Factors related to psychiatric calls to the prehospital emergency care services in Malaga (Spain)

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Original article

ABSTRACT

Introduction

In recent years, there has been a significant increase in the demand for prehospital emergency care in different countries.

Objective

The aim of the present study was to identify the variables associated with psychiatric calls to the Prehospital Emergency Care Services (PECS) in the province of Malaga.

Method

An observational retrospective study based on calls made to the PECS and registered in the computerized database of the Coordination Emergency Centre during one year (N = 163 331). Independent variables included 1. sociodemographic variables: sex and age; and 2. variables related with the characteristics of each call: time of day, type of day, time of year, caller identification, number of resources needed, number of patients attended and type of solution. The χ^2 test was used to compare of the variables. A multivariant logistic regression analysis was also carried out.

Results

Psychiatric calls accounted for 7% of the total calls and were associated with: younger age, female gender, calls made in the evenings and afternoons, a lower number of patients attended, the call being performed by other individual calling on the patient's behalf, and no ambulance transportation.

Discussion and conclusion

The calls concerned with mental health problems have specific characteristics which need to be taken into account in order to provide a better care for psychiatric patients.

Key words: Prehospital Emergency Care, mental health, utilization.

RESUMEN

Introducción

En los últimos años se ha producido un importante aumento de la demanda asistencial de urgencias a nivel prehospitalario.

Objetivo

El presente estudio tiene como objetivo principal identificar las variables asociadas a las demandas clasificadas como psiquiátricas a los Servicios de Urgencia y Emergencias Médicos Prehospitalarios (SUEMP) de la provincia de Málaga.

Método

Estudio observacional retrospectivo de las demandas registradas en la base de datos informatizada (computarizada) del Centro Coordinador de Urgencias y Emergencias durante un año (N = 163 331). Se han considerado: 1) variables sociodemográficas: la edad y el sexo, y 2) variables relacionadas con la demanda: la franja horaria, el tipo de día, el trimestre del año, el sujeto alertante, el número de recursos movilizados, el número de personas atendidas y si hubo trasporte sanitario. Para la comparación de las variables se empleó la prueba χ^2. También se realizó un análisis de regresión logística multivariante.

Resultados

El 7% de las demandas a los SUEMP se clasificaron como psiquiátricas. Entre las variables relacionadas con las demandas psiquiátricas se encontraron tener menor edad, ser mujer, demanda realizada por la noche y la tarde, menor número de personas atendidas, que la alerta no fuera efectuada por el propio usuario y la no realización de traslado sanitario.

Discusión y conclusión

Las demandas por problemas de salud mental presentan características diferenciales al resto de demandas a los SUEMP, lo que hay que tener en cuenta para mejorar la atención a dichos pacientes.

Palabras clave: Servicios de emergencias prehospitalarios, salud mental, utilización de servicios.

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INTRODUCTION

In recent years there has been a significant increase in the demand for both hospital[1,2] and prehospital emergency care.[3,4] Some studies show that the largest increase has occurred in psychiatry-type calls.[4,5] Several factors have been postulated as causes of this increase:[6] decrease in psychiatric beds per inhabitant in recent decades, psychosocial stress increase, increased alcohol consumption among young population, less social support and higher isolation of the population; also, Larkin et al.[7] found that one in three patients with mental disorders who attended hospital emergencies did so by ambulance, unlike only one in seven with other pathologies. Cuddeback et al.[8] observed that the majority of ambulance transfers were associated with substance abuse, but these patients were the ones less admitted at the hospital, being the ones with mood disorders and schizophrenia the most frequently ended in admission. Hyperfrequency and misuse of emergency services have also been linked to mental disorders,[9] substance abuse,[10] and socio-economic difficulties,[11] and different initiatives have been proposed in order to improve this situation.[12-14]

Despite the fact that people with mental disorders repeatedly use the Prehospital Emergency Care Services (Servicios de Urgencias y Emergencias Prehospitalarios, SUEMP in Spanish)[15] and despite the increased calls related to mental problems, there are few studies that analyze the prehospital calls due to mental problems.

