

RESEARCH

Open Access



Factors predicting admission of psychiatric emergency contacts after presenting to the emergency department: results of a regression analysis

Heribert Kirchner^{1*}, Martin Schaefer^{2,3}, Heiko Ullrich⁴, Nik Hulsmans⁵, Georg Juckel⁶, Patrick Brzoska¹ and Frank-Gerald Bernhard Pajonk^{7,8}

Abstract

Background: Psychiatric emergency patients have great relevance in the interdisciplinary emergency department. Emergency physicians in this setting often have to make decisions under time pressure based on incomplete information regarding the patient's further treatment. The aim of this study was to identify possible predictors associated with an increased likelihood of inpatient psychiatric admission.

Methods: A retrospective cross-sectional study of all psychiatric emergency contacts in an interdisciplinary emergency department (ED) of a general hospital in a large German city was conducted for 2015. A binary regression analysis was performed to identify possible predictors.

Results: In 2015, a total of 21421 patient contacts were reported in the emergency department, of which 1733 were psychiatric emergencies. Psychiatric emergency was the fourth most common cause presenting to the ED. The most common diagnosis given was mental and behavioral disorders due to the use of psychotropic substances (F1). Factors associated with an increased probability of inpatient psychiatric admission were previously known patients, patients under a legal care order (guardianship), and previous outpatient medical contact. No association for gender or age was found. Data demonstrated a negative relationship between a neurotic, stress-related and somatoform disorder diagnosis and admission.

Conclusions: The present study shows some significant characteristics associated with an increased likelihood of emergency admission. Independent of the health care system, the predictors found seem to be relevant with regard to the probability of admission, when compared internationally. To improve the treatment of patients in emergency units, these factors should be taken into account.

Keywords: Psychiatric emergency, Regression analysis, Emergency department, Predictor, Admission

Background

The relevance of interdisciplinary emergency departments (ED) as care units has increased significantly during the last two decades. In 2019, approximately 21 million patients were treated in German emergency departments, with an estimated annual growth rate of approximately 4–5%, of which approximately 5–10%

*Correspondence: heribert.kirchner@uni-wh.de

¹ Faculty of Health, School of Medicine, University of Witten/Herdecke, Witten, Germany

Full list of author information is available at the end of the article



© The Author(s) 2022. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>. The Creative Commons Public Domain Dedication waiver (<http://creativecommons.org/publicdomain/zero/1.0/>) applies to the data made available in this article, unless otherwise stated in a credit line to the data.

were psychiatric emergencies [1–4]. Psychiatric emergency patients become increasingly important in this setting [5]. In the Anglo-American region, a continuous increase in psychiatric cases in EDs has been described for the last two decades [6], and an increase of approximately 16% between 2000 and 2010 was also found in Germany [1].

Patients arrive at the ED through emergency medical services, ambulance services, the police, or individuals approach the ED themselves with or without referral [1, 2, 7, 8]. There are typical emergency indications (see Table 1) named in the German guideline “Emergency Psychiatry” [9], that may indicate an increased likelihood of inpatient admission. The absolute and relative psychiatric emergencies listed in Table 1 differ with regard to their need for immediate action. The “absolute psychiatric emergency” usually requires immediate diagnostic and/or treatment, which is usually not the case for relative psychiatric emergencies. According to the German guideline for emergency psychiatry, psychiatric emergencies are defined as “a medical situation in which the acute onset or exacerbation of an existing psychiatric disorder leads to an immediate threat to the life and health of the affected person and/or his or her environment and requires immediate diagnosis and/or therapy [9].”

In the ED, in addition to the initial diagnosis, the decision about the patient’s need for further treatment must be made quickly by means of an assessment, even if little information is available [6, 10].

