Parasuicide in a low-income country: results from three-year hospital surveillance in Nicaragua

Trinidad Caldera1,3, Andrés Herrera2,3, Ellinor Salander Renberg3 and Gunnar Kullgren3

1Department of Mental Health, 2Department of Preventive Medicine and Public Health, University of León UNAN, León, Nicaragua, 3Department of Clinical Sciences, Division of Psychiatry, WHO Collaborating Centre, Umeå University, Umeå, Sweden


Aims: A study was undertaken to assess the incidence of parasuicide in Nicaragua, to identify groups at risk, and to describe the characteristics of parasuicides, such as methods used and seasonal and diurnal patterns. Method: All hospital-admitted parasuicide cases in the area of León, Nicaragua, were assessed over a three-year period using standardized instruments. Results: Two hundred and thirty-three parasuicide cases were identified in the catchment area giving a parasuicide rate of 66.3/100,000 inhabitants per year based on the population 10 years and older. Corresponding figure for 15 years and older was 71.3. A majority were females (68.8%), who were significantly younger than the males (mean 20.8 years vs. mean 24.6 years). The highest rates were found in the age group 15–19 years with a female rate three times higher than the male rate (302.9 vs. 98.9). Pesticides, a highly lethal substance, were used as method in 19.1% of the attempts. Consistent seasonal variation with peaks in May–June and September–October were found over the years. Among parasuicide cases, 46.5% had been in contact with the healthcare system within 6 months before attempting suicide. Conclusions: Parasuicides represent a significant health problem among young people in Nicaragua. Preventive efforts should be directed especially towards the life situation for young girls, limitation of availability of suicide means, increased awareness in schools concerning suicidal problems, as well as improved management of patients with mental health problems within primary healthcare.

Key words: hospital surveillance, Nicaragua, parasuicide, seasonal pattern, sociodemographic characteristics.

Ellinor Salander Renberg, Department of Clinical Sciences, Division of Psychiatry, Umeå University, SE-901 85 Umeå, Sweden. Tel: +46 90 785 6323, fax: +46 90 13 53 24. E-mail: ellinor.salander.renberg@psychiat.umu.se

BACKGROUND

Suicidal behaviour has become increasingly recognized by the World Health Organization as a major public health problem. In the younger age groups, suicide is now one of the leading causes of death in many countries. Every year close to one million people die from suicide – almost as many deaths as caused by traffic accidents. Suicidal behaviour is considered a major public health problem also in low-income countries (1). The National Mental Health Committee in Nicaragua estimates that suicide rates have increased threefold from year 1992 to year 2000.

The rate for attempted suicide, the most evident risk factor for completed suicide (2–4), is so far difficult to estimate. In Nicaragua only a few studies on parasuicide attempts were reported during the 1990s. The first study (5) used data from the register of the emergency room at the León hospital and two smaller studies were performed in the Northern and Western part of the country (6, 7). Suicide attempts were reported to occur most frequently among young people between 15 and 25 years of age. Whereas females are in majority among suicide attempters in most European studies (8), no clear gender difference was observed in the Nicaraguan studies. A common method used was a very serious one, namely ingestion of pesticides. From the perspective of prevention, it is noteworthy that 88% had visited a general practitioner within 6 months before the suicide attempt. These studies focused on mere prevalence data and are hampered by small sample sizes and less standardized methodology.

AIMS

Few studies have systematically examined parasuicides in low-income countries. The overall aim of present study is to assess the incidence of parasuicides in León, Nicaragua, to identify sociodemographic groups at risk and to examine other characteristics of parasuicides in this region.
To allow for international comparisons, this study used research protocols and instruments developed within the framework of the WHO/EURO Multi-center Study on Parasuicide, initiated during the 1980s (8 – 10).

