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ORIGINAL ARTICLE

Identification through the Manchester Triage System of the older population at risk of delirium: A case–control study

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Abstract

Objective: To identify the flow charts and discriminators of the Manchester Triage System that are most likely to identify the onset of delirium in older people.

Background: Delirium is an underdiagnosed geriatric syndrome, and up to 80% of all cases of delirium go undetected in emergency departments. Patient triage seeks to manage clinical risk with a view to safely and appropriately managing patient flows.

Design: A case–control study was performed according to the STROBE checklist.

Setting: The emergency department of a secondary hospital.

Participants: Older adults aged ≥65 years and admitted from 1 January to 31 December 2020.

Methods: Older patients were identified from the emergency department research database. Cases were defined as patients diagnosed with delirium ($n = 128$), excluding cases of delirium due to alcohol or substance abuse. Controls were randomised from the remaining patients ($n = 128$).

Results: A total of 29.35% of the subjects admitted to the emergency department were older adults with an incidence of delirium of 0.7%. The flow charts with the highest probability of delirium were 'unwell adult' [OR = 3.04 (95%CI:1.82–5.1)] and 'behaving strangely' [OR = 16.06 (95%CI:3.72–69.29)], and the discriminators were 'rapid onset' [OR = 3.3 (95%CI:1.85–5.88)] and 'new neurological deficit less than 24 h old' [OR = 4.76 (95%%CI:1.01–22.5). The area under the curve for 'unwell adult' in the presence of dementia, previous stroke and fall in the previous 30 days was 0.73 (95%CI: 0.67–0.79), and that for 'behaving strangely' in the presence of diabetes was 0.75 (95%CI: 0.69–0.81).

Conclusions: Knowing which flow charts, discriminators and risk factors are most likely to predict delirium allows the identification of the older population at risk for triage screening in emergency departments.

Relevance to clinical practice: Risk factors such as diabetes, dementia, previous stroke and recent fall among 'unwell adult' or 'behaving strangely' triaged older persons should be assessed for the probable presence of delirium.

KEYWORDS
aged, Delirium, emergency department, risk factors, triage

1 | INTRODUCTION

Demographic changes associated with an increasing percentage of the population over 65 years of age create the need to prepare healthcare systems to care for this population, which is more vulnerable than the general population. Older people have greater comorbidity, polypharmacy, lower functionality and less physical endurance, and are therefore more susceptible to risk factors (Perry et al., 2018). The increase in the use of hospital emergency departments (EDs) by the older population has increased over the last decade, and the atypical presentation of diseases in the older patient makes it difficult to identify and classify the seriousness of the reason for ED attendance (Bermúdez Menéndez de la Granda et al., 2018).

Delirium is an underdiagnosed and undertreated syndrome in all hospitals, long-term care centres and home settings (Boettger et al., 2021; Sepúlveda et al., 2019; Tremolizzo et al., 2021). It is characterised by disturbed consciousness and changes in cognitive function and/or perception that develop over a short period of time (Oh et al., 2017). The prevalence of delirium in the ED ranges from 8%–13% in the older population, increasing to 22% and 42% in the inpatient setting and up to 80% in intensive care units (ICUs) (Fong et al., 2009). Delirium is associated with prolonged hospital stays, functional decline, increased cognitive impairment, increased risk of falls and increased use of the healthcare system, as well as a threefold increased risk of mortality (Goldberg et al., 2020). Previous studies in the United States and Australia found the hospital costs for patients with delirium to be twice as high as for those without delirium (Akunne et al., 2012; Leslie et al., 2008; Pezzullo et al., 2019).

Triage is used to classify the need for care of a person who comes to the ED. This process consists of a rapid assessment in which the nurse screens patients for acuity level, mortality risks associated with their conditions, and anticipated resource needs based on patient or family complaints, clinical signs, clinical constants and symptoms (Ausserhofer et al., 2021). The most commonly used tool in ED settings in Europe is the Manchester Triage System (MTS) (Mackway-Jones et al., 2013). Clinical practice is geared around the concept of a presenting complaint—that is the chief sign or symptom identified by the patient or caregiver. The Manchester Triage System group agreed a list of presentational flow charts that covers almost all presentations to Emergency Departments, so the nurse must select the most appropriate presentational flow chart from a list of 55 according to the presenting complaint. Following this selection, information must be gathered and analysed to allow the actual priority to be determined. The flow chart structures this process, linking key discriminators at each level of priority—the assessment being carried out by finding the highest level at which the answer posed by the discriminator question is positive. Discriminators are deliberately posed as questions by the triage practitioner to facilitate the process. Finally, the patient can be assigned to one of 5 clinical priorities: (1) Immediate—Red; (2) Very urgent—Orange; (3) Urgent—Yellow; (4) Standard—Green; and (5) Non-urgent—Blue (Mackway-Jones et al., 2014).

