Is attempted suicide different in adolescent and adults?

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Abstract

Attempted suicide may be a different phenomenon in adolescents than in adults. To our knowledge, direct comparisons between these two populations are very scarce. The aim of this study is to analyze the differences between adolescents and adults in methods of attempted suicide, accompanying certainty of death, and intentionality. All cases admitted to one adult (n=173) and one adolescent (n=104) inpatient unit who attempted suicide in the period from January 2003 through October 2005 were included in a prospective, common, national register, with data on methods, circumstances, and intentionality. The methodology followed that of the WHO/Euro Multicenter Study on Parasuicide. A stratified analysis was performed using the Mantel–Haenszel procedure in order to control for the effects of gender and diagnosis. Adolescents used significantly more over-the-counter medicines. Adults were significantly more certain of the possible fatal outcome of their attempt and had a significantly more severe intention when harming themselves. Individuals appear to use the methods that are available to them to attempt suicide. Adolescents may display more impulsive and less lethal directed behavior than adults or, alternatively, they are more frequently admitted for less severe attempts.

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1. Introduction

The incidence of suicide attempts reaches a peak during the mid-adolescent years (Shaffer et al., 1996). In adolescents, suicidal thoughts are common (7.5% in the US general adolescent population), as are suicide attempts, although to a lesser extent (3.3%) (Gould et al., 1998). Completed suicide increases considerably in the late teens and continues into the early twenties. In Spain, in 2002, the rate of completed suicide in individuals 10–14 years of age was 0.38/100,000 and, in 15–19 year olds, it was 2.70/100,000 (INE, 2002).

Methods for self-aggression vary between nations and also across ages. The most common method in all countries included in the WHO/EURO Multicentre Study on Parasuicide is drug overdose, with psychotropicics being the preferred drug class, followed by non-narcotic analgesics (Michel et al., 2000). The WHO/Europe Multicentre Study on Parasuicide found that
methods used for the suicide attempts did not co-vary significantly with age (Schmidtke et al., 1996). “Soft” methods were prevalent in all age groups (overdose followed by cutting, primarily of the wrist). There were some exceptions for special methods. Self-poisoning decreased with age among females and more older men than younger men used the method of “jumping or lying before a moving object.”

Although many studies have assessed the characteristics of suicide attempts in adults and adolescents, and some epidemiological studies have recorded data on age at attempted suicide and method used, very few studies have directly compared the two age groups using the same methodology. Regarding methods of attempting suicide in adolescents, availability seems important. Data from the United States show that the most common methods of committing and attempting suicide are firearms and drug overdose, respectively (Shaffer et al., 2001). An analysis of data collected by the Oxford Monitoring System for Attempted Suicide between 1976 and 1993, for all cases of deliberate self-harm in under-16-year-olds referred to the general hospital in Oxford, reported that most cases involved drug overdose (Hawton et al., 1996a).

The intentions underlying suicidal attempts include reasons as varied as attention-seeking, influencing others’ behavior, involuntary loss of control, and dying. An analysis of the intentions of more than 1500 patients was conducted with data for the periods 1990–1992 and 1996–1998 from the WHO/EURO Multicentre Study. There were very slight differences in the intention of young and old patients, with more young than older patients having an intention to influence others and fewer young than older patients reporting having lost control (Hjelmeland et al., 2002).

The objectives of the present study are, firstly, to describe the comparative patterns of methods of attempted suicide that are followed by psychiatric admission, used by adults and adolescents in a Spanish population sample. Secondly, we aim to compare the intentionality and certainty of death between adolescents and adults when attempting suicide. These objectives are pursued using the WHO/Euro Multicenter Study methodology.