SUEMPs were created in Spain in the 1980s and early 1990s with a twofold purpose: a) to establish a coordination mechanism through a single telephone number (061) and b) to create public emergency teams for prehospital medical care and transferring of patients to health centers, i.e., the Emergency Coordination Centers (*Centros de Coordinación de Urgencias y Emergencias,* CCUE in Spanish) and the Critical Caring and Emergency Teams (*Dispositivos de Cuidados Críticos y Urgencias,* DCCU in Spanish). In Spain, SUEMPs serve approximately eight million people annually,[16] implying a significant cost for the public health system. In Spain, each autonomous community manages its own health system. The Autonomous Community of Andalusia, with approximately eight million inhabitants, has a network managed by the Public Enterprise of Health Emergencies (*Empresa Pública de Emergencias Sanitarias*) (EPES). The coordination of the different teams is conducted from the CCUEs located in each of the eight Andalusian provinces. From these eight centers, those of Seville and Malaga (the latter is the place where the study is conducted) are considered highly complex, currently managing more than half a million annual calls.

The main objective of this study is to compare the calls classified as psychiatric with the other calls to SUEMPs, as well as to identify the variables associated with the psychiatric calls.

METHOD

Design and Scope of the Study

A cross-sectional, observational study was conducted. In particular, the information recorded during 2008 in the computerized database of the Malaga CCUE was reviewed. This service includes all the prehospital emergency calls made in the province of Malaga, whose covered population is approximately 1 528 851 inhabitants.

In the province of Malaga, SUEMPs transfer patients to six public hospitals, which offer psychiatric care in the relevant hospital emergency services. From these six hospitals, two have short-stay psychiatric units for patients requiring short admissions for stabilization. Also, there is a private psychiatric hospital having places arranged in accordance with the public health system in short-, medium- and long-stay psychiatric hospitalization units.

SUEMP users are served based on a *triage* system using the most important or more serious symptom (guiding symptom) reported by the alerting person (caller). According to the guiding symptom, there is a specific question protocol carried out by the professional answering the call to determine the priority level: (1) emergency, (2) non-delayed urgency, (3) delayed urgency, and (4) home notices; which generates a series of health actions and resources to be sent. One objective of these services is to allocate a resource (ambulance or helicopter) within three minutes in the case of priority 1 emergencies. Medical transfers are made according to the medical criterion of the physician responsible for the call, who assesses the necessity.

Subjects

The analyzed database consists of a total of 321 167 calls. For this study, non-medical calls were eliminated, i.e., those calls not involving medical care (*n* = 74 058) and, on the other hand, calls not classified in any CCUE category (*n* = 71 977), as the information did not fit into any of the categories of such classification system. These last calls were eliminated to prevent biases, since most calls were pharmacological or non-specific calls. Additionally, a quality control of the database was performed and the duplicates were eliminated (because the identification number, date, and time matched) and registry errors (11 801). Thus, all those calls that led to a medical advice (some kind of indication by CCUE without the need to use a resource), the allocation of a resource (some type of *in-situ* health care) or a transfer to another medical team (transfer to a hospital), and classified in one of the specific categories used by CCUE (*n* = 163 331). For further information on the sample selection process please see figure 1.

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Measures

Psychiatric calls have been considered as a dependent variable. Classification of calls is based on data obtained on the telephone by the CCUE on the most relevant symptoms reported by the user to the call center agent, while the medical coordinator is the responsible for the final classification of the call. This classification system relates specifically to the Andalusian CCUE, and most of these services in other places use a classification system adapted to local characteristics. The classification system of the CCUE includes 13 main categories (table 1), one of which is the psychiatric calls that in turn contains seven subcategories: suicide threat, incoherence/confusional arousal, nervousness, opposition, sadness, violence, others and non-classified (not enough information). For this study, there have been added within the psychiatric calls those classified as "anxiety" included in the main category of "dyspnea". Within the classification of intoxication/allergies there is a sub-section: toxidrome, drugs, medication, and alcohol intoxication.

Since this section may include intoxications by the use of medication or other toxics that are not related to drug and alcohol use, it was decided not to include it within the psychiatric calls.