METHODS

Study area

The municipality of León covers an area of 820 km² and according to the last Nicaraguan census report (1998) the region has 161,530 inhabitants, of whom 77% live in the urban area. The gender distribution is 48% males and 52% females. Among those older than 15 years, 54% are females, of whom 59% are single. The annual population growth is estimated at 3.15%. The unemployment rate has been very high and is estimated to be around 50% in the León area and even higher in the rural part of the study area. For more than 10 years until the mid-1990s, Nicaragua was in a state of war with an economy strictly controlled by the government. Conditions were poor for all citizens. During recent years the country has opened up to international markets, leading to huge gaps between socioeconomic classes and also inequity in terms of health (11).

The educational system is based on the primary school, which is mandatory and free of charge. The illiteracy rate is 21% for women and 20% for men. Children attend primary school in the urban area from 6 to 13 years and in rural areas 2 years later. However, many children and adolescents quit school much earlier. In León, which is much dominated by its university, students in the age group 6 to 30 years represent about 56% of the population.

The hospital HEODRA (Hospital Escuela Oscar Danilo Rosales Argüello) is located in the city of León and is the only healthcare facility with inpatient care services in the region, apart from a few very small private clinics which do not offer emergency services. In the study area, the municipality of León, there are also three primary healthcare centres.

Mental Health services are composed of a community mental healthcare unit, offering outpatient services (12) and a consultant psychiatrist at the HEODRA hospital where a few beds are assigned for psychiatric patients. Patients requiring more intensive psychiatric inpatient treatment are referred to the mental hospital in Managua, the capital of Nicaragua, 90 km from León. Primary healthcare centres have very limited resources to care for mentally disordered patients and we have in previous studies shown that mental health problems are often overlooked (13).

The study covers the municipality of León where cases in need of medical treatment after a suicide attempt are referred to the emergency unit of HEODRA hospital, with very few exceptions. All hospital-admitted cases of parasuicide according to the ICD-10 definition (9) living in the study area were interviewed following the standardized monitoring procedure developed within the WHO/EURO multicentre study. In addition to basic demographic information the interview covered information on method used, place, and time of the day when the attempt took place.

As soon as possible after the patients had been admitted and defined as a parasuicide case (usually within 24 – 48 hours), the interviews were performed in the emergency room or on a clinical ward. One trained nurse, who for several years has been responsible for the general epidemiological surveillance system at the hospital, performed all interviews. Inclusion in the study was based on informed consent. All patients under 15 years old were interviewed after informed consent by relatives or tutor. Patients who refused to be interviewed (12%) gave consent for inclusion of data from clinical records. The study was approved by the ethical committee at the medical faculty, university of León.

The present study reports on data from the first three years of monitoring, from March 1999 to February 2002. For statistical analyses the Mann – Whitney test was used to compare means of continuous variables and a chi-square test was used to compare distributions.

RESULTS

During the three-year period a total of 326 persons were admitted to the HEODRA hospital after deliberate self-harm. After exclusion of 17 cases of completed suicides and 76 cases living outside the study area, 233 parasuicide cases were included in the analyses, giving a parasuicide rate of 66.26/100,000 inhabitants per year based on the population 10 years and older. The corresponding figure for 15 years and older was 71.3. Females were in the majority (68.8%) with an overall male to female ratio of 1:2.3. In the age groups 10 – 14 years and 15 – 24 years, the ratios were 1:9.5 and 1:2.7, respectively. The proportions were inverted for the age group 25 – 34 years and 45 – 54 years with a male/female ratio of 1:0.9 and 1:0.8, respectively. Females were significantly younger with a mean age of 20.8 years compared with 24.6 years for males ($z = 3.575; p < 0.001$). As regards family structure, females were almost twice as likely to be living with their parents ($\chi^2 = 13.895; p < 0.05$).
In terms of economic activity there were significant gender differences: a larger proportion of males as compared with females were employed (48.8% vs. 13.2%; $\chi^2 = 34.47; p < 0.001$) whereas a larger proportion of females were students (52.3% vs. 31.8%; $\chi^2 = 15.28; p < 0.001$). There was a clear predominance of Catholics (78%), whereas 12% reported they had no religious belief.

