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SHORT COMMUNICATION

Epidemiology of otorhinolaryngologic emergencies in a secondary hospital: analysis of 64,054 cases

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Abstract

Purpose To determine the incidence and distribution of care in relation to urgent otorhinolaryngologic pathologies by the different medical specialist units.

Methods A descriptive, observational and retrospective study was conducted of patients seen by the Emergency Service at a secondary hospital over the course of 7 years (2011–2017).

Results A total of 546,701 patients were seen during the period in question, of which 64,054 presented with otorhinolaryngologic symptoms. The attendance rate was 450/1000 inhabitants/year. The most frequent diagnoses were upper respiratory tract infection, with 13,639 cases (21.3%), tonsillopharyngitis, with 10,150 cases (15.8%) and vertigo/dizziness with 8761 cases (13.7%). Patients seen by the Hospital Emergency Service physicians and those referred to the Otorhinolaryngology or Paediatric Units were analysed both together and separately. The Hospital Emergency Service dealt with 77.1% of the cases, and referred 15.4% to the Otorhinolaryngology Unit and 7.5% to the Paediatrics Unit. Within the subgroup of patients referred to the Otorhinolaryngology Unit, the most frequent diagnoses were problems related to inflammatory ear disease (25.6%), followed by cervicofacial trauma (15.4%) and bleeding with otorhinolaryngologic symptoms (12.5%). The percentage of hospital admissions for the entire sample was 3%, while for patients referred to the Otorhinolaryngology Unit this figure was 6.8%.

Conclusions A large percentage of patients presenting at the Hospital Emergency Service do so with otorhinolaryngologic symptoms, and the vast majority are treated effectively by the physicians in that service and are referred to the specialist services on the basis of sound criteria.

Keywords Hospital Emergency Service · Otorhinolaryngology · Tonsillitis · Otitis · Vertigo · Epistaxis · Bleeding

Introduction

Otorhinolaryngology is a specialist area encompassing a wide variety of clinical syndromes and pathological entities which have proven important from an epidemiological [1, 2] and financial perspective, both as generators of pharmacological expenses and as consumers of health [3, 4] and clinical resources, due to the severity with which certain symptoms can manifest [5, 6].

The general move to digitise the files stored in our healthcare system has enabled the entry of Big Data, thus permitting researchers to make use of their statistical potential. Based on the data contained in the files kept in our hospital since 2011, we conducted this study to ascertain the real frequency rate of these cases, determine the involvement of related professionals and analyse the epidemiological data that may be relevant for improving the care provided to these patients in the future.

Method

A descriptive, observational and retrospective study was conducted of patients seen by the Emergency Service at the Rafael Méndez General University Hospital in Lorca, from January 2011 to December 2017. The hospital in question is a secondary, public healthcare centre which forms part of

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the hospital network administered by the Murcia Regional Health Service and provides specialist healthcare to a population of 174,416 inhabitants (according to census data from 2017) [7]. The Hospital Emergency Service is staffed by physicians specialising in family and community medicine. The hospital staff also encompasses other on-site healthcare professionals (in areas such as Paediatrics, General Surgery, Trauma and Gynaecology, among others). The on-call otorhinolaryngologist is always reachable and can be contacted by the emergency service physicians whenever necessary. The hospital does not have a Maxillofacial, Plastic Surgery or Dermatology Unit, meaning that pathologies within these specialist areas that affect the head and neck are normally seen initially by the Otorhinolaryngology Service.

The data upon which this study is based comprised all the cases recorded in the digital files of the Hospital Emergency Service from January 2011 to December 2017. During the data gathering process, in accordance with Organic Law 15/1999 on the Protection of Personal Data, we ignored all family details and requested permission from the Murcia Region's Health Area III research and ethics commission.

The data obtained for each patient were as follows: date of presentation, sex, age, diagnosis, service by which he/she was seen, discharge circumstances (sent home, admitted to hospital, transferred to another hospital or absconded) and residential postcode.

The initial processing of the data aimed to group the diagnoses into categories consistent with the nomenclature of otorhinolaryngologic pathologies. Here, it is worth highlighting the wide variety of different terms used to refer to the same entity in the discharge diagnoses. To avoid additional bias, the diagnosis screening and normalisation work was carried out by a single otorhinolaryngology specialist. A total of 26 different diagnostic categories were established, as shown in Table 1. Patients were studied both together (overall sample) and separately in individual groups, in accordance with the medical service authorising the discharge notice.