To date, there are only nonspecific criteria under which conditions emergency psychiatric patients should be admitted as inpatients, in part because the aims and methods of individual studies have been inconsistent [7, 11–16]. However, despite differences in study designs and country-specific differences in health care systems, some predictors are described repeatedly. These include the presence of suicidality and a diagnosis of schizophrenia [11, 12, 17–20], as well as the presence of aggressiveness, impulsivity, and danger to others [14, 16, 20, 21]. In contrast, diagnoses such as anxiety panic disorder are more likely not to result in inpatient admission [7]. The particular mode of transport of the patient to the ED (via

ambulance and/or police) also appears to have an impact on the likelihood of admission [7, 11, 13, 22]. In addition to these factors, age and referral by a general practitioner are also reported as additional predictors [11, 14, 15, 19, 23, 24]. Considering that previous studies on the factors associated with the admittance of emergency psychiatric patients to hospitals have been inconsistent, the purpose of the present secondary data analysis was to add to the existing body of research by examining how recent data from a large German hospital compares to previous investigations. By doing so, we draw conclusions for the further development of algorithms in psychiatric emergency care, both nationally and internationally.

Methods

A retrospective evaluation of all psychiatric emergency contacts in the ED of the Kreisklinikum Siegen, a hospital in a large German city, was conducted. In the study period (01.01.2015–31.12.2015), Kreisklinikum Siegen had 556 beds and 11 specialized departments, including a psychiatric department with 140 beds, and was responsible for the entire district of 280,000 inhabitants. The ED is part of the emergency medical care of the city of Siegen. Almost all psychiatric emergencies are presented by emergency physicians, rescue service and police. In addition, it is possible for patients to present themselves on their own initiative, with or without a referral from a physician, at any time of the day on all days of the week.

The ED of the examined hospital is the only one in the city with a psychiatric department at a general hospital, covering all potential psychiatric emergency patients in the entire urban region. All patients with a primary psychiatric diagnosis and a minimum age of 18 years who presented at the ED were included in the study. These patients were examined by a consultant in psychiatry and psychotherapy, who also made the diagnosis (according to ICD-10) and decided on further treatment and, if necessary, inpatient admission. Data collection was performed by a consultant psychiatrist and psychotherapist working in the psychiatric hospital. Age, sex, diagnosis, and, if present, an emergency psychiatric syndrome according to the German S2k guideline “Emergency

Table 1 Psychiatric emergency criteria (German Guideline—DGGPN 2019)

Absolute psychiatric emergency	Relative psychiatric emergency
-Suicide attempt	-Confusion
-Concrete suicide ideas/plans	-Withdrawal without delirium
-Severe intoxication	-Suicidality without intention
-Severe state of arousal	-Anxiety and panic disorder
-Aggressiveness/violence caused by mental disorder	-Acute adjustment reaction and psychosocial dysfunction
-Delirium	

Table 1 lists all important absolute and relative psychiatric emergencies according to the German guideline for emergency psychiatry (2019)

Psychiatry” were documented [9]. The following additional data were recorded: date and time of presentation, legally initiated deprivation of liberty measures due to a mental disorder, outpatient or inpatient psychiatric pre-treatment in the hospital, performance of medical clearance (basic examination as laboratory tests and ECG), referral by a general practitioner, and route of access to the ED.

Statistical analysis was conducted using SPSS 25. Multivariable regression analysis was performed to determine predictors of a patient’s hospitalization. The following factors were included in the analysis: age, sex, day of the week, time of day, month, previous outpatient or inpatient psychiatric treatment at the investigated hospital, admission to the hospital due to legal measures, referral by a physician, route of access (emergency medical and ambulance service, police, self-initiated), emergency psychiatric syndrome, existence of suicidality, performance of ECG, laboratory tests and imaging (CT or MRI), main diagnosis according to International Classification of Diagnosis (ICD-10; F0–F7), and use of drugs. Since the dependent variable was a binary (categorical) variable (stay: yes/no), binary logistic regression was chosen to analyze the data. According to the omnibus test, the regression model had significant explanatory power with a p value < 0.001. Nagelkerke R-squared of 0.747 indicated a high explanatory power of the model. Because the regression analysis performed on all parameters collected was a very large model with many non-significant predictors, the analysis comprised two steps. In the first step of the regression analysis, we examined all recorded parameters of the study shown in Table 2. Subsequently, in the second step, we only included predictors significant at $p < 0.1$ in the first step that were predictive of an increased probability of admission.

