

Patients leaving the emergency department without being seen by a physician: a retrospective database analysis

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Summary

QUESTIONS UNDER STUDY: To describe characteristics of patients leaving the emergency department (ED) before being seen by a physician and to identify factors associated with a greater risk of leaving the ED too early.

METHODS: Design: retrospective database analysis. Setting: emergency department (ED) of an urban teaching hospital admitting 60,000 patients per year. Study subjects: all patients older than 18 years admitted to the ED over one year. Collected data: patient's and ED visit characteristics.

RESULTS: Among the 57,645 patients admitted, we identified 2,413 patients (4.2%) who left without being seen (LWBS). LWBS patients were more likely to be male (odds ratio [OR] 1.13, 95% confidence interval [CI 95%]: 1.03–1.23), single (OR 1.12, CI 95%: 1.01–1.23), unemployed (OR 1.27, CI 95%: 1.13–1.44), dependent on welfare (OR 1.29, CI 95%: 1.12–1.50) or Muslim (OR 1.19, CI 95%: 1.00–1.42). LWBS patients were also more likely to present with less acute emergency triage levels. As complaints, alcohol and/or other substance abuse (OR 6.08, CI 95%: 5.04–7.34), neurological problems (OR 2.23, CI 95%: 1.88–2.64) or dermatological problems (OR 1.63, CI 95%: 1.37–1.94) were over-represented in this population. Patients admitted at weekends (OR 1.27, 95% CI: 1.16–1.39) and/or during the night (OR = 2.67, 95% C: 2.35–3.02) also were at higher risk of leaving the ED prematurely.

CONCLUSIONS: LWBS patients share some characteristics and a better understanding of these characteristics as well as time and logistic issues could ease to implement strategies to reduce premature leaving from the ED.

Key words: left without being seen (LWBS); substance abuse; frail population

Introduction

Left without being seen (LWBS) patients represent between 1.4% and 15% of all emergency department (ED) visits each year [1–4]. Leaving the ED too early may lead to unrecognised serious medical conditions, additional costs, recurrent ED or primary care physicians' visits and potentially avoidable hospitalisation [4–10].

Available literature, mainly from the US, suggests that, in comparison with patients who receive care in the ED, LWBS patients are predominantly younger, males and self-referring. Many are also uninsured or have a low socioeconomic status and leave preferentially the ED at times of the day when ED overcrowding is at the highest [4, 6, 11–13]. In Europe little is known about LWBS patient characteristics, except in the United Kingdom: in one study LWBS rate ranged between 0% and 14.5%. LWBS patients were predominantly males, and 12.7% of them re-attended within seven days of their initial presentation to the same ED [14]. The goal of this study was to describe characteristics of LWBS patients and to identify factors that were associated with a greater risk of leaving the ED too early, in a Swiss primary and tertiary urban teaching hospital using a database retrospective analysis.

Material and methods

Design

We performed a retrospective analysis of the administrative database and electronic medical record of the population of patients.

This project was initially designed as a master thesis for two medical students (Bérénice Cramer, Mathilde Schaller) and was also part of a quality improvement project. Therefore, we did not register this trial in an international database, although our ethics committee approved the protocol.

Selection of participants

All patients older than 18 years admitted to our ED during the year 2008 were eligible for the study.

Study setting

The study was conducted at the Geneva University Hospital, an 800-bed primary and tertiary urban teaching hospital with 60,000 annual ED visits.

In our ED triage is the responsibility of a triage nurse who records symptoms, evaluates the severity of the patient's clinical condition and assigns an emergency level of severity in accordance with to the Swiss Emergency Triage Scale (SETS) [15]. The SETS is a four-level scale: (1) life-threatening emergencies (receiving immediate care), (2) urgent conditions (to be seen within 20 minutes), (3) semi-urgent conditions (care to be initiated within 2 hours) and (4) non urgent conditions. Triage information is recorded in the electronic medical record. Following triage patients are dispatched to one of the two areas of our ED (ambulatory care or urgent care area).