The statistical analysis was conducted with the IBM SPSS statistical software package. First, we compiled a series of dynamic tables to assess the composition of the sample. Next, we conducted a statistical analysis of the qualitative variables by compiling contingency tables and comparing said variables using the Chi-square statistical test. Finally, means comparisons were carried out to compare the qualitative variables, using the Student's *t* test.

Table 1 Diagnostic categories

Diagnoses
Upper respiratory tract infection
Tonsillopharyngitis
Vertigo/instability/dizziness
Earache/inflammation
ENT trauma
ENT foreign body/accidental ingestion
ENT bleeding
Oral mucosa pathology
Laryngitis/dysphonia
Rhinosinupathy
Cervicofacial/pharyngeal abscess
ENT surgical revision
Pathology of the peripheral nerves
Specific viral infection
Cough
Cervical mass
Impaired swallowing
Sialadenitis
Impaired hearing
Temporomandibular joint dysfunction
Sudden oropharyngeal/facial oedema
No ENT pathology
No data
Malignant neoplasm
ENT cancer
Tracheostoma-related problems

Results

A total of 546,701 Hospital Emergency Service discharge files were analysed, dating from between January 2011 and December 2017 (inclusive). The attendance rate for the Hospital Emergency Service was 450/1000 inhabitants/year. A total of 64,054 patients (11.71% of all those presenting at the Emergency Service) had otorhinolaryngologic pathologies falling into the diagnostic groups described in Table 1. The mean age in the overall sample group was 32 and the standard deviation 26.25. As regards gender, 52% were men and 48% women (a ratio of 1.08/1). There were significantly more men than women (Chi-square: 90.43 with 32 degrees of freedom and $p < 0.001$) in all groups of patients seen by the different medical services.

Following presentation, over three-quarters (77.1%) of otorhinolaryngologic cases were resolved by the Hospital Emergency Service itself, 15.4% were referred to the Otorhinolaryngology Unit and 7.5% to the Paediatrics Unit. The percentage of all patients presenting at the Hospital Emergency Service who were eventually referred to the Otorhinolaryngology Unit as a result of various symptoms was 1.8%.

As shown in Fig. 1, the number of Hospital Emergency Service and Otorhinolaryngology attendances has increased significantly over the years, whereas paediatric attendances have decreased slightly. The attendance rate for both the Hospital Emergency Service and the Paediatrics Unit is

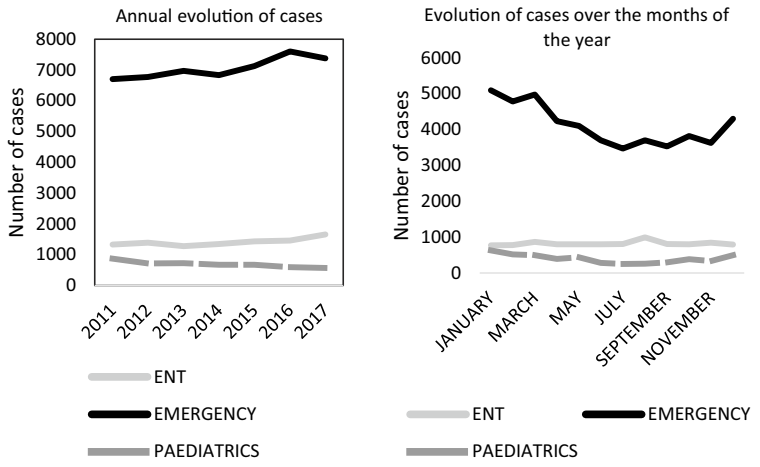
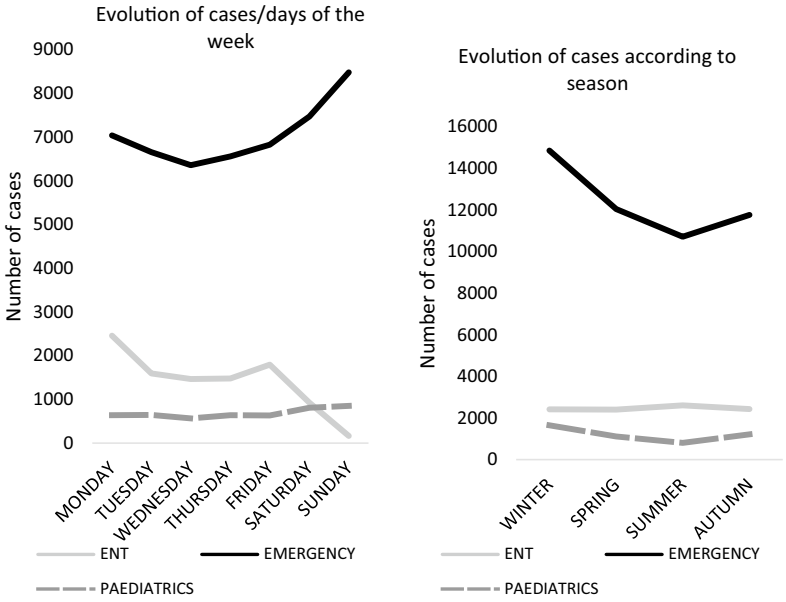