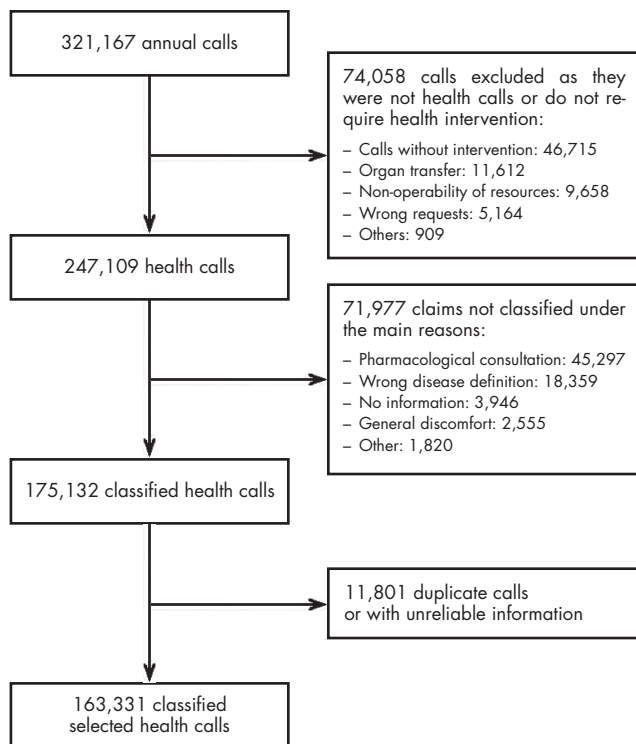Also, an analysis of the differential characteristics among the different types of psychiatric calls was conducted. For this, the psychiatric calls were grouped into three categories: "suicide threat", as suicidal behavior is one of the most relevant social problems and less studied in the field of emergencies;[17] "nervousness, anxiety, and sadness", which are related to the anxiety and affective states that are the most prevalent among the general population,[18] and "others".

There have been considered as independent variables regarding the users: age, categorized in intervals (0-17, 18-44, 45-64, 65-79 and > 80 years of age; although the logistic regression model used age as a continuous variable) and gender; and regarding the calls, the following has been taken into account: the time zone (morning [8:01 to 15:00], afternoon-evening [15:01 to 21:00], and night [21:01 to 8:00]), the kind of day (business or non- business day) and the quarter of the year in which the call was made. Also, the caller has been analyzed (user or other); the number of mobilized resources (0, 1, and > 1), considering the use of any type ambulance or helicopter as a mobilized resource (given that there can be many ambulances sent for one single call) with or without any transfer to a health center; the number of people received (1, > 1), and the type of resolution (transfer to a health center, no transfer).

Statistical analysis

In order to compare the category variables, the χ^2 test has been used. In addition, a multivariate logistic regression analysis was conducted, taking as a dependent variable the psychiatric-type calls to know the link with the independent variables. Adjusted *Odds Ratios* (ORa) and their 95% confidence intervals (CI) were calculated for each variable category. With the purpose of analyzing the characteristics of the different categories of psychiatric calls, a bivariate analysis was conducted by multinomial logistic regression. All

Figure 1. Flow diagram of the selection process of the studio sample.

Table 1

Classification of the reasons for calling the Coordinating Center of Emergencies and Emergencies of Malaga (*N* = 163 331).

Calling reason	*N*	%
Non-traumatic pain	34,984	21.4
Neurological and/or level of consciousness alterations	33,197	20.3
Dyspnea	17,496	10.5
Injuries	16,519	10.7
Alteration of vital signs	15,987	9.8
Psychiatric	11,331	6.9
Traffic accidents	9,116	5.6
Gastrointestinal	8,405	5.1
Nursing requests	5,133	3.1
Poisoning/allergies	4,697	2.9
Bleeding	4,011	2.5
Gynecological/obstetrical/urinary	2,133	1.3
Environmental emergencies/external agents	322	0.2

Table 2

Comparison of psychiatric with non-psychiatric calls: bivariate and multivariate analysis (*N* = 163331).