2. Methods

2.1. Subjects

We prospectively collected data on suicide attempts that led to psychiatric admission in two regions of Spain between January 2003 and October 2005. Data was collected as part of the National Suicide Network (RENEPCA). The RENEPCA was established in January 2003 and its aim was to conduct national studies on suicide. The entire project and the primary methodology was derived from the WHO/EURO Multicentre Study on Parasuicide set for multicultural comparison of suicidal behavior (Schmidtke et al., 1996). The study consisted of a compilation of socio-demographic and clinical data on suicide attempts using common instruments (monitoring form) and common definition of attempt. Attempted suicide was defined according to the proposed ICD-10 definition: “An act with non-fatal outcome, in which an individual deliberately initiates a non-habitual behavior that, without intervention from others, will cause self-harm, or deliberately ingests a substance in excess of the prescribed or generally recognized therapeutic dosage, and which is aimed at releasing changes which the subject desired via the actual or expected physical consequences” (de Leo et al., 2004). The protocol was approved by the consultative committee of the Fundación Española de Psiquiatría y Salud Mental and the Ethics and Research Committee of the Hospital Gregorio Marañón.

All patients who attempted suicide or had suicidal thoughts and were subsequently admitted to an adolescent or adult psychiatric inpatient unit during the aforesaid period were included. The 20-bed adolescent inpatient unit is located in one of the major general hospitals in Madrid, covering an area with an estimated population of 3,800,000 inhabitants, of which 659,000 individuals (17.5%) are adolescents (12 to 17 years of age). The most prevalent ICD-10 diagnoses at discharge are psychotic disorders, affective disorders, and conduct disorders associated with other pathologies. The adult psychiatric inpatient unit is located at the Central University Hospital of Asturias in Oviedo. The 20-bed unit covers an area with an estimated population of 400,000 inhabitants, of which 76.0% are adults (=18 years of age) (304,000 individuals). The most prevalent diagnoses at discharge are psychotic, affective, and personality disorders. Both hospitals are located in the inner city of the two regions and are affiliated with the university. See Table 1 for the sample discharge diagnoses.

The total sample consisted of 277 suicidal attempts. 173 were inflicted by adults and 104 by adolescents (12 to 17 years of age). Three variables were analyzed for each event: suicide method, intentionality of the suicide attempt, and death certainty. The report was made by the attending psychiatrist in light of all information obtained during the admission.
2.2. Variables

For a first analysis, there were eleven categories of methods of attempting suicide (see Table 2). These were then grouped for a second analysis into four categories: 1. overdose; 2. self-cutting; 3. hanging, shooting, or throwing oneself from a height; and 4. ingestion of chemicals or inhalation of gas. The first two categories are regarded as "soft methods" and the other two as "hard methods".

Intentionality is the appropriate notion to address the question of what the patients wanted to achieve by suicidal acts, whether it was to die or to influence some significant other (Hjelmeland and Hawton, 2004). It was grouped into three options: self-aggression, parasuicidal ideation or acting out, and severe suicide attempt. Self-aggression was defined as "self-induced physical injury without suicidal ideation". Parasuical ideation or acting out was defined as "self-injurious behavior in which the person intends to influence some significant other or manipulate the environment". Severe suicidal attempt was any "self-injurious behavior with the intention of killing oneself". This was rated based on both lethality of method and intentionality.

Certainty referred to the patients’ subjective report about the conceptions of the method’s lethality (i.e. if s/he did less to self than s/he thought would be lethal or equalled or exceeded what s/he thought would be lethal) (Beck et al., 1974). Certainty was categorically defined as present or absent.

Both intentionality and certainty of death were scored based on the evaluator’s clinical judgment.

2.3. Statistics

A Chi-square statistical ($\chi^2$) analysis was used to compare global method of self-aggression, intention, and certainty between both age groups. A Fisher exact test was used when there were more than 20% of cells with expected count less than 5. Odds ratios (OR) with 95% confidence intervals (CI) were used to calculate the excess of risk of using any given method between both age groups. A stratified analysis was performed using the Mantel–Haenszel procedure (and Breslow–Day homogeneity tests) to control for the effects of confounders such as gender and diagnosis on the differences in methods and certainty between adults and adolescents. Odds ratios (OR) and their confidence intervals (CI) were computed for death certainty comparison. In the analysis of

Table 1
Diagnosis (ICD-10 chapters)