Rates of parasuicides per 100,000 inhabitants per year by sex and age groups are given in Table I. The highest rates for both genders were found in the age group 15 – 19 years.

In Table II suicide methods are divided into four main categories, and the predominant method was drug intoxication, followed by ingestion of pesticides. There were no gender differences ($\chi^2 = 2.08; p = 0.557$) or age differences ($F = 1.36; p = 0.254$) in method used for parasuicide.

In almost all cases the suicide attempt occurred at home. Close to 80% had had previous contact with health facilities, most of them during the past 6 months. Among females younger than 25 years of age, 54 out of 118 individuals (45.7%) had had recent healthcare contact within 6 months, and among men older than 34 years of age, 8 out of 10 (80.0%) had had such contact.

Seasonal peaks of parasuicide occurred in May – June and September – October, as shown in Fig. 1. Within the hours of the day, parasuicides occurred most frequently between 1100 and 1300 hours and 1900 to 2100 hours (Fig. 2).

### DISCUSSION

This is the first Nicaraguan study to use a standardized method enabling international comparisons. It is shown that Nicaraguan parasuicide rates are quite similar to rates in most European regions (8),

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### Table I. Person-based age and gender rates per 100,000 inhabitants of total hospital admitted parasuicide cases

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>Rate</td>
</tr>
<tr>
<td>10 – 14</td>
<td>2</td>
<td>2.8</td>
<td>6.02</td>
</tr>
<tr>
<td>15 – 19</td>
<td>27</td>
<td>37.5</td>
<td>98.93</td>
</tr>
<tr>
<td>20 – 24</td>
<td>15</td>
<td>20.8</td>
<td>70.08</td>
</tr>
<tr>
<td>25 – 29</td>
<td>7</td>
<td>9.7</td>
<td>42.68</td>
</tr>
<tr>
<td>30 – 34</td>
<td>10</td>
<td>13.9</td>
<td>69.14</td>
</tr>
<tr>
<td>35 – 39</td>
<td>5</td>
<td>6.9</td>
<td>39.64</td>
</tr>
<tr>
<td>40 – 44</td>
<td>2</td>
<td>2.8</td>
<td>20.26</td>
</tr>
<tr>
<td>45 – 49</td>
<td>2</td>
<td>2.8</td>
<td>26.75</td>
</tr>
<tr>
<td>50 – 54</td>
<td>2</td>
<td>2.8</td>
<td>36.33</td>
</tr>
<tr>
<td>55+</td>
<td>0</td>
<td>0</td>
<td>0.6</td>
</tr>
</tbody>
</table>

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### Table II. Method, place of suicide attempt and previous healthcare contacts

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>72</td>
<td>161</td>
<td>233</td>
</tr>
<tr>
<td>%</td>
<td>31.2%</td>
<td>68.8%</td>
<td></td>
</tr>
</tbody>
</table>

### Method
- Non-narcotic/Other drugs
- Pesticide
- Sharp object
- Othersa

### Place
- Street
- Home
- At work
- Jail

### Previous healthcare contacts
- None
- <6 months
- >6 months <12 months
- >12 months

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including high rates among young people, in particular among young girls. However, our setting differs somewhat from European countries. From the WHO/EURO study 1989–92 (8, 15), the highest male to female ratio was 1:1.8 reported among those 15–24 years old, which should be compared with a ratio of 1:2.7 in

Fig. 1. Seasonal variation in suicide attempts.

Fig. 2. Diurnal variation in parasuicide attempts.
Nicaragua. Since the attempt rate was 210/100,000 per year for women aged 15 to 24 years, similar to the rates presented in other studies (8, 15), it is rather a low male rate that constitutes a unique pattern in Nicaragua.

Gender differences in suicidal behaviour in the literature are mainly attributed to gender-specific social behaviours (16), leading to differences in choice of method, different socialization associated with different coping strategies (17), and different exposure to risk factors, in particular depression (18, 19), but also sexual abuse (victimization) among girls (20, 21). Previous studies in Nicaragua have shown that for unmarried girls living at home, often with several generations in the same household, sexual abuse and unwanted pregnancies are important problems (22). We have also in a previous study in Leon showed that domestic violence contributes to mental distress among young married women (23), possibly leading to suicidal behaviour.