Characteristics	Total N	Others N	Others %	Psychiatrics N	Psychiatrics %	χ^2	Logistic regression (N = 132 416) ORa	Logistic regression (N = 132 416) CI 95%
Age[a]	152,395					6,964.0[†]	0.97[†]	0.972–0.974
0–17		4,312	3.04	292	2.70			
18–29		10,136	7.20	1,647	15.30			
30–44		16,470	11.60	3,676	34.20			
45–59		17,958	12.70	1,931	18.00			
60–75		31,893	22.50	1,252	11.60			
> 75		60,876	43.00	1,952	18.20			
Gender	150,300					181.0[†]		1.392–1.515
Male		62,561	44.80	4,050	38.90			
Female		77,099	55.20	6,590	61.90		1.45[†]	
Time zone	163,331					277.0[†]		
Morning (8:01 to 15:00)		58,769	38.70	3,528	31.10			
Afternoon-evening (15:01 to 21:00)		54,179	35.60	4,320	38.10		1.26[†]	1.196–1.319
Night (21:01 to 8:00)		39,052	25.70	3,483	30.70		1.25[†]	1.188–1.318
Day of the week	163,331					13.0[†]		
Working day		100,143	65.90	7,654	67.50			
Weekend		51,857	34.10	3,677	32.50		0.91[†]	0.871–0.950
Quarters	163,331					46.0[†]		
First		35,116	23.10	2,356	20.80			
Second		35,857	23.60	2,762	24.40		1.15[†]	1.079–1.217
Third		40,362	26.60	3,247	28.70		1.18[†]	1.114–1.252
Fourth		40,665	26.80	2,966	26.20		1.12[†]	1.059–1.191
Mobilized resources	163,331					1642.0[†]		
0		32,530	21.40	4,281	37.80			
1		111,753	73.50	6,705	59.20		0.58[†]	0.550–0.607
>1		7,717	5.10	345	3.00		0.41[†]	0.360–0.463
Persons received	153,711					4.7[*]		
1		140,656	98.50	10,706	98.70			
>1		2,210	1.50	139	1.30		0.57[†]	0.474–0.685
Callers	143,524					6.0[*]		
Others		29,642	22.10	2,133	23.20			
Users		104,677	77.90	7,072	76.80		0.84[†]	0.792–0.885
Sanitary transfer	163,331					282.0[†]		
No		100,534	66.10	8,368	73.90			
Yes		51,466	33.90	2,963	26.10		0.77[†]	0.735–0.816

Note: ORa: *Odds Ratio* adjusted; CI: Confidence Interval; CCUE: Emergency Coordination Centers;
[a] For the multivariate logistic regression model, age was introduced as a continuous variable and not by age bands.
*$p < 0.05$, [†]$p < 0.001$

statistical analyzes were made by using the SPSS software, version 15.0, for Windows.

Ethical considerations

The study was approved by the Ethics and Research Committee of Northeast Malaga (*Comité de Ética e Investigación Málaga Nordeste*).

RESULTS

163 331 calls to the SUEMP have been analyzed. From these calls, 33.3% required health transfer; from them, 59.5% were made by medicalized ambulance, 22.9% with a basic ambulance without medical equipment and 17.6% with other type of resource, or the information was not collected. From those which did not show health transfer (66.7%), in 41.5% care was provided at home, 21.0% were solved through medical advice by the operator, 7.8% were canceled by the

Table 3
Comparison of different kinds of psychiatric calls: bivariate analysis

Characteristics	Nervousness, anxiety, or sadness (1) (reference)		Suicide threat (2)		Others (3)		Multinomial logistic regression	
	N	%	N	%	N	%	OR2 vs 1	OR3 vs 1
Age (N = 10,750)ª							0.978†	1
0–17	182	2.8	29	2.8	81	2.5		
18–29	941	14.6	211	20.1	495	15.2		
30–44	2,119	32.9	444	42.3	1,113	34.1		
45–59	1,133	17.6	235	22.4	563	17.2		
60–75	805	12.2	92	8.8	355	10.9		
> 75	1,254	19.5	38	3.6	660	20.2		
Gender (N = 10,640)								
Male	2,079	32.6	478	45.3	1,493	46.5		
Female	4,291	67.4	578	54.7	1,721	53.5	0.586†	0.558†
Time zone (N = 11,331)								
Morning (8:01 to 15:00)	2,040	30.3	330	28.2	1,158	33.7		
Afternoon-evening (15:01 to 21:00)	2,574	38.3	456	38.9	1,290	37.5	1.128	0.826†
Night (21:01 to 8:00)	2,109	31.4	385	32.9	989	28.8	1.095	0.883*
Day of the week (N = 11,331)								
Working day	4,525	67.3	795	67.9	2,334	67.9		
Weekend	2,198	32.7	376	32.1	1,103	32.1	0.974	0.973
Quarters (N = 11,331)								
First	1,352	20.1	218	18.6	786	22.9		
Second	1,594	23.7	266	22.7	902	26.2	1.035	0.973
Third	1,951	29.0	357	30.5	939	27.3	1.135	0.828†
Fourth	1,826	27.2	330	28.2	810	23.6	1.122	0.763†
Mobilized resources (N = 11,331)								
0	3,025	45.0	178	15.2	1,078	31.4		
1	3,542	52.7	933	79.7	2,230	64.9	6.536†	2.320†
>1	156	2.3	60	5.1	129	3.8	4.476†	1.767†
Persons received (N = 10,845)								
1	6,405	98.8	1060	99.0	3,241	98.5		
>1	78	1.2	11	1.0	50	1.5	0.852	1.267
Callers (9,205)								
Others	1,283	23.1	204	26.2	646	22.5		
Users	4,276	76.9	574	73.8	2,222	77.5	0.844	1.032
Sanitary transfer (N = 11,331)								
No	5,502	81.8	490	41.8	2,378	69.2		
Yes	1,221	18.2	681	58.2	1,059	30.8	6.223†	2.007†