Fig. 1 Evolution of cases over the study period, in accordance with healthcare unit

Chi-square 164.48 Degrees of freedom 12, p<0.001 Chi-square 380.98 Degrees of freedom 22, p<0.001



Chi-square 2388.24 Degrees of freedom 12, p<0.001 Chi-square 285.17 Degrees of freedom 6, p<0.001

higher during the colder months of the year. In the Otorhinolaryngology Unit the rate generally remains stable, with the exception of the summer months, in which it rises (see Fig. 1). As regards distribution throughout the week, the highest rate is observed on Mondays (15.8%) and the lowest on Wednesdays (13.1%). Attendance at specialist services such as the Hospital Emergency Service and the Paediatrics Unit rises at weekends, while attendance at the Otorhinolaryngology Unit drops (see Fig. 1). In relative terms, the day of the week with the highest percentage of admissions/patients seen by this Unit is Tuesday (3.5%), while the one with the lowest percentage is Sunday (2.2%).

The most common diagnoses are upper respiratory tract infection (13,639 cases, 21.5%), tonsillopharyngitis (10,150 cases, 15.8%), vertigo/dizziness (8761 cases, 13.7%) and problems related to inflammatory ear disease (5881 cases, 9.2%). Figure 2 lists the principal pathologies in accordance with the different seasons of the year, and Table 2 shows all the diagnostic categories grouped in accordance with the specialist area responsible for treating them.

We also assessed patients' outcomes after being seen by the Hospital Emergency Service. The vast majority of patients (95.9%) were discharged from the service and sent home, 2.5% were admitted to our hospital and 0.5% were transferred to another hospital (giving a global admission rate of 3%). Of patients presenting with otorhinolaryngologic symptoms, 5.7% were admitted to our hospital, and 0.4% were transferred to another hospital. Table 3 lists all

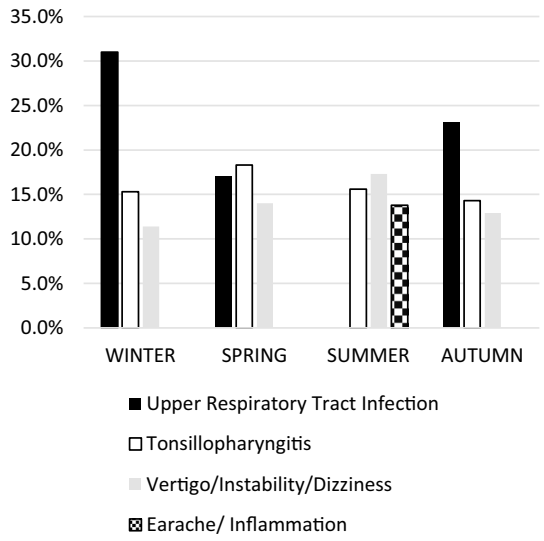


Fig. 2 Main pathologies in accordance with season (Chi-square 3551.59, degrees of freedom 75, $p < 0.001$)

the diagnoses resulting in admissions to our hospital, in accordance with each specialist area.