What does this paper contribute to the wider global clinical community?

- The Manchester triage flow chart that best identifies the older person with probable delirium is 'unwell adult' and 'behaving strangely'.
- The Manchester triage discriminators that best identify the older person with probable delirium are 'rapid onset' and 'new neurological deficit less than 24 h old'.
- Risk factors such as diabetes, dementia, previous stroke and fall in the last 30 days among 'unwell adult' or 'behaving strangely' triaged older persons should be assessed for the probable presence of delirium in order to identify as soon as possible this geriatric syndrome.

The diagnosis of delirium in EDs is challenging, since up to 80% of all cases are not diagnosed in the ED, and approximately 57% of the older adults seen in the ED are subsequently hospitalised (Han et al., 2009). A longer time spent in the ED has also been associated with a higher mortality rate (Lee et al., 2020). Knowing the flow chart and discriminators that best identify the older adults with probable delirium would allow more exhaustive screening in the triage process.

The aim of the present study was to identify Manchester Triage System flow charts, discriminators and risk factors for delirium in people over 65 years of age reporting to the hospital ED.

2 | MATERIALS AND METHODS

2.1 | Study design and setting

A retrospective, case and non-matched control study was designed to establish a predictive model of Manchester Triage System screening for delirium risk in older people ≥65 years of age reporting to the Emergency Department of Hospital Francesc de Borja of Gandía (Valencia, Spain). This study was performed according to the STROBE checklist (Supplementary file 1) for observational studies (von Elm et al., 2007).

This is a secondary, 256-bed academic hospital serving a population of 188,000 and with an average annual volume of 60,000 admitted emergencies.

The ED is divided into 8 care areas: triage area, admission, consultation, resuscitation, observation, paediatrics, traumatology

and treatment room. Triage is performed by the nursing staff 24 h a day, 7 days a week. Depending on the workload, this ED is staffed by a total of approximately 9 nurses in the morning shift and 7 nurses in the evening shift—their function being to perform triage of patients who come in after being registered for emergency admission.

2.2 | Study participants

We identified all patients aged ≥65 years and reporting to the ED between 1 January and 31 December 2020. The cases were subjects diagnosed and coded according to the ICD-9 for delirium in the ED either as primary diagnosis or secondary diagnosis documented in the electronic health record. The delirium indicator variable was obtained by the attending physician based on the DSM-V criteria: (1) Disturbance in attention and awareness; (2) Develops over a short period of time; (3) Additional disturbance in cognition; and (4) Attention and cognition are not from a pre-existing or evolving neurocognitive disorder, and not from severely reduced arousal (coma) (European Delirium Association & American Delirium Society, 2014). Cases of delirium due to alcoholism or toxic substances were excluded.

Once the cases were identified, controls were randomised from the remaining group of patients who met the inclusion criteria, based on computer-based block randomisation using the XLSTAT® application.

2.3 | Sample size

A representative sample size of 117 subjects per group was calculated for the unpaired case–control study, assuming an expected proportion of delirium in the case group of 9% versus 1% in the control group, for an alpha error of 5% and a statistical power of 80%.

2.4 | Data collection

All data were collected from the electronic medical record. Sociodemographic parameters such as age and sex were compiled. In addition, the number of drugs prescribed daily and the presence of the following comorbidities were recorded: diabetes, arterial hypertension, dyslipidaemia, dementia, acute neurological disease, renal failure, liver disease, major surgery in the last 30 days, malnutrition, obesity, previous stroke, visual and hearing impairment, incontinence, recurrent urinary tract infection, hospitalisation in the previous 30 days and recent fall in the last 30 days. In addition, the patient origin (home, referral from the healthcare centre, nursing home, home hospitalisation unit, hospital outpatient clinic, other hospital centre or other private clinics, etc.) was also recorded.

The variables related to the Manchester Triage System were the vital signs (systolic and diastolic blood pressure, heart rate, oxygen saturation, blood glucose, temperature), in addition to the flow chart, discriminator and priority. (Supplementary file 2).

