

# The Incidence of Hospital-Treated Attempted Suicide in Oviedo, Spain

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**Abstract.** *Background:* The incidence of hospital-treated attempted suicide has not been well established in Spain. *Aims:* To determine the incidence of suicide attempts presenting to a hospital in Oviedo, Spain, to describe the nature of the suicidal behavior, and to identify sociodemographic subgroups of the population with high rates. *Methods:* All admitted to the Hospital Universitario Central de Asturias, Oviedo, during the period 1 May 2008 to 30 April 2009 were examined and those meeting the internationally-recognized case definition were identified. *Results:* A total of 308 suicide attempt presentations (39% male, 61% female) were made by 279 individuals. Almost 90% of the suicide attempts involved a drug overdose. The age-adjusted total, male, and female attempted suicide rates were 83, 66, and 99 per 100,000, respectively. The highest rate was among 35–44-year-olds for men and women (141.1 and 191.8 per 100,000, respectively). Incidence rates varied widely by sociodemographic characteristics with especially high rates among separated/divorced men (2.4%) and women (1.1%). *Conclusions:* The reported incidence of hospital-treated attempted suicide is below average in the European context but higher than that reported by previous Spanish studies. Persons separated or divorced constitute a high-risk group.

**Keywords:** suicide attempt, incidence, hospital, epidemiology

## Introduction

Establishing the extent of the problem and identifying sub-groups of the population with elevated incidence rates are fundamental steps in the public health approach to addressing health-related behaviors. The first European-wide effort to address nonfatal suicidal behavior in this way began in the late 1980s with the WHO/Euro Multicentre Study on Parasuicide (subsequently renamed the WHO/Euro Multicentre Study on Suicidal Behavior). The study collected data on medically-treated nonfatal suicidal behavior in 25 centers spread across 19 countries using a standardized methodology (Platt et al., 1992). Data from the late 1990s showed a 14-fold difference in rates from a low of 36 per 100,000 among men in Ankara, Turkey to a high of approximately 500 per 100,000 among women in Rennes, France. In all but three centers, women had higher incidence rates and there was also widespread variation in rates by age group. In general, the peak male and female rates were in the 25–34- and 15–24-year age groups, respectively, with very low rates among the 55+ groups (Schmidtke, Weinacker, Lohr et al., 2004).

The WHO/Euro Study showed that, compared to the general population, suicide attempters more often belonged

to sociodemographic categories associated with disadvantage (e.g., unemployed, living alone, separated, or divorced). However, the study recognized that incidence rates needed to be determined for categories of sociodemographic variables in order to better identify those with an increased risk (Schmidtke, Weinacker, & Lohr, 2004). The few studies that have adequately assessed the risk of non-fatal suicidal behavior across a range of sociodemographic variables have identified high risk among persons who are unemployed, of low educational attainment, living alone, single, separated, or divorced (Hawton, Fagg, Simkin, & Mills, 1994; O'Loughlin & Sherwood, 2005; Petronis, Samuels, Moscicki, & Anthony, 1990; Van Heeringen, 1994).

Monitoring Suicidal Behavior in Europe (MONSUE) is a European Commission-funded project with the aim of assessing the frequency of suicidal behavior in Europe. The project developed from the previous WHO/European Multicentre Study on Suicidal Behavior and currently involves 17 centers across Europe. The present study reports the findings of the Spanish center in the MONSUE project with regard to the nature of suicide attempt presentations to a hospital and their incidence in the population across a range of sociodemographic characteristics.

## Methods

### Setting

Asturias is one of the 17 autonomous communities in Spain. It is located on the Spanish north coast and has a population of just over one million people. The study took place in Hospital Universitario Central de Asturias (HUCA), the university hospital located in Oviedo, the capital city of Asturias. Oviedo and its surrounding municipalities constitute Health Area IV of Asturias and this was considered the study catchment area. According to the 2008 population estimate of the Spanish National Statistics Institute, Health Area IV of Asturias has a population of approximately 336,000.

### Case Definition and Ascertainment

The MONSUE study uses the term suicide attempt according to the following definition that was devised by the Working Group of the former WHO/European Multicentre Study on Suicidal Behavior (Platt et al., 1992):

An act with nonfatal outcome, in which an individual deliberately initiates a nonhabitual 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 realizing changes which the subject desired via the actual or expected physical consequences.