Results

In 2015, there were a total of 21421 patient contacts in the emergency department, of which 1733 (8.1%) were psychiatric emergencies. Psychiatric emergency was the fourth most common cause presenting to the ED after internal medicine, surgery, and neurology emergencies. The mean age of psychiatric patients was 42.7 years (SD = 17.1), and the proportion of male patients was 51.8% ($n = 898$). After presentation to the ED, almost 60% of emergency psychiatric patients were admitted as inpatients. The most common diagnosis given was mental and behavioral disorders due to the use of psychotropic substances (F1). Diagnoses from the categories schizophrenia, schizotypal and delusional disorders (F2), mood [affective] disorders (F3), and neurotic, stress-related and somatoform disorders (F4) did not differ much in frequency. Patients with a mental and behavioral disorder

caused by psychotropic substances were also the most frequently admitted (see Fig. 1).

Before conducting the regression analysis some of the outpatients and inpatients had to be excluded. The initial dataset comprises $N = 1898$ cases. Of these, a total of $n = 163$ cases was excluded due to missing values. In the regression analysis, $n = 2$ cases were further excluded due to a Cook Distance significantly > 1. The final sample size thus comprises $N = 1733$.

The results of the final regression analysis to identify possible predictors associated with an increased likelihood of admission are shown in Table 3. Not all of the 32 parameters initially included in the model remained in the final regression model. Among others, the involuntary presentation of patients was strongly associated with admission (OR = 25.9; 95%-CI 8.9–75.7), performed laboratory (OR 15.0, 95%-CI 9.4–24.1) and ECG examinations (OR 3.6, 95% CI 2.3–5.8), and a referral by a physician (OR = 5.0, 95%-CI 2.3–10.7) were also associated with an increased probability of admission. If the criteria for a psychiatric emergency according to the German guideline are met, the probability of being admitted as an inpatient also increases (OR 2.8, 95%-CI 1.9–4.1). Patients who had already been psychiatrically treated in the hospital earlier were also more likely to be admitted (OR 2.5, 95%-CI 1.7–3.7).

There was no increased probability of admission for any principal diagnosis. Age and gender were also not associated with an increased probability of admission. However, a significantly decreased probability of admission was found for neurotic, stress-related and somatoform disorders.

Discussion

The aim of this study was to identify predictors for an increased probability of admission of inpatient psychiatric emergency patients after presentation to an ED. To date, there has been no further development of clear SOPs although there have been few international studies on this issue since the 1980s, two of which were from Germany.

One reason may be the lack of data and inconsistent results of previous studies because of the lack of development and implementation of SOPs for psychiatric emergency patients.

The patients we studied largely matched those of other studies [1, 2, 8, 12, 15, 16, 19, 25–27] in terms of age, diagnostic spectrum, and admission rate.

Consistencies in predictors of inpatient psychiatric admission include prior psychiatric treatment [7, 11, 28], presence of legally initiated admissions against the patient’s will [7, 21], and physician referral [7, 12, 21, 22]. The psychiatric emergency syndromes from the German