<table>
<thead>
<tr>
<th>Diagnosis (ICD-10 chapters)</th>
<th>Adults</th>
<th>Adolescents</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>F10–19</td>
<td>19 (11.4%)</td>
<td>0 (0%)</td>
<td>19 (7.5%)</td>
</tr>
<tr>
<td>F20–29</td>
<td>14 (8.4%)</td>
<td>0 (0%)</td>
<td>14 (5.5%)</td>
</tr>
<tr>
<td>F30–39</td>
<td>73 (44.0%)</td>
<td>28 (31.8%)</td>
<td>101 (39.8%)</td>
</tr>
<tr>
<td>F40–49</td>
<td>21 (12.7%)</td>
<td>27 (30.7%)</td>
<td>48 (18.9%)</td>
</tr>
<tr>
<td>F50–59</td>
<td>2 (1.2%)</td>
<td>6 (6.8%)</td>
<td>8 (3.1%)</td>
</tr>
<tr>
<td>F60–69</td>
<td>35 (21.1%)</td>
<td>16 (18.2%)</td>
<td>51 (20.1%)</td>
</tr>
<tr>
<td>F70–79</td>
<td>1 (0.6%)</td>
<td>1 (1.1%)</td>
<td>2 (0.8%)</td>
</tr>
<tr>
<td>F90–99</td>
<td>1 (0.6%)</td>
<td>10 (11.4%)</td>
<td>11 (4.3%)</td>
</tr>
<tr>
<td>Total</td>
<td>166</td>
<td>88</td>
<td>254</td>
</tr>
</tbody>
</table>

Information on these variables is missing in 1.2% of adults and 13.5% of adolescents for the analysis. All tests are bilateral.

Table 2
Methods of attempted suicide by age group

<table>
<thead>
<tr>
<th>Methods of attempted suicide by age group</th>
<th>Total</th>
<th>Adults ($n=173$)</th>
<th>Adolescents ($n=104$)</th>
<th>$P$</th>
<th>OR (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-narcotic analgesics, antipyretics, anti-inflammatories</td>
<td>22</td>
<td>5</td>
<td>17*</td>
<td>&lt;0.0001</td>
<td>9.4 (3.3–26.7)</td>
</tr>
<tr>
<td>Psychotropic drugs</td>
<td>115</td>
<td>81</td>
<td>34</td>
<td>0.68</td>
<td>1.1 (0.7–1.9)</td>
</tr>
<tr>
<td>Other drugs or medications</td>
<td>31</td>
<td>28*</td>
<td>3</td>
<td>&lt;0.01</td>
<td>4.8 (1.4–16.4)</td>
</tr>
<tr>
<td>Alcohol</td>
<td>7</td>
<td>7</td>
<td>0</td>
<td>0.10</td>
<td>7.06 (0.4–125.2)</td>
</tr>
<tr>
<td>Petroleum derivatives, solvents, gas</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>0.20</td>
<td>0.3 (0.1–1.5)</td>
</tr>
<tr>
<td>Pesticides and other agricultural chemicals</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0.55</td>
<td>3.3 (0.2–64.2)</td>
</tr>
<tr>
<td>Other chemical substances</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>0.64</td>
<td>0.7 (0.1–4.1)</td>
</tr>
<tr>
<td>Hanging, suffocation, and submersion</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>0.18</td>
<td>6.1 (0.3–109.4)</td>
</tr>
<tr>
<td>Shooting</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1.4 (NA)</td>
</tr>
<tr>
<td>Sharp objects</td>
<td>32</td>
<td>14</td>
<td>18*</td>
<td>&lt;0.01</td>
<td>3.4 (1.6–7.3)</td>
</tr>
<tr>
<td>Jumping from a height or throwing oneself under a vehicle</td>
<td>28</td>
<td>16</td>
<td>12</td>
<td>0.19</td>
<td>0.5 (0.2–1.2)</td>
</tr>
<tr>
<td>Other specific methods</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other non-specific methods</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>16</td>
<td>2</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valid total</td>
<td>261</td>
<td>171</td>
<td>90</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Group with a greater risk of using that specific method.
intention, due to three possible outcome responses, the analysis was conducted separately for males and females. Level of significance was set at \( P = 0.05 \). All significance tests are two-tailed.