A standardized monitoring form is used by all participating centers in the MONSUE study seeking data relating to age, sex, and other sociodemographic variables, such as marital status, household composition, religious denomination, level of education, and economic situation. The method of the suicide attempt is recorded according to the ICD-10 X-codes. Alcohol was included as a suicide method following the patient's statement of the methods used in the attempt. For the 12-month period, 1 May 2008 to 30 April 2009, all presentations to the emergency department of the HUCA in Oviedo were examined. Those meeting the case-definition criteria were selected at admission to the emergency department. The information required for the monitoring form was sought at the emergency department. Patients whose data could not be collected at the emergency department because of their clinical condition, or those who left the emergency department before the assessment, were tracked and data for the monitoring form was obtained at a later interview. All the assessments were done by a researcher trained in the understanding and application of the case-definition.

### Rate Calculations

From the website of the Spanish National Statistics Institute (<http://www.ine.es>) we obtained the 2008 population

estimates for the municipalities of Asturias disaggregated by sex and five-year age group. The municipalities forming Health Area IV of Asturias, the study catchment area, were identified from online resources of the Asturian Government ([http://tematico8.asturias.es/repositorio/sanidad-ambiental/articulos/articulo\\_1237905380141.html](http://tematico8.asturias.es/repositorio/sanidad-ambiental/articulos/articulo_1237905380141.html)) and their population estimates aggregated in order to be used as denominators in the calculation of the incidence rates. Population data for the catchment area were also obtained by sex, age, and across a range of sociodemographic variables from the most recent Spanish National Census (2001) using the Spanish National Statistics Institute's online information query system ([http://www.ine.es/censo/en/seleccion\\_ambito.jsp](http://www.ine.es/censo/en/seleccion_ambito.jsp)).

In calculating rates, we considered only the first presentation of each patient. Patients residing outside the catchment area who presented to the hospital following attempted suicide were included in the rate calculations to balance, to some extent, catchment area residents who may have presented elsewhere. Total, male, and female age-adjusted rates per 100,000 were calculated using the European standard population (Waterhouse, Muir, Correa, & Powell, 1976). For 15–64-year-olds, crude rates were calculated for sociodemographic groups stratified by sex. Age and gender were known for all cases, whereas marital status, household situation, level of education, and economic status were unknown for 5.9–10.2% of individuals, respectively. For example, if the sociodemographic variable was known for 90% of cases then the weighting applied was 1.11 (i.e., 100/90). To adjust for missing data, a weighting was applied to the numerator in the calculation of rates relating to these variables. Assuming that the number of persons who presented following attempted suicide ( $x$ ) followed a Poisson distribution, 95% confidence intervals for the rates were calculated using the *normal* approximation, i.e., confidence interval =  $(x \pm 2 * \sqrt{x}) * 100,000 / \text{population}$ .

## Results

In the study period (1 May 2008–30 April 2009), a total of 308 suicide attempt presentations (males, 119 (38.6%); females, 189 (61.4%)) were made to the emergency department by 279 individuals, yielding a person:event ratio of 1:1.10. Repeat presentations were made during the study period by 23 (8.2%) of the patients. Over 95% of the presentations were made by residents of the catchment area (295, 95.8%). Individuals of a nationality other than Spanish accounted for 16 (5.2%) of the suicide attempt presentations.

A psychiatric diagnosis was specified in approximately 80% of all acts of attempted suicide and this was similar for both genders. Mood disorder was the most commonly assigned diagnosis (Table 1). There was a highly statistically significant association between primary psychiatric diagnosis and gender ( $\chi^2 = 25.12$ ,  $df = 7$ ,  $p < .001$ ) because of a higher prevalence of mood disorder and adjustment

**Table 1.** Primary psychiatric diagnosis associated with attempted suicide acts

Diagnosis (ICD-10 code)	Male	Female	All	
None specified	23	(19.3%)	42	(22.2%)
Substance use disorder (F10)	14	(11.8%)	7	(3.7%)
Psychotic disorder (F20)	12	(10.1%)	3	(1.6%)
Mood disorder (F30)	31	(26.1%)	69	(36.5%)
Neurotic disorder (F40)	22	(18.5%)	45	(23.8%)
Personality disorder (F60)	14	(11.8%)	17	(9.0%)
Other	3	(2.5%)	6	(3.2%)
			9	(2.9%)