As the study period was the year 2020—a year characterised worldwide by the SARS-CoV-2 pandemic—positive COVID-19 diagnoses were also collected in both the case and control groups.

Given the possible bias in hospital emergency care in the year 2020, we proceeded to analyse the number of ED attendances, presentation flow charts, discriminators and priority after triage in the ED of people over 65 years of age during the period 1 June to 31 December 2019 and 2020. Analysis was made from 1 June onwards, since in this month free mobility of the population was allowed throughout Spanish territory. The percentage of emergencies in older persons over 65 years of age was 3% lower in 2020 compared to 2019, with no significant differences in the presentation flow charts, discriminators or priority in the ED (Supplementary file 3).

2.5 | Ethical considerations and data confidentiality

The study was approved by the Ethics Committee of Hospital Francesc de Borja. The data obtained were kept confidential, in line with Spanish legislation on the protection of personal information as defined under '*Ley Orgánica 3/2018, de 5 de diciembre, de protección de datos personales y garantía de los derechos digitales*'. The study was carried out in accordance with the principles of the Declaration of Helsinki.

2.6 | Statistical analysis

The study sample included all subjects who met the established inclusion criteria. The variables were reported as proportions and/or the mean and standard deviation (SD). Parametric tests (Student *t*-test and Fisher–Snedecor F-test) were used for the comparison of means, while nonparametric tests (chi-squared test and Wilcoxon test) were used for the comparison of proportions. We analysed the association between delirium and the different risk factors based on the odds ratio (OR). A binary logistic backward stepwise regression model was developed to explore the importance of delirium as a risk factor. We considered the complete model with all the variables found in the bivariate analysis to be significantly associated with the presence of delirium, while in a second step we eliminated from the model all those variables which did not result in an improved standard error of the estimate on adjusting the model without such variables. Consensus was sought among the investigators in those cases where two or more subsets of variables with the same degree of fit were obtained. Using these criteria, 10 variables were used to construct the best predictive model for 'unwell adult' and for 'behaving strangely': age >80 years, the male sex, diabetes, dementia, acute neurological disease, malnutrition, previous stroke, incontinence and fall in the previous 30 days. The study data were entered in MS Excel spreadsheets, followed by analysis using the SPSS® version

23.0 statistical package (SPSS for MS Windows; IBM Corp., Armonk, NY, USA).

3 | RESULTS

During 2020, a total of 60,809 emergencies were attended in the Emergency Department of Francesc de Borja Hospital. Of these, 29.35% (n = 17,852) corresponded to people aged ≥65 years, with the identification of 128 cases of delirium (0.7%).

We analysed 128 cases and 128 controls, and found differences in age and the number of drugs prescribed daily—the figures being higher among the cases. No differences were found in terms of sex and clinical parameters obtained at triage or assigned priority, except for the Glasgow scale (Table 1).

After the analysis of risk factors (Table 2), differences were found in the presence of previous stroke [OR = 4.79 (95%CI: 2.12–10.91)], dementia [OR = 3.98 (95%CI: 2.04–7.75)], acute neurological disease [OR = 2.39 (95%CI: 1.27–4.49)], fall in the past 30 days [OR = 2.46 (95%CI: 1.18–5.13)], incontinence [OR = 2.46 (95%CI: 1.15–5.25)], diabetes [OR = 1.90 (95%CI: 1.08–3.31)] and polypharmacy [OR = 1.65 (95%CI: 1.01–2.71)]. The remaining factors were not predictors of delirium, and no differences were found in patients diagnosed with COVID-19.

Following triage, of the 55 flow charts, only 45 were of possible application, since 10 were related to paediatrics and pregnancy. Of these 45 flow charts, 15 were identified in the sample analysed (Table 2). The flow charts identified as 'strange behaviour' [OR = 16.06 (95%CI: 3.72–69.29)] and 'adult poor general condition' [OR = 3.04 (95%CI: 1.82–5. 1)], and the discriminators of rapid onset [OR = 3.3 (95%CI: 1.85–5.88); p = .001] and recent neurological symptoms [OR = 4.76 (95%CI: 1.01–22.5); p = .031] (Figure 1) proved to be the strongest predictors of delirium.