Discussion

Within our geographical area of influence, the attendance rate at the Hospital Emergency Service was 448/1000 inhabitants, with a discrete yet sustained increase over the years covered by the study. This figure is clearly higher than that reported by Benayas et al. [8] in 1998, and slightly lower than those published by the Spanish Health Ministry [9] in 2010. The number of Hospital Emergency Service attendances has continued to increase over the years, in accordance with that stated in the Health Ministry report [9].

Within our study, a great deal of time was spent on standardising the diagnoses given on the discharge reports issued by the Hospital Emergency Service. We believe it is necessary to introduce an unequivocal, standardised diagnostic nomenclature to facilitate subsequent analysis of the data contained in digital records.

Of all the patients seen by the Hospital Emergency Service, the percentage referred to the Otorhinolaryngology Unit (1.8%) is similar to that reported by Lammens (1.3%) [10]. The percentage of patients presenting with otorhinolaryngologic symptoms is fairly high, and it is worth noting that the Hospital Emergency Service physicians were able to resolve four out of every five of these cases, referring only 15% to the Otorhinolaryngology Unit.

In the overall sample, slightly more men than women attended the Hospital Emergency Service. Previous studies have found mixed results, with some reporting percentages

Table 2 Distribution in accordance with diagnosis and medical Service

Diagnosis	Physician			Total
	ENT	Emergency	Paediatrics	
Cervicofacial/pharyngeal abscess				
Number	434	896	27	1357
% of total	0.70%	1.40%	0.00%	2.10%
Oral pathology				
Number	73	2279	127	2479
% of total	0.10%	3.60%	0.20%	3.90%
Impaired hearing				
Number	209	287	0	496
% of total	0.30%	0.40%	0.00%	0.80%
Impaired swallowing				
Number	96	655	0	751
% of total	0.10%	1.00%	0.00%	1.20%
ENT cancer				
Number	47	3	0	50
% of total	0.10%	0.00%	0.00%	0.10%
Upper respiratory tract infection				
Number	45	11,498	2096	13,639
% of total	0.10%	18.00%	3.30%	21.30%
ENT foreign body/accidental ingestion				
Number	893	2090	350	3333
% of total	1.40%	3.30%	0.50%	5.20%
Temporomandibular joint dysfunction				
Number	146	216	0	362
% of total	0.20%	0.30%	0.00%	0.60%
Sudden oropharyngeal/facial oedema				
Number	67	288	7	362
% of total	0.10%	0.40%	0.00%	0.60%
Tonsillopharyngitis				
Number	544	8664	942	10,150
% of total	0.80%	13.50%	1.50%	15.80%
Specific viral infection				
Number	91	739	261	1091
% of total	0.10%	1.20%	0.40%	1.70%
Vertigo/instability/dizziness				
Number	151	8583	27	8761
% of total	0.20%	13.40%	0.00%	13.70%
Earache/inflammation				
Number	2213	3379	289	5881
% of total	3.50%	5.30%	0.50%	9.20%
Cough				
Number	22	803	79	904
% of total	0.00%	1.30%	0.10%	1.40%
Laryngitis/dysphonia				
Number	141	1197	393	1731
% of total	0.20%	1.90%	0.60%	2.70%
Cervical mass				
Number	177	552	130	859
% of total	0.30%	0.90%	0.20%	1.30%

Table 2 (continued)

Diagnosis	Physician			Total
	ENT	Emergency	Paediatrics	
Malignant neoplasm				
Number	28	37	0	65
% of total	0.00%	0.10%	0.00%	0.10%
Pathology of the peripheral nerves				
Number	209	951	18	1178
% of total	0.30%	1.50%	0.00%	1.80%
ENT trauma				
Number	1329	2853	0	4182
% of total	2.10%	4.50%	0.00%	6.50%
Tracheostoma-related problems				
Number	27	5	0	32
% of total	0.00%	0.00%	0.00%	0.00%
ENT surgical revision				
Number	1237	14	1	1252
% of total	1.90%	0.00%	0.00%	2.00%
Rhinosinupathy				
Number	162	1279	8	1449
% of total	0.30%	2.00%	0.00%	2.30%
ENT bleeding				
Number	1077	1800	27	2904
% of total	1.70%	2.80%	0.00%	4.50%
Sialadenitis				
Number	198	302	16	516
% of total	0.30%	0.50%	0.00%	0.80%
No ENT pathology				
Number	143	1	0	144
% of total	0.20%	0.00%	0.00%	0.20%
No data				
Number	126	0	0	126
% of total	0.20%	0.00%	0.00%	0.20%
Number	9885	49,371	4798	64,054
% of total	15.40%	77.10%	7.50%	100.00%