**Table 2.** Method of attempted suicide\*

	Total		Male		Female		Association with gender**
Method (ICD-10 code)	n	(%)	n	(%)	n	(%)	p-value
Drug overdose (X60-X64)	265	(86.0%)	88	(73.9%)	177	(93.7%)	<.001
Alcohol*** (X65)	65	(21.1%)	28	(23.5%)	37	(19.6%)	.408
Poisoning (X66-X69)	8	(2.6%)	4	(3.4%)	4	(2.1%)	.504
Hanging (X70)	6	(1.9%)	6	(5.0%)	0	(0%)	.002
Self-cutting (X78)	23	(7.5%)	12	(10.1%)	11	(5.8%)	.166

Note. \*Multiple methods were used in some suicide attempt. \*\*Assessed by chi-square tests with one degree of freedom. \*\*\*Alcohol was the only method used in three cases.

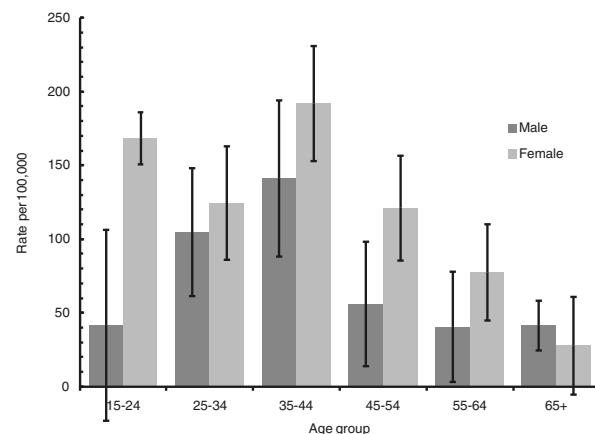
disorder in women and a higher prevalence of substance use disorder and schizophrenia disorder in men.

Almost 90% of the suicide attempts involved a drug overdose (Table 2). The vast majority of those overdoses (91.2%) involved psychotropic prescription drugs such as barbiturates, sedatives, hypnotics, and other psychotropic agents; 4.0% of the overdoses included illicit drugs and only 1.5% involved nonnarcotic analgesics, antipyretics, and antirheumatics. Drug overdose was particularly associated with female suicide attempts. Alcohol was stated by the patients as a suicide method in one in five attempts. Alcohol and self-cutting were more often involved in male suicide attempts but not significantly so. Hanging was the method used in just six cases but each of these suicide attempts were made by men. Multiple methods (excluding alcohol) were involved in 14 (4.5%) of the suicide attempts, five by men and nine by women, and generally these cases involved drug overdose and self-cutting ( $n = 8$ ).

Table 3 details the crude and age-standardized attempted suicide rates based on all ages and those aged over 15 years. The female rate was significantly higher than the male rate,

**Table 3.** Annual total, male and female attempted suicide rate per 100,000

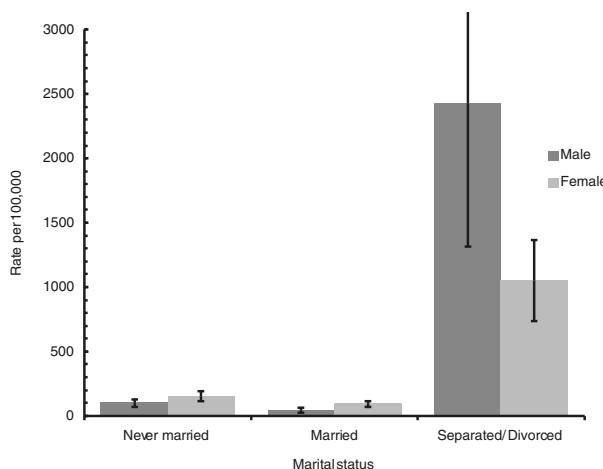
		Total		Male
		Rate	95% CI	
All ages	Crude	83.0	(73.1–93.0)	65.7
	Age-adjusted	77.5	(67.6–87.5)	55.8
Over 15 years	Crude	92.8	(81.6–103.9)	74.4
	Age-adjusted	98.6	(87.5–109.8)	71.5