Table 2 First regression analysis of all variables

Variable	Category	Regressions coefficient B	Odds ratio	p-value	CI (95%)
Age range (Reference: < 25 years)	25–60	.051	1.052	.834	0.65–1.69
	> 60	.356	1.427	.309	0.72–2.83
Patient known (pretreated at the hospital) (Reference: no)	Missing	– 17.609	.000	1	1.75–3.76
	Yes	.942	2.566	.000	
Sex (Reference: female)	Male	.181	1.198	.322	0.84–1.71
Weekday (Reference: Sunday)	Monday	.105	1.111	.744	0.59–2.09
	Tuesday	.230	1.258	.471	0.67–2.35
	Wednesday	.456	1.578	.164	0.83–3.00
	Thursday	– .107	.899	.751	0.47–1.73
	Friday	– .304	.738	.362	0.38–1.42
	Saturday	– .169	.844	.625	0.43–1.67
	Time of arrival (Reference: 0:00–3:49)	04:00–7:59	– .499	.607	.300
	08:00–11:59	– .408	.665	.258	0.33–1.35
	12:00–15:59	– .147	.863	.675	0.43–1.72
	16:00–19:59	– .167	.846	.643	0.42–1.71
	20:00–23:59	.157	1.170	.883	0.58–2.38
Legal status (Reference: voluntary)	Involuntary by psychkg	3.433	30.962	.000	7.96–120.37
	Involuntary by BtG	3.417	30.469	.000	4.49–206.78
	Missing	3.659	38.839	.091	0.56–2712.94
Referral to hospital (Reference: no)	Yes by general physician	1.452	4.271	.001	1.87–9.74
	Yes by emergency physician	– 2.110	.121	.000	0.05–0.31
	Missing	– 1.733	.177	.105	0.02–1.44
Mode of transportation (Reference: by foot)	Ambulance	– .418	.658	.065	0.42–1.03
	Police	.670	1.955	.215	0.68–5.64
	Others	– .760	.468	.624	0.02–9.74
	Missing	– 2.158	.116	.029	0.02–0.80
Psychiatric emergency according to the German guideline. (Reference: no)	Yes	1.048	2.851	.000	1.94–4.20
	Missing	– 1.291	.275	.517	0.01–13.58
Diagnosis according to ICD-10 F0 (Reference: no)	Yes	– .782	.458	.377	0.08–2.59
	Missing	– 22.851	.000	.998	0
Diagnosis according to ICD-10 F1 (Reference: no)	Yes	– 2.252	.105	.001	0.03–0.39
	Missing				
Diagnosis according to ICD-10 F2 (Reference: no)	Yes	– 1.785	.168	.044	0.04–0.64
	Missing				
Diagnosis according to ICD-10 F3 (Reference: no)	Yes	– 2.381	.092	.000	0.02–0.35
	Missing				
Diagnosis according to ICD-10 F4 (Reference: no)	Yes	– 3.817	.022	.000	0.01–0.09
	Missing				
Diagnosis according to ICD-10 F5 (Reference: no)	Yes	– 4.128	.016	.009	0.00–0.36
	Missing				
Diagnosis according to ICD-10 F6 (Reference: no)	Yes	– 1.320	.267	.066	0.07–1.09
	Missing				
Diagnosis according to ICD-10 F7 (Reference: no)	Yes	– 1.710	.181	.219	0.01–2.76
	Missing				
Suicide attempt X84 (Reference: no)	Yes	21.075	> 1 Mrd	.998	0
	Missing	31.730	> 1 Mrd	.999	0
Intoxication according to ICD-10 T36–T50 (Reference: no)	Yes	1.634	5.125	.170	0.50–52.89
	Missing	– 34.218	.000	.999	0

Table 2 (continued)

Variable	Category	Regressions coefficient B	Odds ratio	p-value	CI (95%)
Internal additional diagnosis (Reference: no)	Yes	− 2.484	.083	.000	0.04–0.20
	Missing	− 11.734	.000	.999	0
Neurological additional diagnosis (Reference: no)	Yes	− .182	.834	.757	0.26–2.64
	Missing				
Surgical additional diagnosis (Reference: no)	Yes	− .047	.954	.925	0.36–2.56
	Missing				
Psychopharmaca administered at ER (Reference: no)	Yes	.376	1.457	.784	0.09–21.60
	Missing	15.371	> 4 Mio	.999	0
Benzodiazepine administered at ER (Reference: no)	Yes	− .628	.534	.558	0.07–4.36
	Missing				
High potency antipsychotics administered at ER (Reference: no)	Yes	18.374	> 9 Mrd	.999	0
	Missing				
Low potency. antipsychotica administered at ER (Reference: no)	Yes	− .989	.372	.460	0.03–5.14
	Missing				
Antidepressiva administered at ER (Reference: no)	Yes	− 49.524	.000	.999	0
	Missing				
Internal medications administered at ER (Reference: no)	Yes	− 1.354	.258	.189	0.03–1.95
	Missing				
Other medications administered at ER (Reference: no)	Yes	1.345	3.840	.283	0.33–44.83
	Missing				
ECG at ER (Reference: no)	Yes	1.382	3.982	.000	2.47–6.41
	Missing				
Laboratory at ER (Reference: no)	Yes	2.789	16.262	.000	9.93–26.64
	Missing				
Radiological examination at ER (Reference: no)	Yes	− .191	.826	.664	0.35–1.96
	Missing				

Table 2 includes all variables examined in the study related to emergency psychiatric patients presented in the ER during 2015

guideline Emergency Psychiatry [9] are also predictive, supporting the validity of the syndromes.