Administrative registration immediately follows triage for every patient. Demographic data are recorded in the administrative database that will contain all the information concerning the ED stay. LWBS patients are identified as such in the administrative database after they leave the ED.

Data collection

Administrative database and electronic medical record of all patients admitted to the ED during the study period were analysed to obtain: (1) demographic characteristics (age, sex, nationality, profession, religious preference, marital status); (2) ED visit characteristics (triage category, main complaint at admission and admission mode) and (3) time characteristics (month, day and hour of admission). All data were treated anonymously and this study was approved by our institutional ethics committee.

Data analysis

LWBS patients' characteristics were compared to those of all other patients admitted during the same period to the ED. Unadjusted odds ratios (ORs) of LWBS compared to being seen by a physician were calculated, Chi-square was used to compare differences between groups. Confidence intervals (95%) were computed and p-values <0.05 were considered as statistically significant. Age was our unique continuous variable and ORs were computed using each supplementary year of age for comparison. All other variables included in the model were categorical (see table 1). All variables for which a statistically significant association with LWBS was found in the univariate analyses were introduced in a multivariate logistic regression model (SPSS version 15 for Windows, SPSS Inc., Chicago, IL). Adjusted ORs of LWBS compared with being seen by a physician were computed using this regression model.

Results

During the study period, 59,354 patients were admitted and registered in our administrative database. Patients younger than 18 years (n = 1,709) were excluded and finally 57,645 patients were included for analysis. From them, 2,413 (4.2%) patients were administratively registered but left the ED before being seen by a physician, and were identified as LWBS patients. Triage was completed for 514 other patients who then immediately left the ED, before registration was completed in the administrative database. Thus, we can consider that a total of 2,927 left our ED (4.9% of the overall population). Insufficient data was

available concerning these 514 patients and thus they were not included in the analysis.

Sociodemographic and ED visit characteristics of LWBS patients are described in table 1. In our multivariate model, LWBS patients were more likely to be male (OR 1.13, CI 95%: 1.03–1.23), single (OR 1.12, CI 95%: 1.01–1.23), unemployed (OR 1.27, CI 95%: 1.13–1.44), dependent on welfare (OR 1.29, CI 95%: 1.12–1.50) or Muslims (OR 1.19, CI 95%: 1.00–1.42). Ethnic origin was not associated with a higher risk of leaving the ED without being seen.

LWBS patients were more likely to present with less acute emergency triage levels (3 and 4). Their complaints more frequently concerned alcohol or other substance abuse (OR 6.08, CI 95%: 5.04–7.34), psychiatric (OR 1.25, CI 95%: 1.01–1.55), neurological (OR 2.23, CI 95%: 1.88–2.64), anaphylactic or cutaneous (OR 1.63, CI 95%: 1.37–1.94) or digestive problems (OR 1.29, CI 95%: 1.09–1.52). Patients admitted for follow-up care were also more prone to leave without being seen. Ear-nose-throat (ENT) problems were associated with a lower risk. No significant association was found for other complaints.

Admission mode influenced the risk of leaving the ED too early: self-presenters or patients brought by relatives were more likely to leave the ED prematurely than those brought in by ambulance.

Week-ends (including Friday and Monday) also increased the risk of leaving too early (OR 1.27, 95% CI: 1.16–1.39). Finally, patients were more likely to leave before being seen by the physician when they presented between 4 pm and midnight (OR 2.16, CI95%: 1.96–2.39), or between midnight and 8 am (OR 2.67, CI 95%: 2.35–3.02).

Discussion

In our urban primary and tertiary care hospital ED, 4.2% of ED admitted patients left the ED without being seen. These patients shared some sociodemographic characteristics, presented with lower emergency severity levels, and were more likely to be admitted during off hours. Their complaints were also more likely to concern substance abuse and psychiatric reasons.