Notes: OR: *Odds Ratio*. The reference comparison group in the multinomial logistic regression was nervousness, anxiety, or sadness (1). 2 *vs* 1: *Odds Ratio* of group (2) compared to the reference group (1). 3 *vs* 1: *Odds Ratio* del grupo (3) of group (3) compared to the reference group (1).
ª For the multinomial logistic regression model, age was introduced as a continuous variable and not by age range.
*$p < 0,05$, †$p < 0,001$

user and 29.7% had another kind of resolution. As for the priority: 14.4% was classified as an emergency, 61.9% as a non-delayed urgency, 13.8% as a delayed urgency, and 9.9% as home notices. The distribution of calls classified by the CCUE in the year of study is shown in table 1, being the most frequent the non-traumatic pain (21.4%), followed by calls for neurological disorders and/or consciousness level (20.3%). The number of psychiatric calls was 11 331, ranked in the sixth place (6.9%).

Psychiatric and non-psychiatric calls comparison is shown in table 2. It shows that 49.6% of psychiatric calls were to assist people between 18 and 44 years of age. Only 2.7% were for people under 18 years and 30% were for people over 60 years old. Regarding gender, psychiatric calls were associated with females (61.9%); with regard to non-psychiatric ones (57.2%; $p < 0.001$). They were less made in the morning (31.1% *vs*. 38.7%), increasing in the afternoon-evening (38.1% *vs*. 35.6%) and at night (30.8%

vs. 25.7%) (*p* < 0.001). The percentage of psychiatric calls during the weekend was lower in comparison to the other calls and were more frequent in the second and third quarter compared to non-psychiatric ones (*p* < 0.001). It is pointed out that only 3.0% mobilized more than one resource against 5.1% of non-psychiatric calls (*p* <0.001). The number of served people was significantly lower for psychiatric calls (*p* <0.05). As for the caller identification, psychiatric calls were less likely to be made by the user (76.8%) compared to non-psychiatric (77.9%; *p* < 0.05). Psychiatric calls required health transfers (26.1%), fewer than other calls (33.9%, *p* < 0.001).

The multivariate logistic regression model (table 2) accounted for 9.8% of the maximum variance (Nagelkerke R^2 = 0.098). Variables related to psychiatric calls (*versus* non-psychiatric) were age (ORa = 0.97; decrease of 3% of psychiatric calls for each year of increasing age), being female (ORa = 1.45), call made at night (ORa = 1.25) and in the afternoon-evening (ORa = 1.26), call made on a business day (business *vs.* non-business, ORa = 0.91), call made in the last quarters of the year (2 *vs.* 1, ORa = 1.15; 3 *vs.* 1, ORa = 1.18; 4 *vs.* 1, ORa = 1.12), call that did not mobilize any resource (1 *vs.* 0, ORa = 0.58; > 1 *vs.* 0, ORa = 0.41), having served a smaller amount of people (> 1 *vs.* 1, ORa = 0.57), alert not made by the user (user *vs.* others, ORa = 0.84), and call not requiring health transfer (transfer *vs.* no transfer, ORa = 0.77).

The percentage of the different groups within the psychiatric calls was as follows: nervousness, anxiety, or sadness (59.3%), suicide threats (10.3%), and others (30.4%). Calls categorized as suicide threats compared to those categorized as nervousness, anxiety, or sadness were characterized for being lower age (OR = 0.978), for being less associated with the female gender (OR = 0.586), for mobilizing more resources (1 *vs.* 0, OR = 6.536; > 1 *vs.* 0, OR = 4.476), and requiring more health transfers (OR = 6.223). The differences among the three psychiatric call groups are summarized in table 3.