3. Results

3.1. The sample

There were 53.2% females in the adult sample and 77.9% girls in the adolescent sample (\( \chi^2 = 16.9, P < 0.001 \)). Mean age was 39.81 (S.D. 12.98) in the adult group and 15.44 (S.D. 1.2) in the adolescent group. A total of 44% of adults were diagnosed as having an affective disorder (F30–F39 of the ICD-10) at discharge in comparison with 31.8% of adolescents. 12.7% of adults and 30.7% of adolescents had anxiety or adjustment disorders (F40–F49) and 4% of adults and 15.4% of adolescents did not have any psychiatric diagnosis (inter-group diagnosis differences \( \chi^2 = 60.3, P < 0.001 \)). See Table 1. More adults than adolescents had had a previous attempt (63.9% vs. 50.6%, \( \chi^2 = 17.55, P = 0.004 \)). 40.1% of the adult patients and 44.6% of the adolescents had attempted suicide in the previous 12 months.

3.2. Suicide methods

Adults and adolescents differed in method of self-aggression, although the preferred method for both was overdose, used by 72.5% of adults and 60% of adolescents. Tables 2 and 3 summarize the methods used by adults and adolescents. Youngsters were more likely to overdose with non-narcotic analgesics or anti-inflammatory drugs (16.3% of events compared with 2.9% for adults), while adults tended to use psychotropic drugs (not significantly) or other medications (a total of 63% of events compared with 35.5% for adolescents). The difference in methods used persisted between adolescents and adults after controlling for gender (OR = 9.39, 95% CI = 2.95–29.83, \( P < 0.001 \) for non-narcotic analgesics; OR = 0.168, 95% CI = 0.04–0.598, \( P < 0.005 \) for the use of “other drugs” and OR = 3.07, 95% CI = 1.39–6.81, \( P < 0.009 \) for using sharp objects). There was an independent effect of gender on the use of non-narcotic analgesic/anti-inflammatory drugs, with a difference between female and male groups (\( \chi^2 = 18.48, P < 0.001 \) in females; \( \chi^2 = 0.709, P < 0.345 \) in males; \( \chi^2 = 4.05, P < 0.048 \) between genders). The use of “other drugs” and sharp objects was only significant in females when the gender layers were analyzed separately (\( \chi^2 = 5.06, P < 0.036 \) in females; \( \chi^2 = 4.07, P < 0.066 \) in males; \( \chi^2 = 1.07, P < 0.3 \) between groups for “other drugs” and \( \chi^2 = 6.67, P < 0.015 \) in females; \( \chi^2 = 1.51, P < 0.25 \) in males, \( \chi^2 = 0.305, P < 0.581 \) between groups).

The differences in methods used by adults and adolescents persisted after controlling for diagnosis (OR = 5.99, 95% CI = 2.01–17.90, \( P < 0.001 \); OR = 0.13, 95% CI = 0.29–0.57, \( P < 0.004 \); OR = 2.67, 95% CI = 1.21–5.89, \( P < 0.022 \) controlling for affective disorders in non-narcotic analgesics/anti-inflammatory drugs, “other drugs,” and using sharp objects respectively; OR = 7.22, 95% CI = 2.36–22.16, \( P < 0.001 \); OR = 0.128, 95% CI = 0.03–0.58, \( P < 0.005 \); OR = 2.64, 95% CI = 1.18–5.19, \( P < 0.028 \) controlling for reactive disorders in non-narcotic analgesics/anti-inflammatory drugs, “other drugs” or sharp objects, respectively).