Following the results obtained in the analysis of the triage flow charts, two logistic regression analyses were performed, one for 'unwell adult' and the other for 'behaving strangely', with the identified risk factors for delirium. Both models were found to be statistically significant. For subjects screened as 'unwell adult' (X^2 = 53.7,

TABLE 1 Sociodemographic profile and characterisation of the Manchester Triage System

Variable	*n*	Case Mean (SD)/ %	*n*	Control Mean (SD)/%	*p*-value
Age, years	128	81.24 (7.51)	128	78.97 (7.99)	.02[t]
Sex					
Female	56	43.8	70	54.7	.08[χ2]
Male	72	56.2	58	45.3	
Prescribed daily drugs, n	128	7.97 (4.07)	128	6.93 (3.88)	.038[t]
Systolic blood pressure, mmHg	123	139.23 (23.98)	110	134.38 (24.84)	.131[t]
Diastolic blood pressure, mmHg	123	75.01 (16.37)	110	72.82 (16.35)	.309[t]
Heart rate, bpm	122	83.13 (17.86)	117	84.20 (21.73)	.679[t]
SpO_2, %	117	96.68 (2.50)	112	96.40 (3.83)	.803[u]
Blood glucose, mg/dl	24	169.17 (67.71)	2	170.12 (101.12)	.979[t]
Temperature, °C	123	36.31 (0.67)	112	36.41 (0.78)	.229[u]
Glasgow scale	127	14.16 (1.99)	120	14.87 (0.56)	<.001[u]
Patient origin					
Home	59	46.1	74	57.8	.197[χ2]
Primary healthcare centre	60	46.9	47	36.7	
Nursing home	8	6.3	4	3.1	
Home hospital care	0	0	1	0.8	
Hospital outpatient	0	0	1	0.8	
Other hospital	0	0	1	0.8	
Private medical practice	1	0.8	0	0	
Priority					
Blue	0	0	0	0	.194[χ2]
Green	37	28.9	43	33.6	
Yellow	83	64.8	71	55.5	
Orange	7	5.5	14	10.9	
Red	1	0.8	0	0	

Note: T, *t*-test; u, Mann–Whitney–Wilcoxon test; x^2, Chi-squared test.

TABLE 2 Association between risk factors, Manchester Triage System flow chart and delirium

Risk factors	Case n (%)	Control n (%)	OR (95%CI)	*p*-value
Male sex	72 (56.3)	58 (45.3)	0.64 (0.39–1.06)	.080
Age ≥80 years	73 (57)	58 (45.3)	1.6 (0.98–2.62)	.061
Polypharmacy ≥7 drugs daily	69 (53.11)	53 (41.4)	1.65 (1.01–2.71)	.045
Diabetes	43 (33.6)	27 (21.1)	1.90 (1.08–3.31)	.025
Arterial hypertension	100 (78.1)	88 (68.8)	1.62 (0.93–2.85)	.089
Dyslipidaemia	60 (46.9)	55 (43)	1.17 (0.72–1.92)	.395
Dementia	42 (32.8)	14 (10.9)	3.98 (2.04–7.75)	<.001
Acute neurological disease	36 (28.1)	18 (14.1)	2.39 (1.27–4.49)	.006
Renal failure	26 (20.3)	36 (28.1)	0.65 (0.37–1.16)	.145
Liver failure	8 (6.3)	14 (10.9)	0.54 (0.23–1.34)	.181
Previous surgery <1 month	4 (3.1)	2 (1.6)	2.03 (0.366–11.30)	.409
Malnutrition	3 (2.3)	10 (7.8)	0.28 (0.09–1.05)	.056
Obesity	3 (2.3)	8 (6.3)	0.36 (0.09–1.40)	.123
Recent hospitalisation <1 month	18 (14.1)	11 (8.6)	1.74 (0.79–3.85)	.167
Previous stroke	31 (24.2)	8 (6.3)	4.79 (2.12–10.91)	<.001
Visual impairment	13 (10.2)	20 (15.6)	0.61 (0.29–1.29)	.192
Use of diapers	24 (18.8)	11 (8.6)	2.46 (1.15–5.25)	.018
Recurrent urinary tract infections	34 (26.6)	25 (19.5)	1.49 (0.83–2.68)	.182
Recent fall <1 month	26 (20.3)	12 (9.4)	2.46 (1.18–5.13)	.014
Hearing impairment	4 (3.1)	6 (4.7)	0.67(0.18–2.38)	.519
COVID–19	11 (8.6)	10 (7.8)	1.11 (0.45–2.71)	.820
MTS flow chart	**Case n (%)**	**Control n (%)**	**OR (95%CI)**	***p*-value**
Unwell adult	72 (56.3)	38 (29.7)	3.04 (1.82–5.1)	<.001
Falls	8 (6.3)	18 (14.1)	0.41 (0.17–0.97)	.039
Headache	4 (3.1)	3 (2.3)	1.34 (0.29–6.13)	.702
Behaving strangely	26 (20.3)	2 (1.6)	16.06 (3.72–69.29)	<.001
Fits	1 (0.8)	0 (0)	2.01 (1.77–2.27)	.316
Diabetes	1 (0.8)	0 (0)	2.01 (1.77–2.27)	.316
Shortness of breath	4 (3.1)	21 (16.4)	0.16 (0.56–0.49)	<.001
Abdominal pain	1 (0.8)	20 (15.6)	0.04 (0.01–0.32)	<.001
Chest pain	3 (2.3)	13 (9.4)	0.23 (0.06–0.84)	.017
Haematological illness	1 (0.8)	0 (0)	2.01 (1.77–2.27)	.316
Mental illness	0 (0)	1 (0.8)	2.01 (1.77–2.27)	.316
Wounds	1 (0.8)	0 (0)	2.01 (1.77–2.27)	.316
Limb problems	2 (1.6)	0 (0)	2.02 (1.78–2.28)	.156
Urinary problems	3 (2.3)	13 (10.2)	0.21 (0.06–0.76)	.010
Major brain trauma	1 (0.8)	0 (0)	2.01 (1.77–2.27)	.316