LWBS patients represented 4.2% of all annual visits. This result is quite similar to what is shown in other studies, even though the rate of LWBS patients can vary significantly between different ED centres owing to differences in type of population, ED logistic issues, and data collection [14]. These patients were young males, single or unemployed, and benefitting from welfare. These results are consistent with previous similar studies [2].

As shown in other similar studies [1, 16, 17], lower emergency severity levels (SETS levels 3 and 4), were over-represented in our LWBS patient population. For this young population, ED is frequently the sole access to primary care even for non urgent conditions [18]. Although we were not able to correlate the rate of premature leavers with ED crowding, we can hypothesise that this growing population with non-urgent complaints may contribute to ED overcrowding, resulting in more patients leaving without being seen.

Although most patients leaving prematurely were triaged with less urgent problems (SETS levels 3 and 4), we found

Table 1: Demographic and ED visit characteristics of LWBS patients.					
	LWBS	Non-LWBS	Total	Unadjusted OR	Adjusted OR
	n = 2,413	n = 55,232	n = 57,645	OR (CI 95%)	OR (CI 95%)
Sex, n (%)					
Female	1,085 (45)	26,657 (48)	27,742 (48)	Reference	Reference
Male	1,328 (55)	28,575 (52)	29,903 (52)	1.14 (1.04–1.24)	1.13 (1.03–1.23)
Age (years), median (IQR)	36 (27–49)	45 (31–65)	45 (31–65)	0.98 (0.97–0.98)*	0.99 (0.98–0.99)*
Marital status, n (%)					
Married	779 (32.3)	22,216 (40.2)	22,995 (39.9)	Reference	Reference
Single	1,634 (67.7)	33,016 (59.8)	34,650 (60.1)	1.41 (1.29–1.54)	1.12 (1.01–1.23)
Profession status, n (%)					
Active	1,049 (43.5)	23,187 (42.0)	24,236 (42.0)	Reference	Reference
Unemployed	467 (19.4)	7,343 (13.3)	7,810 (13.5)	1.41 (1.26–1.57)	1.27 (1.13–1.44)
Retired	249 (10.3)	14,392 (26.1)	14,641 (25.4)	0.38 (0.33–0.44)	0.92 (0.75–1.14)
Student	233 (9.7)	3,721 (6.7)	3,954 (6.9)	1.38 (1.20–1.60)	0.94 (0.80–1.11)
Social welfare	298 (12.3)	4,954 (9.0)	5,252 (9.1)	1.33 (1.17–1.52)	1.29 (1.12–1.50)
Unknown	117 (4.8)	1,635 (3.0)	1,752 (3.0)		
Religion, n (%)					
Christian	977 (40.5)	26,950 (48.8)	27,927 (48.4)	Reference	Reference
Muslim	256 (10.6)	4,268 (7.7)	4,524 (7.8)	1.65 (1.43–1.90)	1.19 (1.00–1.42)
Other	370 (15.3)	7,719 (14.0)	8,089 (14.0)	1.30 (1.15–1.46)	1.05 (0.93–1.20)
Unknown	810 (33.6)	16,295 (29.5)	17,105 (29.7)	1.37 (1.24–1.51)	1.12 (1.00–1.24)
Emergency level, n (%)					
1	6 (0.2)	2,596 (4.7)	2,602 (4.5)	0.04 (0.02–0.10)	0.06 (0.03–0.14)