3.3. Suicidal intention

Most commonly, intention was scored as “parasuicidal ideation or acting out” (64.4% of cases in the total sample, 60.1% in the adult group and 71.6% in adolescents). “Severe attempt” accounted for 11.8% in the younger group. In adults, “severe attempt” was second in frequency (35.3%), after “parasuicidal ideation or acting out.” Information was lacking for 2.3% of adults and 3.9% of youngsters. The difference in intention was statistically significant between adults and adolescents, with more adults having severe intent (\( \chi^2 = 24.63, df = 2, P < 0.001 \)). The difference in intention was significant only in females (\( \chi^2 = 5.86, df = 4, P < 0.210 \) in males; \( \chi^2 = 24.7, df = 3, P < 0.001 \) in females). After stratifying by diagnosis, adjustment/reactive disorders failed to show a difference in intention between adults and adolescents (\( \chi^2 = 3.70, \)
df = 3, \( P = 0.295 \) and \( \chi^2 = 27.89, \ df = 4, \ P < 0.001 \) for reactive and non-reactive layers, respectively).

3.4. Certainty

Seventy-six adults (43.9%) and 14 adolescents (13.6%) were judged to be certain that the suicidal act would result in death. Information about certainty was missing for 2.9% of adults and for 3.9% of minors. The difference was statistically significant (OR = 5.01, 95% CI = 2.64–9.53, \( P < 0.001 \)) and persisted after controlling for gender (OR = 4.49, 95% CI = 2.35–8.57, \( P < 0.001 \)) and diagnosis (OR = 5.34, 95% CI = 2.62–10.85, \( P < 0.001 \) for affective disorders; OR = 5.33, 95% CI = 2.62–10.82, \( P < 0.001 \) for reactive disorders). The effect was present only in females (\( \chi^2 = 22.27, \ df = 1, \ P < 0.001 \) in females; \( \chi^2 = 2.84, \ df = 1, \ P < 0.73 \) in males) but differences between gender groups were not significant (\( P = 0.136 \)).

4. Discussion

In this study, we have analyzed suicide attempts followed by psychiatric admission in a population of adults and a population of adolescents consecutively admitted to hospital in two regions of Spain. Greater severity of attempts (regardless of reason for admission) than in general population studies must therefore be assumed. We have found that adolescents more often use over the counter drugs and cutting objects in suicide attempts, and that less frequently do they have the intention of killing themselves.

Some differences in socio-demographic data stand out between the two groups included in this study. As in other studies on suicide attempts, there is a majority of females, which is more marked in the adolescent group. The higher number of girls in the adolescent group parallels a trend toward less severe suicide attempts in younger subjects. A higher proportion of adults than adolescents have a discharge diagnosis of affective disorder, while more adolescents have adjustment or anxiety disorders or no psychiatric diagnosis at all. The percentage of adolescents with no psychiatric diagnosis is similar to that provided in a very recent study assessing admitted adolescents with a recent history of non-suicidal self-injury (Nock et al., 2006). This could also be interpreted as adolescents showing less severe or more impulsive suicidal behaviors.

In this study, there is a higher percentage of repeat attempts as compared with data from the literature, which shows a repeat attempt rate of approximately 10% in adolescents in the year before the index episode (Brent et al., 1993; Hultan et al., 2001). These data, however, refer to suicide attempts followed by any kind of medical health care, while our data includes only cases that were followed by psychiatric admission, which probably reflects an inclination to admit subjects with repetitive suicidal behavior.

Adults and adolescents in our sample used different methods to attempt suicide. Although both groups used overdose as their method of choice, they ingested different substances. Most adults used psychotropic drugs, which is probably a reflection of the availability of those drugs to them and the fact that they had more identified psychiatric problems and, therefore, more treatment. The fact that adolescents use more non-specific medications (e.g., non-narcotic analgesics) and cut themselves more frequently than adults may reflect availability of methods and, also, increased impulsivity in this age group, especially since the influence of age is independent of the influence of gender and diagnosis. The fact that availability influences the method of choice is consistent with the literature and the use of non-narcotic analgesics as a preferred method in the adolescent population has been previously reported (Marbella et al., 2005). A good example is the ease of availability of paracetamol, which before September 1998 could be purchased without restriction over the counter in the UK, which has been blamed for the fact that 50% of overdoses in the UK involved that drug (Hawton et al., 1996b). After legislation regarding package sizes of analgesics was passed, the use of paracetamol decreased (Hawton et al., 2003). In addition, studies conducted in the US found that firearms were twice as likely to be found in the homes of adolescent suicide completers as in the homes of attempters or psychiatric controls (Brent et al., 1991) and more likely to be found in the homes of suicide completers than in their neighbor controls (Brent et al., 1993).