**Figure 1.** Male and female attempted suicide rate by age.

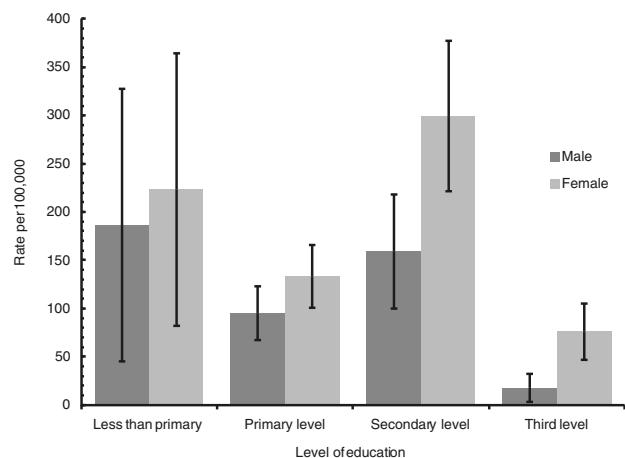
approximately 50% higher when the crude rate was considered and about 75% higher considering the age-adjusted rate.

The highest rate of attempted suicide was among 35–44-year-olds for both male and female populations (141.1 and 191.8 per 100,000, respectively; Figure 1). Among men, the rate increased with age to this peak and there were low rates among over-45-year-olds. Among women, there was a secondary peak of almost equal magnitude in 15–24-year-olds (168.4 per 100,000) and the rate decreased with increasing age over 45 years of age.

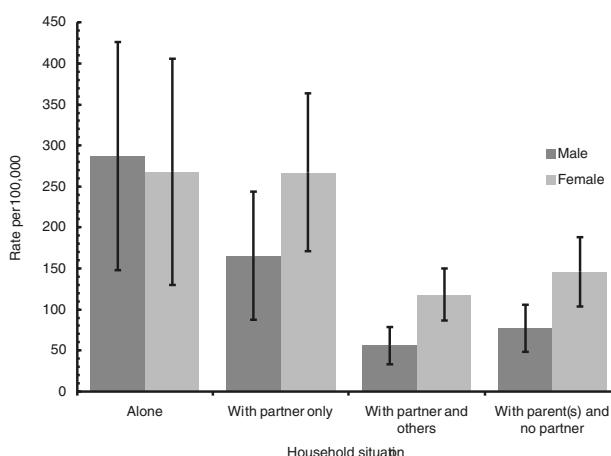
There was striking variation in the incidence of attempted suicide by marital status among 15–64-year-olds (Figure 2). For both sexes, and especially for men, the highest rate



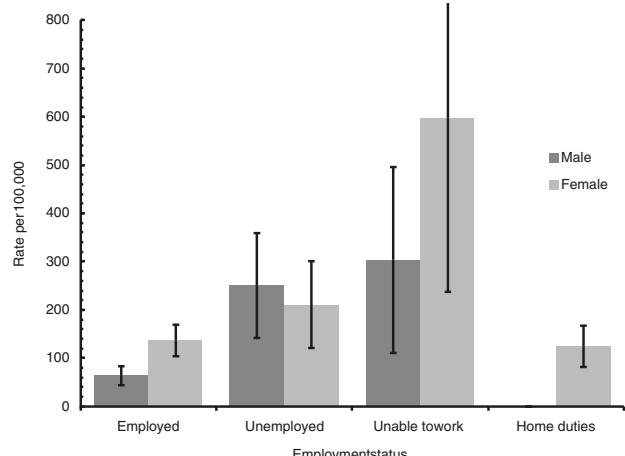
**Figure 2.** Male and female attempted suicide rate among 15–64 year-olds by marital status.



**Figure 4.** Male and female attempted suicide rate among 15–64-year-olds by level of education.



**Figure 3.** Male and female attempted suicide rate among 15–64 year-olds by household situation.



**Figure 5.** Male and female attempted suicide rate among 15–64-year-olds by employment status.

was among the separated or divorced. The magnitude of the rate was exceptionally high – approximately 2.4% and 1.1% for separated/divorced men and women, respectively. The attempted suicide rate was far lower among the never married and even lower among the married.

Men and women living alone and women living only with a partner had equally high rates of attempted suicide (286.7, 268.0 and 267.2 per 100,000, respectively; Figure 3). Men living only with a partner had a lower rate (165.4 per 100,000) but living with a partner and others (usually their children) was associated with the lowest rates for men (55.9 per 100,000) and women (118.2 per 100,000). Low male and female attempted suicide rates were also observed in those living with parent(s) and no partner.

There was marked variation in the incidence of attempted suicide when examined by level of education (Figure 4) with very low rates among men and women who attained a third-level qualification (17.9 and 76.0 per 100,000, respectively). In terms of employment status (Figure 5), em-

ployed men and women and women engaged in home duties had the lowest rates (63.9, 136.6 and 125.0, respectively). The unemployed had higher rates, but being unable to work because of illness or disability was associated with the highest rate for men (303.7 per 100,000) and particularly so for women (597.5 per 100,000).