In contrast to other studies, none of the ICD-10 diagnoses were associated with an increased probability of admission. Some of these studies found a diagnosis of schizophrenia, schizotypal and delusional disorders (F2), or mood [affective] disorders (F3) as predictors [11–13, 16]. Although neurotic, stress-related, and somatoform disorders (F4) account for a significant proportion of psychiatric patients in the ED, they appear to be associated with a decreased likelihood of inpatient admission. This has also been found by other studies [7, 12, 28]. In our study, suicidality was not a predictor of inpatient admission, although this has been found in most other studies. This may be due to the comparatively low documented frequency of suicide attempts or existing acute suicidality (3%) among patients in our study. The reason for this is probably the incomplete documentation of suicidality in the emergency department and, because of the study design with anonymization, the impossibility of

combining different patient records from the emergency physician service, emergency department, and psychiatric hospital. Differences between our study and most other studies were also found with regard to the factors age and gender. In other studies, older age was a predictor [11, 14, 15, 19, 22]. Regarding gender, the results are inconsistent. In an Italian study, a higher probability was found for men [12], while in an American study, the probability was higher for women [19]. Factors that have been shown to be predictive in other studies, such as the presence of aggressiveness, apathy, psychotic perception, thought disorder [7, 11, 16, 28], or homelessness [19], were not examined.

A limitation of our study was the retrospective design. Therefore, maybe in some cases it was a challenge to assess the severity of clinical syndromes, which may have led to a lack of clarity in the distinction between the presence or non-presence of a psychiatric emergency. Due to anonymization of data collection, it was not possible to merge different data sources from

