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Indicated trauma emergency department utilization – A comparison between patients' self-assessment and professional evaluation

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ABSTRACT

Introduction: Patient visits to emergency departments (EDs) increase in many countries. As a result, these facilities are often congested and the socioeconomic burden of growing workload is a well-known problem. In this study, patients' reasons attending an ED with non-emergent needs were analyzed.

Methods: From October 2015 to March 2016 patients (n = 499), attending the ED of an academic teaching hospital without referral from a General Practitioner (GP) were surveyed regarding circumstances of their visit, a self-assessment of illness-severity, and reasons for choosing the ED instead of a GP. Results were compared to responses of ED staff (n = 40).

Results: Most patients assessed their case as urgent (patients: 65% vs. ED staff: 28%, $p < 0.001$) and felt that their medical problem could not to be treated by a GP (74%). However, most patients ranked their injuries as mild (45.7%) or moderate (41.7%). Reasons to prefer an ED instead of a GP were not responded in 80.1% of cases.

Conclusion: In contrast to the self-evaluation of patients, ED staff believed that a significant portion of medical problems could be treated by a GP. Understanding patient-centred reasons and the discrepancy between self-perceived emergencies and minor medical problems might help to reduce inappropriate ED-admissions.

1. Introduction

Emergency department (ED) visits increase in many industrial countries [1–3]. In Germany, there were more than 20 million ED admissions per year [4,5]. However, it is a debatable point whether all of these cases truly required a visit to an ED. Nonetheless, it has been recognized that patients with non-emergent needs and conditions are increasing the workload in the EDs [1,2,6–9].

Reasons for inappropriate visits are multifactorial and can be classified as patient-population-based or health-system-based [10]. In many countries efforts are taken to optimize the health-system-based conditions (e.g., with implementation of gatekeeper-facilities) [6,11,12]. An important patient-population-based factor is the lack of health literacy; which implies that people are not able to decide whether a physician has to be consulted for minor injuries [13-16]. Sørensen and colleagues demonstrated that almost every second citizen in the European Union (EU) has limited health literacy [17]. Poor health-related knowledge promotes patients to struggle with the decision to attend the ED or a General Practitioner for minor physical injuries [18,19]. In addition, many patients are attracted by the walk-by 24/7 availability of an emergency department [20,21]. Scherer and colleagues have surveyed 1175 patients in an ED and suggested that more than the half of them thought their problem did not need urgent treatment [22]. In contrast to the previously reported data we focussed on trauma surgery patients and staff.

Based on the mandatory health insurance coverage, the German

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health care system offers a free and costless approach to healthcare for most citizens. Non-emergent ED visits tend to be highest among patients with public health care coverage while patients enrolled in a private health insurance visit EDs less often for non-emergent causes [23,24]. For each patient, visiting the ED and covered by a state health insurance, German hospitals calculate a financial loss of 80€ per case [25,26]. In this regard, prolonged waiting times or treatment delay for other emergency cases are also relevant and frequent associated problems [7,26,27].

The aim of this study was to evaluate and characterize the reasons of patients without GP-referral, admittance by ambulance, or a Manchester triage score below four for attending an ED instead of first visiting their General Practitioner (GP). Furthermore patient-sided self-evaluation of the urgency of their case and the severity of their injury were compared to the perceptions of ED staff.

2. Methods

2.1. Study design and setting

The survey (available in the Supplement) was offered to all patients with a traumatic injury or disease attending the Emergency Department of the Department of Trauma Surgery at an academic teaching hospital in the period from October 2015 to March 2016 without formal referral of a community based physician or General Practitioner (GP). Multiple participations and incomplete surveys were excluded. Patients with referral from a GP, admittance by ambulance or a Manchester triage score below four were excluded [28]. The patients' survey started with obtaining epidemiological data including age, sex, height, and weight, insurance status, level of education, and sporting activities. Then patients were asked details regarding their injury/illness including the time of the incident, beginning of symptoms, first line treatment and mode of transport to reach the ED. Furthermore, patients were asked to provide a self-assessment of the urgency of their medical problem and the general severity of their injury or illness including reasons why they preferred a visit at the Emergency Department over a visit at a community based physician, health facility or GP. Finally, patients were asked how they perceived the bustle in the Emergency Department, what waiting time they felt appropriate for their medical problem, and whether an admission fee for emergency patients or a better health education would reduce the number of unnecessary admissions to the Emergency Department.