Abbreviations: CI, confidence interval; MTS, Manchester Triage System.

$p < .001$), with a Nagelkerke $R^2 = 0.252$, the sensitivity was 82.8% with a specificity of 54.7%, and 68.8% of the cases were well classified.

The 'strange behaviour' model ($X^2 = 60.8$, $p < .001$) obtained a Nagelkerke R^2 of 0.282. The sensitivity was 60.2% with a specificity of 82%, and 71.1% of the cases were well classified (Table 3).

The area under the curve (AUC) for 'unwell adult' and 'behaving strangely' was 0.73 (95%CI: 0.67–0.79) and 0.75 (95%CI: 0.69–0.81), respectively (Figure 2).

4 | DISCUSSION

The detection of delirium in older people attending EDs is a challenge due to the atypical presentation of many diseases in the older population, the existence of several types of delirium and the lack of implementation of standardised screening tools in ED triage—despite their availability (Carpenter et al., 2021; Perry et al., 2018). The aim of our study was to analyse which flow charts and discriminators of the

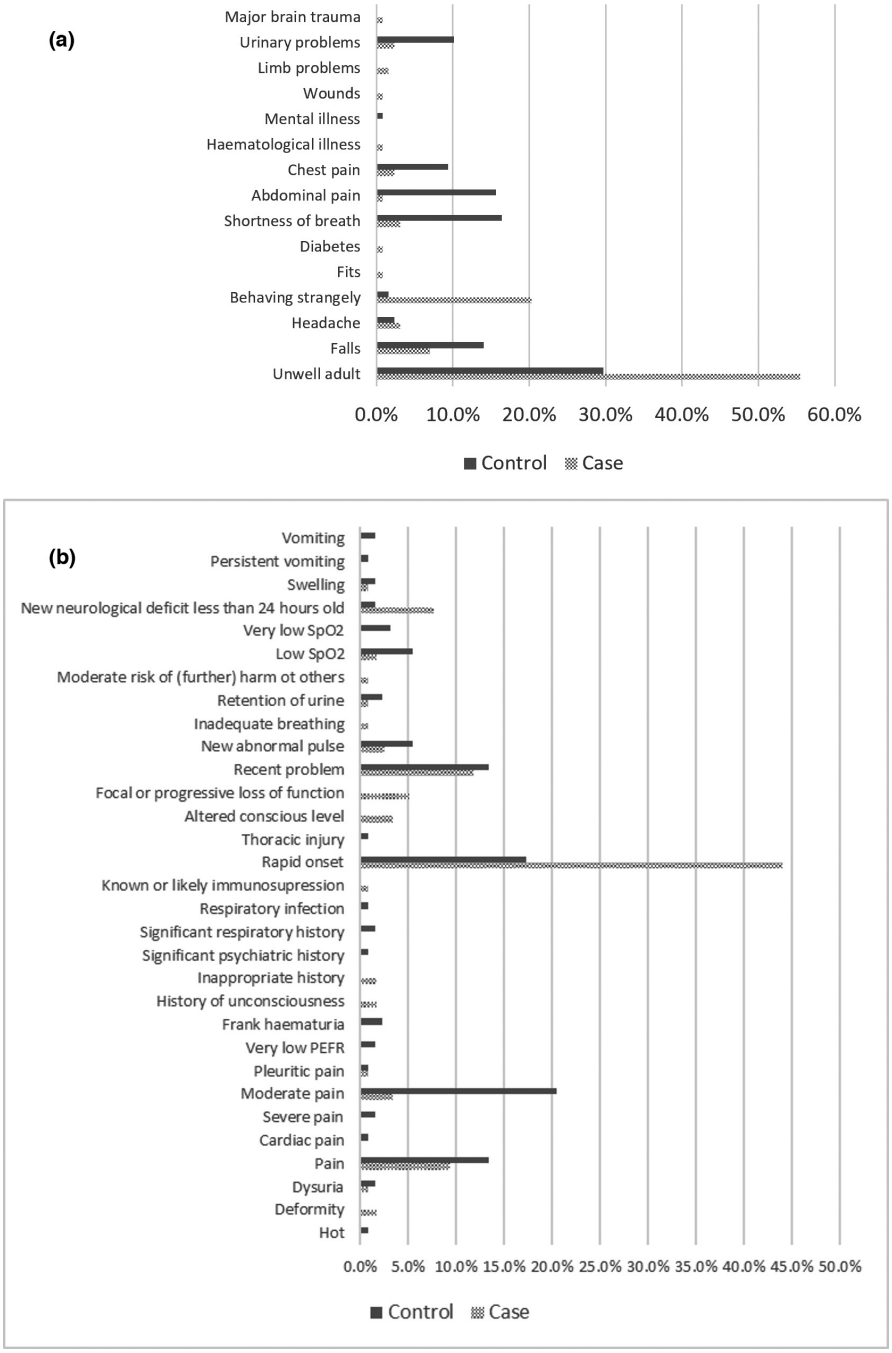

FIGURE 1 Manchester Triage System flow chart and discriminators distribution in the case and control groups. (a) Flow chart, (b) discriminator, PEFR peak expiratory flow rate, SpO2; oxygen saturation

TABLE 3 Multivariate models for 'unwell adult' and 'behaving strangely'

	Unwell adult			Behaving strangely		
	Exp (B)	95%CI	*p*-value	Exp (B)	95%CI	*p*-value
Diabetes	–	–	–	1.75	0.95–3.26	.077
Previous stroke	4.11	1.72–9.83	.001	3.7	1.53–6.35	.004
Dementia	3.07	1.51–6.23	.002	3.1	1.51–6.35	.002
Fall in previous 30 days	3.17	1.41–7.14	.005	2.2	0.98–4.91	<.001

Manchester Triage System are the most commonly identified in older people attending the ED for delirium. In this regard, 'unwell adult' and 'behaving strangely' were found to be the flow charts with the highest predictive capacity. In addition, the presence of diabetes, dementia, polypharmacy, incontinence, previous fall in the last 30 days, acute neurological disease and previous stroke were identified as risk factors.

The Manchester Triage System is widely used in European EDs (Mackway-Jones et al., 2013). Its validity has been well demonstrated,