An interesting finding is the pronounced differences between high suicide attempt rates among young females and very low rates among older females, a pattern not described in high-income countries. Our interpretation is that girls in the youngest age group have, compared with older women, been exposed to a changing Nicaraguan society where traditional values very much have been challenged. This phenomenon might be similar to what Durkheim (24) presented in his famous study more than 100 years ago. He described a situation where rapid changes of the social regulation in a society lead to an increase in a specific type of suicide, namely anomic suicides.

Very few people lived alone, which is to be expected in Nicaraguan society where often several generations live in the same household (25). Only one-third of the individuals had children, which could be linked to suggestions from other studies that having small children offers protection from parasuicide attempts (3).

Most cases declared an occupation as student or housewife, while only 10% reported they were unemployed, which contrasts with the overall unemployment rate, estimated to be around 50% in the study area. It is possible that individuals reported they were employed even though they had only very temporary part-time jobs, for example in the market. In general, we failed to show any association between socioeconomic problems and parasuicide attempts, in contrast with the European studies where attempters more often belonged to social categories associated with social destabilization and poverty (8).

Concerning methods used to attempt suicide, the most challenging finding from a preventive perspective is that pesticides were used by as much as one-fifth of all cases with no gender differences and equally often in the urban and rural areas. Pesticide intoxication is also reported to be a leading method in completed suicide in the region. Discussing our findings with authorities in the community has, among other things, contributed to initiatives aimed at making pesticides less available in the shops.

During all three years there was a consistent seasonal pattern with peaks of attempts around June and November, respectively. These peaks coincide with the end of semesters in school when examinations take place and grades are decided. One hypothesis worth further exploring is that pressure in school and school failures might contribute to suicidal behaviour among young students.

Almost half of the attempters had had contact with a healthcare facility within six months before their suicide attempt, seemingly offering opportunities for prevention. However, we lack sufficient information on healthcare contacts in the corresponding age groups in the general population, as well as information concerning reasons for visiting healthcare services, to fully judge the importance of this finding. Nevertheless, we know from previous studies that a current mental disorder, in particular depression, is a major risk factor for not only completed suicide but also suicide attempts (26). At the same time we have shown in a previous study in Nicaragua that doctors in primary healthcare are likely to overlook mental health problems (13). A future task could therefore be to improve identification and treatment of depression in primary healthcare, which has been a successful approach in high-income countries (27). Anecdotal information, to some extent supported by previous studies in the area (28), indicates that problems related to sexual abuse bring girls to primary healthcare. Improved management of girls with this experience is likely to be important in prevention of suicide attempt (29).

Finally, concerning reliability of the data, it is reasonable to assume that there were cases during the study period that were never referred for any treatment, and cases visiting only healthcare centres, even if they were reportedly very few. No attempt was made to include these cases in the study, in accordance with experiences from other studies within the WHO/EURO project, restricting the study to include only cases admitted to hospital. The nurse responsible for identifying and interviewing cases had for many years been responsible for the routine surveillance system in the emergency unit of the hospital and we believe coverage to be complete in terms of cases detected. Furthermore, a limitation of the present study is that we had to restrict our study base to the municipality of Leon thereby excluding...
CONCLUSION

Parasuicides also represent a significant health problem in a low-income country such as Nicaragua. Young girls in particular are at risk. Pesticides are commonly used for intoxication and measures should be taken to make these toxic agents less available. Restricted availability of drugs is also warranted. Seasonal variations seem to indicate that problems related to school are of importance, a finding that warrants further research. Almost half of all cases have had fairly recent contact with healthcare services before attempting suicide. Staff in all healthcare facilities should be better trained to explore suicidal ideation and behaviours and identify and manage possibly related mental health problems or other factors pertaining to suicidal behaviour.

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