Pearson's Chi-square 22476.533, degrees of freedom 50, $p < 0.001$

similar to those found here [10, 11], while others found a slight predominance of female over male patients [12, 13]. This suggests that there is no specific correlation between sex and Hospital Emergency Service attendance due to otorhinolaryngologic symptoms. Nevertheless, a clear predominance of men over women was observed among patients referred to the Otorhinolaryngology Unit. We believe this may be due to the fact that men in general tend to engage in more toxic habits, and therefore suffer from more otorhinolaryngologic pathologies.

Consistent with that reported by other authors in Spain [14], our results confirm an increase in demand over the time period studied and a higher attendance rate among those living closest to the hospital in comparison with those

Table 3 Outcome of the different diagnostic categories

Hospital admissions				
Diagnosis	Physician			Total
	ENT	Emergency	Paediatrics	
Cervicofacial/pharyngeal abscess				
Number	236	3	4	243
% of total	**14.90%**	0.20%	0.30%	15.30%
Oral pathology				
Number	5	16	10	31
% of total	0.30%	1.00%	0.60%	2.00%
Impaired hearing				
Number	3	0	0	3
% of total	0.20%	0.00%	0.00%	0.20%
Impaired swallowing				
Number	7	60	0	67
% of total	0.40%	3.80%	0.00%	4.20%
ENT cancer				
Number	6	0	0	6
% of total	0.40%	0.00%	0.00%	0.40%
Upper respiratory tract infection				
Number	0	16	69	85
% of total	0.00%	1.00%	**4.30%**	5.40%
ENT foreign body/accidental ingestion				
Number	1	40	96	137
% of total	0.10%	2.50%	**6.00%**	8.60%
Temporomandibular joint dysfunction				
Number	0	1	0	1
% of total	0.00%	0.10%	0.00%	0.10%
Sudden oropharyngeal/facial oedema				
Number	3	2	0	5
% of total	0.20%	0.10%	0.00%	0.30%
Tonsillopharyngitis				
Number	55	9	26	90
% of total	**3.50%**	0.60%	1.60%	5.70%
Specific viral infection				
Number	27	12	7	46
% of total	1.70%	0.80%	0.40%	2.90%
Vertigo/instability/dizziness				
Number	21	201	7	229
% of total	1.30%	**12.70%**	0.40%	14.40%
Earache/inflammation				
Number	15	4	5	24
% of total	0.90%	0.30%	0.30%	1.50%
Cough				
Number	0	10	24	34
% of total	0.00%	0.60%	1.50%	2.10%
Laryngitis/dysphonia				
Number	17	11	47	75
% of total	1.10%	0.70%	**3.00%**	4.70%
Cervical mass				
Number	20	20	29	69

Table 3 (continued)

Hospital admissions				
Diagnosis	Physician			Total
	ENT	Emergency	Paediatrics	
% of total	1.30%	1.30%	1.80%	4.30%
Malignant neoplasm				
Number	8	1	0	9
% of total	0.50%	0.10%	0.00%	0.60%
Pathology of the peripheral nerves				
Number	5	91	1	97
% of total	0.30%	**5.70%**	0.10%	6.10%
ENT trauma				
Number	18	3	0	21
% of total	1.10%	0.20%	0.00%	1.30%
Tracheostoma-related problems				
Number	1	0	0	1
% of total	0.10%	0.00%	0.00%	0.10%
ENT surgical revision				
Number	32	0	0	32
% of total	2.00%	0.00%	0.00%	2.00%
Rhinosinupathy				
Number	6	0	1	7
% of total	0.40%	0.00%	0.10%	0.40%
ENT bleeding				
Number	67	192	1	260
% of total	**4.20%**	**12.10%**	0.10%	16.40%
Sialadenitis				
Number	12	2	1	15
% of total	0.80%	0.10%	0.10%	0.90%
No ENT pathology				
Number	1	0	0	1
% of total	0.10%	0.00%	0.00%	0.10%
Total				
Number	566	694	328	1588
% of total	35.60%	43.70%	20.70%	100.00%

Chi-square 1620.91, degrees of freedom 48, $p < 0.001$

The three diagnoses most frequent in each speciality are in bold

living further away, despite the region's high-quality communications network. This suggests that, in our case at least, distance is a factor that influences people's decision to go to the Hospital Emergency Service, regardless of the severity of their symptoms.