The rates of use of the various methods differ from those published for adolescent epidemiological samples, in which self-cutting is the preferred method of self-harm, closely followed by overdosing (King et al., 2001). The difference probably lies in the fact that the present study includes only individuals admitted to a psychiatric unit, and self-cutting is rarely severe, leading to a lower proportion of admissions than other methods.

Data from general population studies show that suicidal ideation is more common than attempted suicide, which is more common than severe attempts. The same pattern is also found in this sample of inpatient adolescents. The finding that severe attempts are more common in the adult group than in adolescents may reflect the fact that the threshold for psychiatric admission is
lower for adolescents, who are admitted more frequently than adults for “parasuicidal” ideation, which has also been reported in a recent study (Harriss et al., 2005). Many adolescents who attempt suicide have no previous psychiatric history, and assessment and crisis intervention might be an admission criteria more frequently applied to this population. It might be contended that, on the contrary, attempted suicide results in fewer hospitalizations in adolescents than in adults, since they commonly have greater family support and preference is usually given to treating them in an outpatient setting, due to the stigma and negative connotations of a psychiatric admission. The absence of data regarding the ratio of admitted and discharged adolescents and adults after an emergency room assessment limits our capacity to interpret the lower severity of admitted adolescent attempts compared with adults.

Certainty of death is much more common in adults than in adolescents, again supporting the importance of impulsiveness in the case of adolescent self-destructive behaviors.

In our study, more girls than boys were admitted to hospital. A multiple-group comparison study (Beautrais, 2003) designed to identify factors that distinguish young people who commit suicide from those who make serious suicide attempts showed that suicide completers and attempters were distinguished by two factors: gender and mood disorder. Suicide victims were more often male and serious suicide attempters tended to have higher rates of mood disorder. The study suggests that, at least among those young people who make serious suicide attempts, gender differences in outcome are completely explained by method of choice. In our study, there was an independent gender effect on method of choice with females using more over-the-counter drugs. This finding is in agreement with the literature, which shows that attempts in males tend to be associated with higher suicidal intent (Arensman and Hawton, 2004).

Given the previous finding that adolescents with prior attempts are at higher risk for subsequently completing suicide (King et al., 2001) and the continuity in risk factors between adolescents who attempt suicide and those who complete it (Brent et al., 1988), it is especially important to study the mediators of completed suicide in order to implement the appropriate methods of prevention. Furthermore, the effect of admission of suicide and parasuicide attempters on the outcome and suicidal risk in patients warrants further investigation.

The main limitations of the study are the absence of data regarding the ratio of admitted and discharged patients after emergency room assessment and the lack of standardized instruments to measure intentionality and certainty of death. The former makes it difficult to establish clearer conclusions about the practices and decision-making processes involved in the provision of aftercare when evaluating adults and adolescents. The latter increases the subjectivity derived from the clinicians’ clinical judgment. A further limitation, which is common to all studies on suicide is a lack of standard nomenclature across studies. This precludes direct comparison with much of the research on this subject. We have tried to overcome this problem by defining all terms used very clearly.

The profile of adolescents admitted after a suicide attempt seems to be different from that of adults in the same situation. Adolescents admitted after a suicide attempt are frequently girls with an acute emotional crisis, who react by self-cutting or overdosing with non-psychotropic drugs, and who are not clearly searching for a final exit. The adult group is characterized by a more deadly intention, in the context of an affective episode, and with a history of repetitive severe suicidal attempts. The difference in the suggested profile invites reflection as to whether the same medical solution (admission to a psychiatric ward) is the most appropriate response to such different situations. The WHO/EURO Project took note of the problem of type of medical aftercare following attempted suicide in young people as an issue of major concern (Arensman and Hawton, 2004). The findings of the present study suggest that an appropriate possibility is to investigate the provision of some type of crisis intervention rather than psychiatric admission as such for adolescents attempting suicide.

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References