In addition, consultant physicians (n = 9) and registered nurses (n = 31) of the trauma ED completed a similar questionnaire during the same period. As required for certified trauma centres in Germany, all the staff of our trauma ED have obtained or completed (choose which word is best) the official Manchester triage certificate. ED staff was asked how they conceived the patients' severity of illness and their impression about their motivation to visit the ED. Grading of the severity of illness was based on grade 1–3 of the Manchester triage system, e.g. clouded awareness (severe), slash wound (moderate), and pain with considerable history (mild). Furthermore, Emergency Department staff was asked how they perceived the overcrowding in the Emergency Department, what general waiting time needed to be expected until the first patient-doctor-contact, and whether they felt an admission fee or a better health education for emergency patients would reduce the number of unnecessary admissions to the Emergency Department.

2.2. Sample

All patients with a traumatic injury or disease attending the ED without formal referral of a community based physician or GP and willing to participate in the questionnaire in the period from October 2015 to March 2016. In a cross-sectional study design, consultant physicians (n = 9) and registered nurses (n = 31) of the trauma ED completed a similar questionnaire.

2.3. Outcome

Reasons of patients to attend an ED instead of their General Practitioner (GP) were evaluated including a patient-sided self-evaluation of the urgency of their case and the severity of their injury.

2.4. Questionnaire

The detailed version of the questionnaire is available in the Online Supplemental material.

2.5. Statistics

Data were analysed with statistical software package SPSS® Version 24 (IBM, Armonk, North Castle, New York, USA). Continuous variables of two independent groups were compared using non-parametric Wilcoxon-Mann-Whitney test. Categorical data were compared using Chi-square test with z-test to compare cell counts across the columns. All tests were conducted in the area if exploratory data analysis. Therefore, no adjustments for multiple testing have been made. A *P*-value of less than 0.05 was considered significant.

2.6. Ethical statement

The Medical Ethics Committee of the Medical Council Westphalia-Lippe approved this study (number of ethical approval: 2015-497-f-S). Written informed consent was obtained from all study participants before participation and all questionnaires were collected anonymously.

3. Results

In the period from October 2015 to March 2016, 1519 of a total of 2471 patients visited the ED of the Department of Trauma Surgery without a formal referral of a community based physician or General Practitioner (GP). Four hundred ninety-nine (32.9%) of these patients completed the survey. In addition, all 40 physicians and nurses of the ED completed the survey.

3.1. Respondent characteristics

Most patients had coverage by a statutory health insurance (93.4%) and only a minority was covered by a private health insurance (6.6%). The patients had a median age of 32 years (InterQuartile Ranges – IQR: 50–22) and 60.1% (n = 300) of all patients were male. The staff of the ED had a median age of 36 years (IQR: 47–30) and 40.0% (n = 16) were male participants. More than half of all injuries occurred during daily living (58.9%). There was no significant difference between the number of admissions during GP opening hours (8am to 6 pm) compared to the number of admissions from 6 pm to 8am. (GP office open: n = 223 [44.7%] vs. GP office closed: n = 222 [44.5%], non-responders n = 54, [10.8%]; $P = 0.962$). Circumstances of the patients' level of education, living conditions, circumstances of the ED visit, and expectations of the treatment in the ED are shown in Table 1.

3.2. Perception of urgency status

Two thirds of all surveyed patients (n = 315, 63.1%) considered their medical problem as a condition that needed urgent or emergency diagnosis and treatment (Fig. 1). In contrast, Emergency Department staff believed that less than a third of ED visitors without a referral by a physician had medical problems that were appropriate for an admission to an ED (patients 63.1% vs. emergency staff 28.0%, $P \leq 0.001$). The majority of patients tended to rate injuries as mild (45.7%) and

Table 1
Level of education, living conditions, transportation mode/time, and expectations to the treatment of patients visiting the Emergency Department (ED) without referral from another physician (n = 499).

Level of education, n (%)		
No graduation	27	(6.0)
Secondary school certificate	296	(65.5)
A level	129	(28.5)
Missing	47	
Residential location, n (%)		
Urban	179	(35.9)
Suburban	238	(47.8)
Rural	81	(16.3)
Missing	1	
Mode of transportation, n (%)		
Walking	16	(3.2)
Car, driven by patient	102	(20.4)
Car, not driven by patient	345	(69.1)
Public transport	26	(5.2)
Wheelchair-accessible Taxi	10	(2.0)
Transportation time to ED, n (%)		
< *15* min	245	(49.1)
15 min–*30* min	210	(42.1)
> 30 min	44	(8.8)
Patients expectations for the workup of their medical problem, n (%), multiple answers possible		
Detection of severe disease	152	(69.5)
Definitive diagnosis	296	(59.3)
Wound care	206	(41.3)
Technical equipment*	120	(24.0)
Impatient treatment	12	(2.4)
Prescribing of drugs	146	(29.3)

* (E.g. X-Ray, Computer Tomography, Ultrasound, Magnetic Resonance Imaging).