## Discussion

The incidence of hospital-treated attempted suicide in Oviedo, North Spain, is below average in the European context. Higher rates have been reported by most centers of the former WHO/Euro Multicentre Study (Schmidtke, Bille-Brahe, De Leo, & Kerkhof, 2004) and by registries utilizing a similar methodology in Ireland (Corcoran, Arensman, & Perry, 2007) and in the UK (Hawton et al., 1994; O'Loughlin & Sherwood, 2005). This suggests that

in addition to having a relatively low suicide rate compared to other European countries, Spain also appears to have a relatively low rate of nonfatal suicidal behavior. In the context of Spain itself, the incidence of attempted suicide has previously been reported for an area within the Basque Country for the period 1989–1991 (Schmidtke et al., 1996). The respective male and female age-adjusted rates (for over 15-year-olds) were 45 and 69 per 100,000. Another Spanish study from the province of Toledo found very similar male and female age-adjusted attempted suicide rates of 49 and 62 per 100,000 for the period 1990–1998 (Jimenez Moron, 2003). The present study reported higher rates of 72 and 126 per 100,000 for men and women. This may reflect a regional difference in the incidence of attempted suicide since the studies were based in different Spanish regions. However, it is also possible that there has been an increase in attempted suicide in the country, a thesis supported by the fact that suicide rates have increased in Spain in recent decades (Bobes & Saiz, 2004). It has previously been estimated that about 40,000 suicide attempt presentations are made to hospitals in Spain each year (Jiménez Treviño, Saiz Martínez, Paredes Ojanguren, & Bobes García, 2004). We recorded 308 hospital-treated suicide attempts from a population of approximately 336,000. Extrapolating from our data to the 40,085,000 population of Spain yields a similar national estimate of approximately 36,700 suicide attempts.

The frequency of the various methods of self-harm and injury reported by the present study were broadly similar to those reported previously for European centers (Michel et al., 2000), although we found drug overdose to be even more prominent and self-cutting somewhat less frequent. Restricting the availability of certain medicines commonly taken in intentional drug overdose acts has been shown to lead to reduced rates of hospital-treated suicidal behavior and suicide (Corcoran et al., 2010; Hawton et al., 2001, 2009). The predominance of drug overdose in hospital-treated suicidal behavior shown by the present study suggests that there is potential for reducing the incidence of such behavior in Spain by identifying and restricting the availability of the drugs most commonly used in overdose.

Primary psychiatric diagnoses associated with attempted suicide acts in our sample agree with previously published data finding that mood disorders, substance abuse disorders, personality disorders, and schizophrenia are among the most prevalent clinical conditions (Schmidtke, Bille-Brahe et al., 2004; Jiménez Treviño et al., 2004; Petronis et al., 1990). An indepth analysis of diagnosis, comorbidity, and their implications in suicide attempts will be the subject of a further study.

In this study, 5.2% of all suicide attempt presentations were individuals of a nationality other than Spanish. According to the Spanish National Census of 2001, 1.7% of the study catchment area were non-Spanish nationals. Thus, while the numbers involved were small, there is evidence to suggest that non-Spanish nationals are at increased risk of suicidal behavior. Risk of suicidal behavior

in ethnic minorities has been examined recently in the UK (Bhui, McKenzie, & Rasul, 2007; Cooper et al., 2006) and in the Netherlands (Burger, van Hemert, Schudel, & Middelkoop, 2009) with findings showing elevated rates among young women of specific ethnic minorities. As other centers participating in the MONSUE study report their data, it will be possible to examine the relative risk of attempted suicide in ethnic minorities across Europe.

Female rates of nonfatal suicidal behavior are generally higher than male rates (Schmidtke et al., 1996) and often by a margin of 50% (Hawton & Harriss, 2008a). The crude rate of attempted suicide reported in the present study was approximately 50% higher in women. However, this gender ratio has been found to be highly age-dependent (Corcoran, Keeley, O'Sullivan & Perry, 2004; Hawton & Harriss, 2008a), which explains why the female rate was 75% higher than the male rate when the age-adjusted rates were considered.