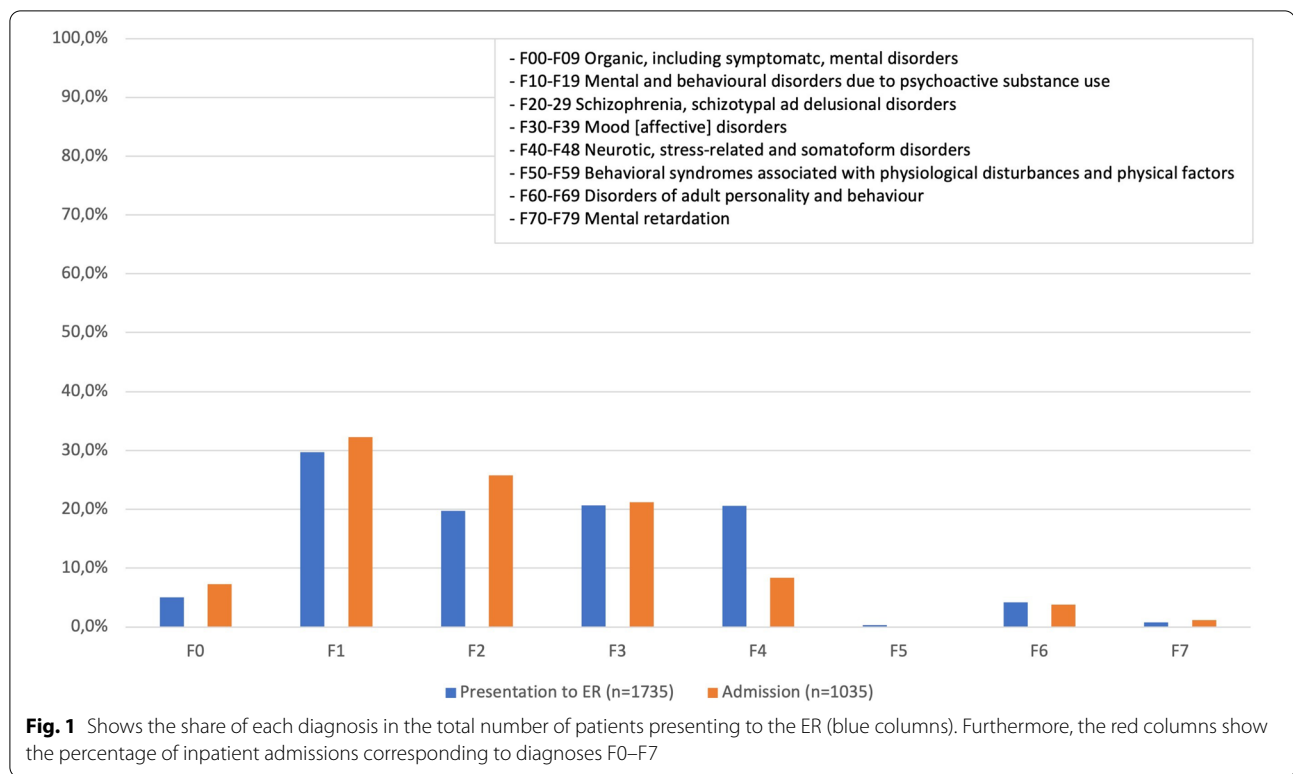


Table 3 Final regression analysis of admission predictors at the ER

Variable	Regression coefficient B	Odds ratio	p-value	CI (95%)
Admission against patients' will (yes or no)	3.255	25.932	.000	8.864–75.865
Laboratory at ER (yes or no)	2.731	15.080	.000	9.401–24.192
ECG at ER (yes or no)	1.303	3.681	.000	2.322–5.836
Referral to hospital by physician (yes or no)	1.615	5.028	.000	2.346–10.780
Psychiatric emergency according to the German guideline (yes or no)	1.056	2.875	.000	1.994–4.145
Patient known (pretreated at the hospital yes or no)	0.921	2.511	.000	1.775–3.756
Referral by emergency physician (yes or no)	– 1.749	.174	.000	.078–.390
Mode of transportation (ambulance/EP) (yes or no)	– .523	.539	.012	.394–.893
Mental and behavioral disorders due to psychoactive substance use (ICD-10: F1) (yes or no)	– 1.641	.194	.000	.086–.435
Schizophrenia, schizotypal and delusional disorders (ICD-10: F2) (yes or no)	– 1.200	.301	.006	.129–.705
Mood [affective] disorders (ICD-10: F3) (yes or no)	– 1.764	.171	.000	.075–.392
Neurotic, stress-related and somatoform disorders (ICD-10: F4) (yes or no)	– 3.174	.042	.000	.018–.096
Behavioral syndromes associated with physiological disturbances and physical factors (ICD-10: F5) (yes or no)	– 3.179	.042	.028	.002–.712

Table 3 lists all relevant predictors in terms of OR and significance

prehospital emergency medicine, EDs, and psychiatric hospitals. Because of that, prehospital treatment in another clinic could not be excluded with certainty. Consequently, in some cases possible conclusions

about patients with a first psychiatric illness could have been over- or underestimated. The results are data from a single ED and are therefore not representative of Germany.

Conclusions

The findings of our study with respect to factors associated with the admittance of psychiatric emergency patients to hospitals are similar to results from other national and international investigations, despite differing health care systems.

Based on our and previous investigations, the following determinants of admittance can be identified: inpatient psychiatric admissions are primarily patients with prior outpatient or inpatient psychiatric treatment, with a physician referral, and with treatment on a legal basis against the patient's will.

Independent of the health care system, the predictors found seem to have a clear significance with regard to the probability of admission, even when compared internationally. For this reason, it would be desirable for subsequent studies to take a more differentiated look at these predictors in order to develop SOPs for more efficient patient care.

Author contributions

HK planned and supervised the study and wrote a draft of the manuscript. MS supervised the study and reviewed critically the manuscript. HU helped in the clinical data collection and reviewed critically the manuscript. NH helped in study planning and statistical analysis. PB planned and supervised the study and reviewed critically the manuscript. GJ helped in choosing the proper data matrix and also supervised the statistically analysis. FGP supervised the study, critically read the manuscript. All authors read and approved the final manuscript.

