0.028*
|                           | Schizophrenia | 3 | 5.5 | 0 | 0 |     |
|                           | Bipolar disorder | 1 | 1.9 | 0 | 0 |     |
|                           | Other    | 0         | 0         | 4        | 2.7  |     |
|                           | Unknown  | 6         | 11.1      | 1        | 0.6  | 0.156*
| Family history            | Of mental illness | 5 | 9.3 | 6 | 4.1 | 0.156*
|                           | Of suicide | 5 | 9.3 | 2 | 1.4 | 0.01*
| Method of burning         | Kerosene | 50        | 92.6      | 76       | 52.4 | <0.003*
|                           | Petroleum | 4 | 7.4 | 12 | 8.3 |     |
|                           | Other    | 0         | 0         | 57        | 39.3 |     |
| Degree of burn            | Second degree | 5 | 9.3 | 31 | 21.4 | 0.04*
|                           | Third degree | 49 | 90.7 | 114 | 78.6 |     |
| Fatal outcome             | Yes      | 34        | 63.0      | 29        | 19.9 | <0.001*

*Chi-square test, *Fisher’s exact test.

Table 2

Multivariate logistic regression

| Variable                  | Self-burning (n = 54) | Accidental (n = 146) | Crude OR | Multivariate OR |
|---------------------------|----------------------|----------------------|----------|-----------------|
|                           | n        | %         | n        | %         | OR    | 95% CI | P   | OR    | 95% CI | P   |
| Gender (female)           | Female   | 44        | 81.5     | 89        | 61.0  | 2.81  | 1.31–6 | 0.08 | 2.6   | 1.1–6.2 | 0.03 |
|                           | Male     | 10        | 18.5     | 51        | 35.2  | 2.2   | 1.3–3.8 | 0.002 | 3.3   | 1.4–7.6 | 0.004 |
| Age group 15–30 years     | 40       | 74.1      | 72        | 49.3      | 2.2   | 1.3–3.8 | 0.002 | 3.3   | 1.4–7.6 | 0.004 |
| Mental illness            | 14       | 25.9      | 8         | 5.5       | 6.0   | 2.3–15.4 | <0.001 | 10   | 3.3–29.8 | <0.001 |
problems (2, 4%) and fear of loss of reputation (1, 2%). Family and marital problems were more common in females (33, 80%) than in males (4, 40%) \( (P = 0.009) \). Thirty-two (60%) patients reported that the aim of their act was to kill themselves. Other aims were: to make others feel guilty (6, 11%), to put pressure on others (8, 15%), to solicit affection (3, 6%) and other aims (4, 7%). Patients with suicidal intent had a higher mean TBSA burnt (38%) than those who had other motives (42%) \( (P = 0.02) \). Subsequently, their mortality rate was far higher (26, 81.3%) than in the control group (7, 35%) \( (P = 0.001) \).

In the self-burning group, 8 patients (15%) had a history of self-harming; 4 (7%) had asked for help before the act and 8 (15%) had informed others before the act. The majority (50, 94%) said that it was their own idea and 40 (74%) said that they regretted it; however, 11 (20%) said that they would burn themselves again if they had the chance.

**Multivariate logistic regression**

Three variables showed a statistically significant association with self-burning: mental illness, female gender and age 15–30 years (Table 2). Separate multivariate logistic regressions were carried out for males and females. It showed that female gender and age 15–30 years (Table 2). Three variables showed a statistically significant risk factor only for females (OR = 3.6, 95% CI = 1.5–9.7, \( P < 0.001 \)). The young age group (15–30 years) was a statistically significant risk factor only for females (OR = 5.6, 95% CI = 1.5–8.7, \( P = 0.005) \).

**Discussion**

This study showed that the rate of self-burning among burns cases is high in a burns unit in Iraqi Kurdistan. We found only one study in this region (Iran) which reported a higher rate, of 36.6% (Saadat, 2005). Burns in the self-burning group were more severe and were associated with a higher mortality rate, which is consistent with previous studies (Laloe, 2004). The majority of self-burning patients in our study were young women, in line with studies from Asia and the Middle East (Laloe, 2004). Explanations might include the new responsibilities young women face when they become of marriageable age (Soni Raleigh & Balarajan, 1992) together with the status of being female in a traditional society. This might be supported by the predominance of family and marital problems in our female sample. In the absence of official data about suicide in Kurdistan and Iraq, it is unclear whether the predominance of young females is restricted to this method or extends to suicide in general.

A history of mental illness was found to be a risk factor for self-burning, with depression being the most common diagnosis, followed by schizophrenia, which is consistent with Laloe’s review (2004). The low rates of mental illness in the self-burning group could be due to our use of patients’ reports rather than a structured instrument, which might have led to underestimation. A history of mental illness was less prominent in females, suggesting that factors associated with female gender itself are more important risk factors in this group.

The question as to why this violent method is used is difficult to answer and requires further exploration. The ready availability of kerosene in Iraq might be one reason (it is used in virtually every house, mainly by women, for cooking and heating).

**Limitations**

This study was conducted in one burns unit in Iraqi Kurdistan, which could limit the generalisation of its findings, even to other parts of Iraq. Some of the accidental burns could have been in fact self-inflicted, and in some cases ‘self-burning’ could in fact have been inflicted by other people. Patients’ own reports of their mental illness could have led to underestimation. This study did not explore motives in depth.

**Implications**

Self-burning is a significant public health issue in Iraqi Kurdistan, occurring mainly in young females with social problems. Psychiatric assessment should be done in all cases. Follow-up is necessary, as a significant number of patients stated that they would repeat the act given the opportunity. A register of all cases of suicide is urgently needed.

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