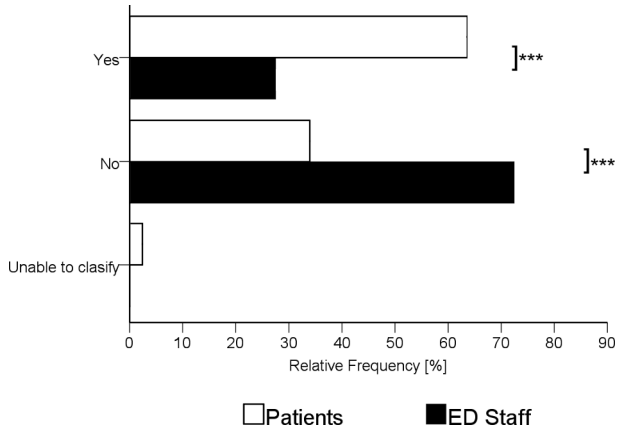

Fig. 1. Assessment of the urgency. Self-Perception of patients regarding their medical problem and whether they believed to need urgent/emergency diagnosis and treatment. Emergency Department (ED) staff evaluated whether medical problems presented at the ED needed urgent/emergency diagnosis and treatment. ($^{*}p < 0.05$, $^{***}p < 0.001$).

moderate (41.7%) in their self-assessment of injury severity (Table 2A). However, ED staff believed that only 10.0% of patients without referral from a physician presented with a severe injury (Table 2A).

3.3. Beliefs about community-based GP ability to address the condition

All patients were asked whether a community-based GP would have been able to treat their health problem. Seventy-four per cent of the respondents (n = 344) believed their medical problem could not be treated by a GP. Only 2.4 percent of the patients expected that a hospital admission or in-patient treatment would be necessary following their attendance to the Emergency Department.

Table 2
(A) Perception of patients and ED staff about injury severity quantified as mild, moderate, or severe. **(B)** Factors guiding patients' decision to prefer a visit to the Emergency Department instead of a visit to a General Practitioner and staff's assessment of patients' guiding factors.

A. Perception of patients and ED staff about injury severity, n (%)

	Patients		Staff		p-value
Mild	228	(45.7)	26	(65.0)	0.019*
Moderate	208	(41.7)	9	(22.5)	0.017*
Severe	16	(3.2)	4	(10.0)	0.029*
I do not like to answer this question	47	(9.4)	1	(2.5)	n.s.

B. Factors guiding decision to prefer a visit to the ED instead of a visit to a GP, n (%), multiple answers

	Patients		**Staff**	
Technical equipment*	53	(3.5)	25	(34.4)
No GP	2	(1.4)	7	(5.2)
24/7 Access	22	(4.3)	25	(26.0)
Negative experience	7	(0.4)	5	(7.3)
Waiting experience	18	(10.3)	33	(26.0)
I do not like to answer this question	411	(80.1)	1	(1.0)

* (E.g. X-Ray, Computer Tomography, Ultrasound, Magnetic Resonance Imaging).

3.4. Factors influencing decision to attend the ED

Furthermore, patients and staff were asked if factors such as waiting time for doctor appointments, negative experiences with their GPs, non-registration with a GP, 24/7-access to medical treatment, or availability of advanced technical equipment for diagnosis and treatment in a hospital guided their decision to prefer a visit to the ED (Table 2B). The most frequently chosen answer option by patients was, I do not like to answer this question".

3.5. Perception regarding financial incentives

Finally, both groups were asked whether an admission fee for a visit to the ED or enhanced basic medical education could help to reduce the number of unnecessary admissions to the ED. Compared to patients, ED staff believed, that both, an admission fee or enhanced basic medical education could be beneficial to reduce the amount of inappropriate admissions to the Emergency Department (fee: patients n = 56 (11.2%) vs. staff n = 27 (67.5%), $p < 0.001$; education: patients n = 51 (10.2%) vs. staff n = 16 (40.0%), $p < 0.001$).

4. Discussion

In this study, we found that in contrast to the self-evaluation of patients that were attending the ED without referral from a physician, ED staff believed that a significant portion of medical problems could be treated by a community-based health care facility or by a GP. Moreover, most patients ranked their injuries mainly as mild (45.7%) or moderate (41.7%) in their self-assessment.

Similar to findings from other hospital EDs, most patients perceived their medical case as urgent while medical professionals considered most cases as non-urgent [12,19,29,30]. Although most patients reported that their medical problem could not be solved by a community-based physician or GP, only 2.4% of respondents expected to be admitted to hospital as an inpatient during or after their visit to the ED. This indicates that patients perceive the ED as an outpatient facility of the hospital. Because most patients did not respond to the question

what factors guided their decision to visit the ED instead of a community-based facility the reasons for this decision remain speculative.