2	171 (7.1)	11,485 (20.8)	11,656 (20.3)	0.28 (0.24–0.31)	0.28 (0.24–0.33)
3	2,089 (86.6)	39,627 (71.9)	41,716 (72.5)	Reference	Reference
4	146 (6.1)	1,433 (2.6)	1,579 (2.7)	1.93 (1.62–2.30)	1.89 (1.56–2.29)
Admission mode, n (%)					
Ambulance	549 (22.8)	17,164 (31.1)	17,713 (30.7)	Reference	Reference
Self-presenters	1,362 (56.4)	26,531 (48.0)	27,893 (48.4)	1.61 (1.45–1.78)	1.51 (1.33–1.71)
Brought by relatives	502 (20.8)	11,537 (20.9)	12,039 (20.9)	1.36 (1.20–1.57)	1.30 (1.12–1.51)
Type of complaint					
Trauma	361 (15.0)	10,893 (19.7)	11,254 (19.5)	Reference	Reference
Cardio-pulmonary	117 (4.8)	7,152 (12.9)	7,269 (12.6)	0.49 (0.40–0.61)	1.13 (0.90–1.41)
Substance abuse / intoxication	301 (12.5)	1,393 (2.5)	1,694 (2.9)	6.52 (5.54–7.67)	6.08 (5.04–7.34)
Anaphylaxis/dermatology	241 (10.0)	3,627 (6.6)	3,868 (6.7)	2.01 (1.70–2.37)	1.63 (1.37–1.94)
Digestive	261 (10.8)	6,308 (11.4)	6,569 (11.4)	1.25 (1.06–1.47)	1.29 (1.09–1.52)
Psychiatry	139 (5.8)	3,203 (5.8)	3,342 (5.8)	1.31 (1.07–1.60)	1.25 (1.01–1.55)
Neurology	260 (10.8)	6,090 (11.0)	6,350 (11.0)	1.29 (1.10–1.52)	2.23 (1.88–2.64)
ENT	65 (2.7)	1,865 (3.4)	1,930 (3.3)	1.05 (0.80–1.38)	0.75 (0.56–0.99)
Follow up	172 (7.1)	2,815 (5.1)	2,987 (5.2)	1.84 (1.53–2.22)	2.06 (1.69–2.50)
Months of visits					
January	192 (8)	4,857 (8.8)	5,049 (8.8)	Reference	Reference
February	192 (8)	4,493 (8.1)	4,685 (8.1)	1.08 (0.88–1.33)	1.09 (0.88–1.35)
March	199 (8.2)	4,649 (8.4)	4,848 (8.4)	1.08 (0.88–1.33)	1.06 (0.86–1.31)
April	176 (7.3)	4,475 (8.1)	4,651 (8.1)	1.00 (0.81–1.23)	0.95 (0.76–1.18)
May	180 (7.5)	4,751 (8.6)	4,931 (8.6)	0.96 (0.78–1.18)	0.90 (0.72–1.12)
June	181 (7.5)	4,693 (8.5)	4,874 (8.5)	0.98 (0.79–1.20)	0.89 (0.72–1.11)
July	183 (7.6)	4,795 (8.7)	4,978 (8.6)	0.97 (0.79–1.19)	0.90 (0.73–1.12)
August	239 (9.9)	4,631 (8.4)	4,870 (8.5)	1.31 (1.08–1.79)	1.21 (0.99–1.49)
September	178 (7.4)	4,418 (8)	4,596 (8)	1.02 (0.83–1.26)	0.99 (0.80–1.23)
October	249 (10.3)	4,613 (8.4)	4,862 (8.4)	1.37 (1.13–1.66)	1.44 (1.18–1.76)
November	202 (8.4)	4,299 (7.8)	4,501 (7.8)	1.19 (0.98–1.45)	1.21 (0.98–1.50)
December	242 (10)	4,558 (8.3)	4,800 (8.3)	1.34 (1.11–1.63)	1.35 (1.10–1.65)
Days of visits					
Middle of the week	16.8 (36.4)	448.5 (42.5)	465.3 (42.2)	Reference	Reference
Week-end	29.4 (63.6)	607.9 (57.5)	636.8 (57.8)	1.29 (1.19–1.41)	1.27 (1.16–1.39)
ED admission time					
8 am – 4 pm	748 (31)	27,847 (50.4)	28,595 (49.6)	Reference	Reference
4 pm – midnight	1,120 (46.4)	20,277 (36.7)	21,397 (37.1)	2.06 (1.87–2.26)	2.16 (1.96–2.39)
Midnight – 8 am	545 (22.6)	7,108 (12.9)	7,653 (13.3)	2.85 (2.55–3.20)	2.67 (2.35–3.02)