Funding

Open Access funding enabled and organized by Projekt DEAL. Open access funding provided by the University of Witten/Herdecke. No further funding was received.

Availability of data and materials

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The study was approved by the Scientific and Research Ethics Committee of the Medical Research Council of the University of Münster, Germany (No. 2019-529-f-s, Ethik-Kommission/Ärztchamber Westfalen-Lippe, Germany) and carried out in accordance with the tenets of the Declaration of Helsinki.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Author details

¹Faculty of Health, School of Medicine, University of Witten/Herdecke, Witten, Germany. ²Department of Psychiatry, Psychotherapy, Psychosomatics and Addiction Medicine, Evang. Kliniken Essen-Mitte, Essen, Germany. ³Department of Psychiatry and Psychotherapy, Charité—Universitätsmedizin Berlin, Campus Charité Mitte, Berlin, Germany. ⁴Department of Psychiatry, Psychotherapy and Psychosomatics, Kreisklinikum Siegen, Hospital, Siegen, Germany. ⁵Department of Psychology, University of Siegen, Siegen, Germany. ⁶Department of Psychiatry, Psychotherapy and Preventive Medicine, LWL

University Hospital, Ruhr University Bochum, Bochum, Germany. ⁷Zentrum Isartal Am Kloster Schäftlarn, Schäftlarn, Germany. ⁸Department of Psychiatry and Psychotherapy, Technical University Munich, Munich, Germany.

Received: 22 August 2022 Accepted: 29 October 2022

Published online: 09 November 2022

References

- Freudenmann RW, Espe J, Lang D, Klaus J, Gahr M, Schönfeldt-Lecuona C. Psychiatrische Notfälle auf der medizinischen Notaufnahme des Universitätsklinikums Ulm in den Jahren 2000 und 2010. *Psychiatr Prax.* 2015;44(01):29–35.
- Kropp S, Andreis C, te Wildt B, Sieberer M, Ziegenbein M, Huber TJ. Charakteristik psychiatrischer Patienten in der Notaufnahme. *Psychiatr Prax.* 2007;34(2):72–5.
- Tonn P, Reuter S, Gerlach N, Dahmen N, Pajonk F-G. Psychiatrische Patienten in der Notaufnahme. *Notfall Rettungsmed.* 2008;11(8):537–46.
- Kirchner H, Sinani G, Ullrich H, Pajonk FGB, Juckel G. Charakterisierung des stationär aufgenommenen psychiatrischen Notfallpatienten in einer interdisziplinären ZNA. *Fortschr Neurol Psychiatr.* 2021;89(9):409–14.
- Pajonk F-GB. Zur Situation der Notfall- und Akutpsychiatrie in Deutschland. *Nervenarzt.* 2015;86(9):1081–90.
- Larkin GL, Claassen CA, Emond JA, Pelletier AJ, Camargo CA. Trends in U.S. emergency department visits for mental health conditions, 1992 to 2001. *Psychiatr Serv.* 2005;56(6):671–7.
- Ziegenbein M, Anreis C, Brüggen B, Ohlmeier M, Kropp S. Possible criteria for inpatient psychiatric admissions: which patients are transferred from emergency services to inpatient psychiatric treatment? *BMC Health Serv Res.* 2006;6(1):150.
- Larkin GL, Claassen CA, Pelletier AJ, Camargo CA. National study of ambulance transports to United States emergency departments: importance of mental health problems. *Prehosp Disaster Med.* 2006;21(2):82–90.
- Pajonk F-G, Messer T, Berzewski H. (eds). S2k-Leitlinie Notfallpsychiatrie. Berlin, Heidelberg. Springer Berlin Heidelberg. 2020.
- Zimmermann M, Brokmann JC, Gräff I, Kumle B, Wilke P, Gries A. Zentrale Notaufnahme-update 2016. *Anaesthesist.* 2016;65(4):243–9.
- Bahji A, Altomare J, Sapru A, Haze S, Prasad S, Egan R. Predictors of hospital admission for patients presenting with psychiatric emergencies: a retrospective, cohort study. *Psychiatry Res.* 2020;290:113149.
- Biancosino B, Vanni A, Marmai L, Zotos S, Peron L, Marangoni C, et al. Factors related to admission of psychiatric patients to medical wards from the general hospital emergency department: a 3 year study of urgent psychiatric consultations. *Int J Psychiatry Med.* 2009;39(2):133–46.
- Friedman S, Margolis R, David OJ, Kesselman M. Predicting psychiatric admission from an emergency room psychiatric, psychosocial, and methodological factors. *J Nerv Ment Dis.* 1983;171(3):155–8.
- Giampieri E, Ratti A, Beretta A, Mattavelli C, Ferrarini E, Pruner C, et al. Determinanti di ricovero dal pronto soccorso psichiatrico dell'Ospedale S. gerardo di monza: studio epidemiologico trasversale. *Epidemiol Psichiatr Soc.* 2002;11(4):266–76.
- Hamilton JE, Desai PV, Hoot NR, Gearing RE, Jeong S, Meyer TD, et al. Factors associated with the likelihood of hospitalization following emergency department visits for behavioral health conditions. *Acad Emerg Med.* 2016;23(11):1257–66.
- Krautheim J. Die Entscheidung zur stationären Aufnahme in einer akut-psychiatrischen Behandlungssituation. 2011. Accessed 29 July 2022.
- Dammak M, Ayadi N. Les variables associées à la décision d'hospitalisation. *Ann Médico-Psychol Revue Psychiatr.* 2009;167(3):195–9.
- Feigelson EB, Davis EB, Mackinnon R, Shands HC, Schwartz CC. The decision to hospitalize. *Am J Psychiatry.* 1978;135(3):354–7.
- Unick GJ, Kessel E, Woodard EK, Leary M, Dilley JW, Shumway M. Factors affecting psychiatric inpatient hospitalization from a psychiatric emergency service. *Gen Hosp Psychiatry.* 2011;33(6):618–25.
- Way BB, Banks S. Clinical factors related to admission and release decisions in psychiatric emergency services. *Psychiatr Serv.* 2001;52(2):214–8.
- Hunt GE, O'Hara-Aarons M, O'Connor N, Cleary M. Why are some patients admitted to psychiatric hospital while others are not? A study assessing