DISCUSSION AND CONCLUSION

The main outcome of this study is that there is a differential profile of the psychiatric calls to the Malaga SUEMPs. The characteristics of the psychiatric calls, compared to the rest, are that the former ones are more frequently made by young people, women, at night and in the afternoon-evening; they are less frequent made by the user; they represent fewer transfers to health centers and fewer people are being assisted. Among the benefits of this work we can emphasize that this is the first study conducted in Spain, which focuses on psychiatric-type calls to the SUEMPs and is based on all calls registered in a specific area, based on a daily clinical practice—which represents the caring reality of these services.[19] Moreover, the analysis of prehospital data may be considered as an important source of information for the surveillance of public health.[4]

In this study psychiatric calls represent approximately 7%, a figure slightly higher than the one found in other investigations within our context. In Spain, according to Pacheco et al.[20] 3.7% of the calls were classified according to the CIE-9-MC (International Classification of Diseases, 9th revision) as group V: psychiatric; while Fuentes Lema and López Pérez[19] offered a figure not reaching 1%. Munjal et al.,[4] studying prehospital calls in an urban area of New York City, report that 5.5% involved psychiatric problems, concluding that the highest increase in prehospital emergency calls was related to the categories of psychiatric/use of substances (+ 5.6%/year). In Madrid, psychiatric-type calls resulted in 10.8% and 12.0% in 2001 and in 2002,[5] which is close to the results showed in this study. One of the reasons for the discrepancy among the numbers of calls concerning psychiatric problems may be due to the differences in the classifications of the calls used in the different places.

Regarding gender, the percentage of women making psychiatric calls is higher (61.9%) than those made for other problems. This is what would be expected due to the high psychiatric morbidity in women. However, in many studies the hospital emergency services are more frequently used by men who have higher prevalence of personality disorders and toxic consumption.[21]

As for the age, people who called concerning a psychiatric need are located in a range from 18 to 44 years of age, unlike the rest of the calls that were more frequently made by 65-year old people and older. This fact may be related to the nature of mental health problems, whose age of onset is usually within a young age range, while a large proportion of physical illnesses usually begin at an older age. Regarding the schedule, psychiatric calls occurred more in the afternoon-evening and at night, which could be related to the prompt service attention need of some patients with mental problems and a more difficult access to specialized mental health services at these hours.

It should be noted that the psychiatric calls were more frequent during the summer months unlike the rest that were mainly in winter. One possible explanation for this may be that, as Ortega et al.[22] suggest, there are factors related to the flow of care needs, such as the difficult access to mental health care centers, or the increase in the population of vacationers in a city such as Malaga, who could present some kind of psychopathological alteration during their stay and cannot access the specialized services immediately. Our results are consistent with another study that indicates a greater use of emergency services by psychiatric patients in the warmest and most humid days.[23]

It is also more likely that psychiatric calls will not mobilize any resources and present fewer health transfers, which

could be related to the fact that some professional prehospital emergency services underestimate the importance of psychiatric calls.[7,24]

Also, the study results show that there are different characteristics within the groups of psychiatric calls, being those related to suicide the ones that require more resources and are made by a younger population, coinciding with other studies conducted in Spain.[25]

Among the study limitations, the use of secondary data obtained from a clinical database can compromise the reliability of some records, nevertheless, as discussed in the method section, an intense debugging and data revision was done to minimize possible errors and, given the wide sample, we consider that it has a limited impact. Another limitation is the huge amount of calls included in the "unclassified" section and, therefore, not analyzed in this study, which makes it impossible to know exactly all the reasons why the calls for these services are made and that may constitute a bias in the results, although the analyzes were repeated including these calls along with the non-psychiatric calls and the results were similar, so we do not believe that they entail an important bias. Another aspect to be noted is that some *odds ratios* figures, although statistically significant because of the large sample, are small, therefore their clinical significance is limited. On the other hand, the fact that most prehospital emergency systems do not use an international classification system also limits service comparisons with other countries and other Spanish autonomous communities.

Finally, we can point out that this paper can help measuring prehospital emergencies in general and mental health calls in particular. It has also allowed us to analyze variability in clinical practice and to establish and monitor caring objectives. In addition, we have been able to identify the different characteristics of urgent calls from people with mental health problems, which represent a public health problem because of the great impact this group has on the general population and the severity of the symptoms.

As a future recommendation, we put forward that an in-depth study of the caring and urgent needs of a group as vulnerable as people with mental illness, would help us to improve health care for this group of patients.

Conflicts of interest

The authors declare not having a conflict of interest.

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