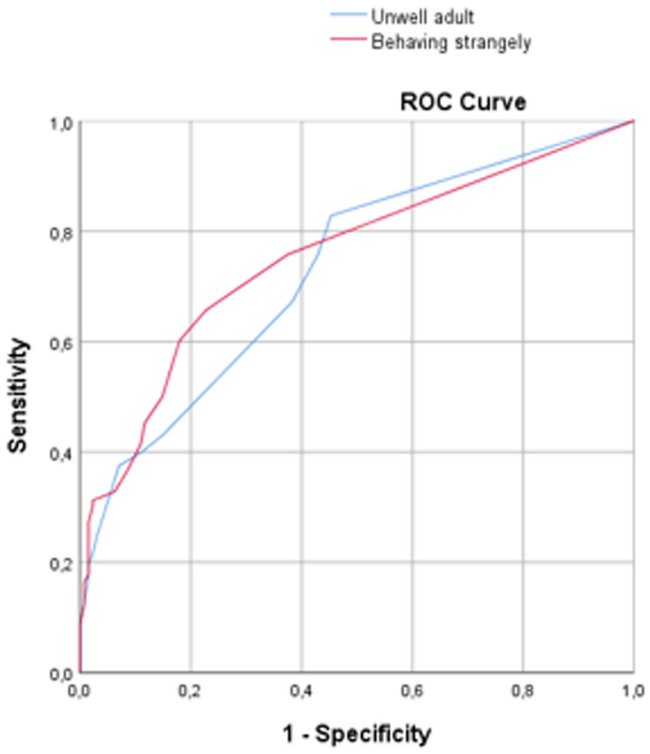

FIGURE 2 Receiver operating characteristic (ROC) curve for 'unwell adult' and 'behaving strangely' [Colour figure can be viewed at wileyonlinelibrary.com]

but at the same time, shortcomings have been detected in some cases (Zachariasse et al., 2017), such as errors in application by inexperienced nursing staff; when screening more than one patient every 15 min; or in the triage of certain specific populations such as young patients or older individuals with comorbidities (Ausserhofer et al., 2021). In the older population, the atypical presentation of diseases makes the correct identification of the flow charts difficult, and there have even been reports of greater mortality among those identified as being of lowest priority (Brutschin et al., 2021; Lucke et al., 2021). Therefore, nursing knowledge of the specific characteristics of the older population is essential for proper triage (Grossmann et al., 2014).

The percentage of the older population attended in the ED in the present study is consistent with the data published elsewhere (Aminzadeh & Dalziel, 2002; Ashman et al., 2020; Bermúdez Menéndez de la Granda et al., 2018). On conducting triage analysis, we recorded a classification of the reasons for urgency similar to that found in other studies in the older population—with a higher percentage of cases corresponding to yellow (urgent) and green (not very urgent) priority in studies in Spain (Bermúdez Menéndez de la Granda et al., 2018) and Switzerland (Hasemann et al., 2018) compared to other studies in The Netherlands (Blomaard et al., 2020; Lucke et al., 2021), Germany (Brutschin et al., 2021) or the United States (Han et al., 2009), which identify the majority of the population in attendance as corresponding to yellow (urgent) or orange (very urgent). This could be due to heterogeneity in the type and access to resources in the healthcare systems of the different countries. The increasing use of hospital EDs is an established fact, but the existence of other services providing 24-h urgent care in certain health systems allows EDs to remain decongested and the population to make better use of the available resources (Baier et al., 2019).

The prevalence of delirium in the analysed population was lower than in other studies in EDs (Han et al., 2009). Diagnostic coding and underdiagnosis of hypoactive delirium could explain the recorded figures (Han et al., 2010), since this was a case–control study without prior screening using active search instruments in triage (Lee et al., 2020).

Several studies have conducted delirium detection interventions in ED, and validated rapid delirium detection tools have been developed with greater or lesser complexity of application (Carpenter et al., 2021; Han et al., 2018; Lee et al., 2020). However, there has been scant protocolization of the use of these procedures in EDs, since ED personnel sometimes feel that they interfere with their work (Carpenter et al., 2021). Most of the studies to date have screened the entire older population included in the study and this, in daily clinical practice, is complicated or almost impossible to do with the limited available time and resources. Carpenter et al. (2021), in a consensus paper, concluded that the development of a screening tool or risk score that does not impose an additional workload upon professionals is essential for the implementation and detection of delirium in EDs. Given this situation, it is necessary to know the most frequent flow charts and discriminators that could help perform screening targeted to the population at higher risk.

According to our results, the 'unwell adult' or 'behaving strangely' flow charts characterised those patients most likely to develop delirium. In addition, 'unwell adult' is one of the most frequently identified flow charts in the older population, due to the lack of specificity of the presentation of disease conditions in this particular population (Perry et al., 2018). In contrast, falls, abdominal pain, chest pain, urinary problems and shortness of breath and breathlessness would be very unlikely to be identified with delirium, though they may be regarded as risk factors for delirium. These findings may seem paradoxical, but delirium in the older person is mainly due to some underlying cause, that is an older individual may experience abdominal pain due to a fecaloma, but in the presence of other predisposing risk factors, the onset of delirium is one of the possible presentations and the patient comes to the ED due to the symptoms of delirium—not because of abdominal pain. The same may occur with urinary tract infection and other organic disorders. For this reason, the diagnosis of delirium should always be accompanied by a physical examination, an analysis of risk factors and complementary tests to identify the possible underlying aetiology (Gower et al., 2012; Han, Shintani, et al., 2010). Accordingly, our results contemplated delirium as both a primary and a secondary diagnosis.