The most frequent diagnoses among patients referred to the Otorhinolaryngology Unit were clearly different from those of the group seen by the Hospital Emergency Service physicians, with the most common ones being ear inflammation, trauma and otorhinolaryngology-related bleeding (mainly epistaxis). This is consistent with that reported by other studies [12, 13, 15, 16]. As regards the overall sample, the frequency of problems linked to nonspecific vertigo/dizziness was particularly striking, being the third most frequent diagnosis, assigned to nearly nine thousand patients. Rhos et al. [15] and Dagan et al. [17] also report a high percentage of patients with impaired balance. The presence of foreign bodies in patients referred to the Paediatrics Unit was also notable, as indeed has been reported by other authors [10, 13, 18]. As regards age, the diagnoses with the lowest mean age were infections and foreign bodies, while those with the highest mean age were tumours and bleeding.

According to the results of our study, the global percentage of admissions was 3%, a figure which is consistent with that reported by Pino et al. [13], but different from those found by other authors such as Lammen in Belgium and our own Health Ministry in Spain [9], who report figures of 8% and 10.5%, respectively. In light of these data, we can conclude [as indeed other studies have done] that the demand for urgent otorhinolaryngologic medical care is not consistent with the objective severity of the symptoms [5, 13]. This in turn prompts us to consider whether there is a possible deficit in the way primary healthcare deals with these patients, or whether it is a case of patients bypassing their General Practitioner and directly demanding hospital care. Nevertheless, the percentage of patients admitted to hospital was much higher in the case of those referred to the Otorhinolaryngology Unit by the Hospital Emergency Service (6.8%), which indicates a set of sound criteria for identifying those patients requiring specialist attention. The principal diagnoses resulting in hospital admission were abscesses/phlegmons (43.2% of admissions); tonsillitis with suspected mononucleosis (14.4%) and posterior epistaxis (12.3%). These data are similar to those reported by Pino et al. [13], but very different from those found in Gallo's classic study [18], thus confirming (to a certain extent) a change in admissions criteria.

Logically, the highest attendance rates among the overall sample are found during the winter months, due to the prevalence of viral infections, while among patients seen by the Otorhinolaryngology Unit there is a clear rise in ear infections during the summer, due to cases of otitis externa which are typical during this season in our geographical location. This is consistent with that reported by Rhos et al. [15], although in Greece, Symvoulakis et al. [19] found that March was the busiest month, due to the influence of tonsillopharyngitis. The day of the week with the highest rate of patients presenting with otorhinolaryngologic symptoms was Monday, with 24%. This is consistent also with that found by Rhos et al. [15]. In relation to specialist area, there is a clear difference between the Otorhinolaryngology Unit and the Hospital Emergency Service on Sundays. This is mainly due to the fact that emergency otorhinolaryngologic care is provided by on-call (rather than on-site) physicians, with no specialists being present in the mornings as they are during the rest of the week.

Our work was a single-centre study and the results obtained derive from the analysis of electronic data. Despite the limitations of the study, we can conclude that a large percentage of patients presenting at the Hospital Emergency Service do so with otorhinolaryngologic symptoms, and the vast majority of these are treated effectively by the Hospital Emergency Service physicians and referred to the specialist services on the basis of acceptable criteria. Problems related to vertigo constitute an improvement opportunity within primary care, in which efforts should be made to avoid over-attendance at the Hospital Emergency Service. In general the demand for emergency medical care is increasing. Finally, there is a need to standardize the diagnostic terms on the Hospital Emergency Service discharge forms.

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Compliance with ethical standards

Conflict of interest All authors declare that they have no conflict of interest.

Ethical approval This article does not contain any studies with human participants or animals performed by any of the authors. The study was approved by the research and ethics commission of Murcia Region's Health Area III.

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