Though the attempted suicide rate was relatively high among female 15–24-year-olds, the peak rate for both genders was among 35–44-year-olds. This is not consistent with other European centers, which have generally reported peak rates in 15–24-year-olds for women and 25–34-year-olds for men (Schmidtke, Bille-Brahe et al., 2004). Our study showed the rate of attempted suicide was low among older adults whereas in Spain suicide rates increase with age for men and women (Bobes & Saiz, 2004). It may be that the association between nonfatal and fatal suicidal behavior is stronger in older adults as has been previously suggested (Corcoran, Keeley, O'Sullivan & Perry, 2003; Hawton & Harriss, 2008b; Skegg, 2005). Further study of the intentions of individuals who present to hospital following attempted suicide and their subsequent risk of suicide is warranted.

Consistent with previous studies, this study showed evidence of significant variation in attempted suicide rates in sociodemographic subgroups of the population (Hawton et al., 1994; O'Loughlin & Sherwood, 2005; Petronis et al., 1990; Van Heeringen, 1994). A protective effect of living with a partner for men and living with a partner and others (primarily children) was observed for both sexes. In addition, those who attained a third-level qualification, the employed, and women engaged in home duties had low rates of attempted suicide, particularly in contrast to those unable to work because of illness or disability. Most striking was the extremely high rate of attempted suicide observed in separated or divorced men and women. This is consistent with a previous Spanish study which showed that, of the psychosocial stressors examined, partner conflicts had the strongest association with attempted suicide (Baca-Garcia et al., 2007). Marital breakdown is a challenging and distressing life event and the research evidence highlights the idea that some are unable to cope. There is a need for greater awareness of, and access to, support services for those struggling to cope with separation and divorce. This is especially relevant to Spain. The Spanish rate of marital breakdown has been increasing for a number of decades

but the increase has recently accelerated. The number of separations and divorces in the country grew by approximately 50% in the period 2000–2006, giving Spain the second highest ratio of marital breakdowns to weddings in the European Union (Instituto de Política Familiar, 2007).

The present study had a number of strengths and weaknesses. It monitored suicide attempt presentations to a hospital in a geographically defined population using an internationally recognized methodology common to current and previous studies in this research area. Spain's free public health system should guarantee that suicide attempters face minimal access barriers to the emergency department. This would suggest that the vast majority of medically treated suicide attempters are seen in the general hospital emergency department, which was the setting for this study. It is possible that some suicide attempters did not contact the emergency services and that a lack of recorded data on these cases may have resulted in their loss to the study. However, such cases are likely to be relatively rare.

The study achieved a high degree of complete data (generally above 90%) and incidence rates were calculated for a range of sociodemographic variables. The 12-month study period yielded 308 suicide attempts by 279 individuals. As a result, there was a degree of imprecision associated with some incidence rates, which was reflected in the 95% confidence intervals provided for the rates. Also, the incidence rate could not be calculated for some sociodemographic subgroups, generally because there were too few cases or equivalent population data could not be obtained, and a multivariate analysis examining the independent effects of each sociodemographic factor could not be undertaken. Furthermore, the population data for sociodemographic subgroups were derived from the most recent census, which took place in 2001. The census data may not accurately estimate the size of some subgroups for the study period 2008/2009. Because of the trend of increasing marital breakdown, the number of separated/divorced persons in the study area in 2008/2009 will have been underestimated by the census figures thereby causing their reported rate of attempted suicide to be overestimated. However, this would only partially account for the higher rate of attempted suicide reported for separated/divorced persons.

A final limitation concerns the suicide attempt definition. As the MONSUE project developed from the WHO/Euro Multicentre Study on Parasuicide, it inherited that suicide attempt definition, which does not include an assessment of suicide intent. Thus, our results are comparable to research studies using the WHO/Euro definition and other definitions that exclude suicide intent (e.g., Schmidtke, Weinacker, & Lohr, 2004; Hawton et al., 1994). Had the MONSUE study used a more restrictive definition of attempted suicide such as those that require the presence of suicide intent (e.g., O'Carroll et al., 1996; Silverman, Berman, Sanddal, O'Carroll, & Joiner, 2007) fewer cases would have been recorded and a lower incidence rate reported.

In summary, this study established that the incidence of hospital-treated attempted suicide in Oviedo, Spain is be-

low average in the European context but higher than reported by previous Spanish studies. The incidence and nature of the suicidal behavior varies by sex, and specific socio-demographic subgroups of the population, in particular separated/divorced persons, are at elevated risk and should be targeted by prevention and intervention initiatives.

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