Altered mental status has a specificity of 98.9%, though the sensitivity is only 38%. As a result, this complaint upon ED admission is insufficient for the detection of delirium (Han et al., 2014). According to the diagnostic criteria of the DSM-V (European Delirium Association & American Delirium Society, 2014), fluctuation,

disorganised thinking, altered level of attention and consciousness, and rapid onset are diagnostic criteria, and any of them should contribute to identify this syndrome (Lee et al., 2020). The diagnostic criteria of delirium could be identified in any of the flow charts previously described as predictors of delirium, and the discriminators 'rapid onset' and 'new neurological deficit less than 24 h old' are the most prevalent in the diagnosis of delirium. The identification of both discriminators resembles the diagnostic criteria for delirium; accordingly, during triage, symptoms compatible with the diagnostic criteria for delirium are identified and therefore a screening scale could be applied here for faster detection. The Confusion Assessment Method scale (Inouye et al., 1990) is considered the gold standard in the use of validated scales and is widely employed throughout the world. It has high sensitivity (86%) and specificity (93%), but takes about 5 min to apply—a circumstance that is not feasible in an ED (Pérez-Ros & Martínez-Arnau, 2019). Other scales such as the Single Question to identify Delirium (SQiD), the Ultrabrief 2-item bedside test (UB-2), the Delirium Triage Screen (DTS), 4AT, and the brief Confusion Assessment Method (bCAM) have been validated in these settings and allow screening to be performed in under 2 min (Lee et al., 2020).

The risk factors identified in our study are the most common ones found in the literature, although an active search for other risk factors should be carried out during screening (Inouye et al., 2014). In relation to falls, it is important to note that falling as a reason for an emergency care visit was not related to the presence of delirium, while a history of previous fall within the past 30 days was indeed related to the presence of delirium. In general, delirium is more common among fallers, though there is also an elevated risk of falls among patients with delirium (Sillner et al., 2019). Previous studies in hospitalised patients suggest the need for prospective studies to better understand this association (Sillner et al., 2019).

The implementation of delirium screening tools in EDs and the testing of delirium prevention strategies in the ED once high-risk individuals have been identified are necessary (Carpenter et al., 2021). The Manchester Triage System has shortcomings in the screening of older people with comorbidities, and screening for certain disease conditions needs to be reinforced in at-risk groups (Ausserhofer et al., 2021). The identification of older people at risk of delirium focuses implementation of the tools. In addition, it would allow delirium to be detected more quickly so that appropriate pharmacological treatment can be provided and possible non-pharmacological measures can be adopted within the ED.

The present study has limitations. Due to the retrospective design involved, it was not possible to analyse other possible existing risk factors nor was it possible to distinguish between hypoactive, hyperactive or mixed delirium. The state of alarm decreed on 13 March 2020 in Spain due to the SARS-CoV-2 pandemic established a total lockdown for 8 weeks, and a further 6 weeks of restricted mobility for the population. Despite the fact that we analysed the period between 1 June and 31 December in both 2020 and 2019, without the detection of differences in terms of admission and flow charts of the older people in the ED, the existence of the COVID-19 pandemic could constitute a source of potential bias to ED attendance and thus introduce bias in the sample.

5 | CONCLUSIONS

The correct detection of delirium in older adults in hospital EDs is a challenge. The use of triage systems helps to categorise the need for urgent care. Older people triaged with the flow charts 'unwell adult' and 'behaving strangely' and the discriminators 'rapid onset' and 'new neurological deficit less than 24 h old' are at an increased risk of delirium. The identification of the older population at risk of delirium would facilitate the implementation of effective screening tools in the ED triage system.

AUTHORS CONTRIBUTIONS

P.P-R and A.S-S conceived and designed the study; A. S-S acquired the data; P.P-R and F.M.M-A analysed and interpreted the data, A. S-S; P.P-R and F.M.M-A drafted the manuscript.; J.S-F revised the manuscript for key intellectual content. P.P-R also supervised the study.

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CONFLICT OF INTEREST

The authors have no conflicts of interest.

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