Many authors have shown that most patients place importance on a high technical quality of their physical examination [3,12,22,32,35]. When asked for specific reasons for the ED visit instead of an appointment with a GP, patients favoured the ED because of the advanced technical equipment and treatment possibilities underlining the claim that the injury cannot be treated by a GP [3,32–34]. In most cases physicians outside a hospital do not have technical equipment like advanced imaging tools, MRIs or access to extensive laboratory facilities. In contrast to the patients' self-assessment, ED staff had the impression that most patients with non-urgent cases attended the ED because of convenient opening hours and waiting periods for doctor's appointments. Shortage of appointment opportunities and consultation hours with GPs were reported by 15.5% of all surveyed patients, which is concordant with data from previous studies [3,22,34]. Dolton and Pathania demonstrated that in England, the number of ED attendances fell by 17.9% when 7-day GP opening was implemented [36]. In Switzerland Chmiel and colleagues showed that an implementation of a hospital-integrated GP reduced the rate of ED attendances by 36.0% [37].

Data published by the German Ministry of Health demonstrated that 10.7% of all German citizens are under cover of a private health insurance while 86.5% are covered by a state insurance and 2.8% have no health insurance [38]. In the current study, only 6.6% of the patients were covered by a private health insurance. In Germany, privately insured patients often have to make an individualized yearly co-payment for medical services, a common economical instrument adopted also by other health care systems [22]. This restriction might lead some patients to a less extensive use of the health services [23,24,39]. When asked whether an admission fee for a visit to the ED could help to reduce the number of unnecessary admissions, ED staff welcomed such a fee. Previous experiences with co-payments for the first contact at a physician's office demonstrated a decline in medical consultations without inhibiting necessary physician contacts [40]. However, an admission fee for ED visits also bears the risk to discriminate against people with low social status. Furthermore, the proportion of patients that underestimate the severity of their medical problems might increase [22].

Low health literacy is associated with a higher number of physician visits and increased use of health care resources [13,22,31,41]. A recent cross-sectional study from Germany revealed that more than half of the participating citizens had limited perceived health literacy [18]. Age, migration background, and low social status were associated with limited perceived health literacy [18]. Most patients did not favour the idea of implementing health education programs. However, based on the data of this survey it is not clear if patients themselves felt that there was a high proportion of unnecessary or non-urgent cases that were presented at the ED. ED staff supported the idea of enhanced basic medical education in general, but the number of supporters was smaller compared to the number of supporters for an admission fee. Several strategies for implementation of education programs have been proposed, e.g. special education nurses that provide discharge teaching in the ED and might help reducing the number of repeat visits [15]. However, to improve basic health literacy of the population that might visit or revisit the ED, a concentrated approach with a set of measures including teaching sessions, guided conversations, supply of information tools and sources, including verbal and visual material, and probably additional manpower is needed [18]. For staff, an admission fee might appear more straightforward and faster to implement than a complex education program. Whether the risks that are associated with an admission fee were taken into consideration by the interviewees remains unclear.

4.1. Limitations

The current study is limited by its single-center design and the imbalance in sizes of groups that were compared. Furthermore, the high number of patients not fully completing the survey might have introduced a bias into the analysis. To confirm that results might be representative a pre-test power analysis was conducted beforehand. Because the Trauma Department, where the survey was conducted, has a special focus on sports traumatology, the median age of patients might be lower compared to other Trauma EDs in the country. The ED staff contained physicians and nurses that were involved in direct patient care. However, with only 22.5%, physicians were a minority compared to the non-academic health-care personnel. ED staff reported a general assessment on presented cases and perceptions of the ED during their shift but not for each surveyed patient. In addition, the staff́s perception of the patient́s reasons to prefer a visit of the ED instead of a GP could not be compared to individual patient responses.

5. Conclusion

In summary, our findings show a discrepancy between patients' and staff's perception for the severity of illness and the emergency case status. Because most of the actual concepts to avoid ED overcrowding are health-system-based, we also suggest consideration of patient-centred reasons for ED visits. Understanding patient-centred reasons and the discrepancy between self-perceived emergencies and minor medical problems might help to reduce inappropriate admissions to the ED. Therefore, the findings of this study can support the initiation of a new health policy discussion upon overcrowded EDs.

Conflict of interest

Not applicable.

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Ethical statement

The Medical Ethics Committee of the Medical Council Westphalia-Lippe approved this study (number of ethical approval: 2015-497-f-S). Written informed consent was obtained from all study participants before participation.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ienj.2019.02.006.

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