- risk during the admission interview and relationship to outcome. *Int J Ment Health Nurs*. 2012;21(2):145–53.
22. Mowbray FI, Omar AE, Pfaff K, El-Masri MM. Exploring the factors associated with non-urgent emergency department utilisation for mental health care. *J Res Nurs*. 2019;24(8):663–74.
 23. Kaltsidis G, Bamvita J-M, Grenier G, Fleury M-J. Predictors of frequent emergency department utilization for mental health reasons. *J Behav Health Serv Res*. 2021;48(2):259–73.
 24. Buhumaid R, Riley J, Sattarian M, Bregman B, Blanchard J. Characteristics of frequent users of the emergency department with psychiatric conditions. *J Health Care Poor Underserved*. 2015;26(3):941–50.
 25. Baune BT. A 6-months assessment of the alcohol-related clinical burden at emergency rooms (ERs) in 11 acute care hospitals of an urban area in Germany. *BMC Health Serv Res*. 2005;5(1):1–12.
 26. Hazlett SB, McCarthy ML, Londner MS, Onyike CU. Epidemiology of adult psychiatric visits to U.S. emergency departments. *Acad Emergency Med*. 2004;11(2):193–5.
 27. Larkin GL, Smith RP, Beautrais AL. Trends in US emergency department visits for suicide attempts, 1992–2001. *Crisis*. 2008;29(2):73–80.
 28. Dazzi F, Picardi A, Orso L, Biondi M. Predictors of inpatient psychiatric admission in patients presenting to the emergency department: the role of dimensional assessment. *Gen Hosp Psychiatry*. 2015;37(6):587–94.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Ready to submit your research? Choose BMC and benefit from:

- fast, convenient online submission
- thorough peer review by experienced researchers in your field
- rapid publication on acceptance
- support for research data, including large and complex data types
- gold Open Access which fosters wider collaboration and increased citations
- maximum visibility for your research: over 100M website views per year

At BMC, research is always in progress.

Learn more biomedcentral.com/submissions