CI = confidence interval; ED = emergency department; LWBS = left without being seen; OR = odds ratio / *ORs computed for each additional year of life

that a significant number of patients with higher emergency levels may leave the ED before care ($n = 177$) as previously shown [10, 16]. This is of concern, since leaving the ED prematurely can theoretically lead to adverse outcomes reflecting an unsolved medical condition [2, 5, 9]. Moreover, LWBS patients more often have no alternative health provider which may lead to recurrent consultation or early hospitalisation within days following the initial visit [16].

Other ED visits characteristics, especially time and flow concerns were associated with higher risk of leaving the ED prematurely, as other studies have shown [10, 17, 19]. LWBS patients were more likely to be admitted in the evening and the night, or during week-ends including Mondays and Fridays, indirectly reflecting overcrowding and prolonged waiting time. Admission mode also seems to impact the rate of leaving without being seen; at similar emergency levels patients admitted by ambulance less frequently left prematurely compared to self-presenters. This might reflect enhanced anxiety and more serious perception of the medical condition associated with ambulance transportation.

We also identified alcohol and/or medication abuse as strong risk factors for leaving the ED prematurely (OR = 6.08). Similarly, patients admitted for psychiatric reasons were more likely to be LWBS patients. Due to their psychiatric comorbidities, these patients may exhibit lower tolerance to waiting, either due the effect of substance abuse itself or to behavioural issues. In addition, physicians might pay less attention to this frail population with the negative consequence of prolonged waiting times. These associations have not been observed in previous studies, and might reflect the difficulties in the long-term follow-up of these patients with frequent unmet needs.

The lack of private insurance has been shown as a strong risk factor for LWBS. Although health insurance is mandatory in Switzerland, our reimbursement system with high deductibles and co-payments may be a limiting factor for most disadvantaged people. Our retrospective design and the absence of data on health insurance coverage did not allow us to investigate this hypothesis.

In contrast to North American studies [12, 16], we did not identify ethnic origin as a risk factor in our multivariate model. Nevertheless, patients with Muslim religion more frequently left the ED without being seen by a physician, which has not been seen previously. We may hypothesise that these patients are more frequently migrants or recently established in our country and at risk of being poorly integrated into our social healthcare system.

Our study has several limitations. First, its retrospective design left out other important factors such as spoken language, waiting time and ED crowding, insurance affiliation, or presence of a general practitioner. This design and the analysis of an electronic and mainly administrative database also exposed to some limitations: (1) there is a lack of quality control over the data, (2) there is the possibility of having missing items, (3) information collected is restricted to data required for administrative purposes and lacks clinical background.

Without follow-up, the consequences of leaving without being seen could not be evaluated. Moreover, this study was restricted to one year; consequently, LWBS prevalence

could not be assessed for other periods. Nevertheless, incomplete data set shows that the proportion of LWBS patients is stable in our ED (4.1% in 2007, 5.2% in 2009, 4.4% in 2010 and 4.6% in 2011). Results of this study may not reflect the experience of other centres due to its single centre design. Finally, triage was completed on 514 other patients who then immediately left the ED, before registration was completed in the administrative database. Insufficient data was available concerning this subset of patients and thus they were not included in the analysis.

LWBS patients share reasons for ED visits and socio-demographic characteristics that our emergency healthcare system handles with difficulty. Logistic and time issues also play an important role in the risk of leaving prematurely the ED. Several strategies could be implemented in order to lower the proportion of patients who leave without being seen.

Among them, a dedicated area for evaluation might help in situations of overcrowding with low acuity levels. General practitioners, other collaborative centres, or semi-elective consultation centers could be used to improve the situation. In addition, as prolonged waits favours leaving prematurely, a better communication at all steps of the ED evaluation and especially immediate information about expected waiting times should be given to help the patient to better tolerate prolonged waiting [20].

This is the first original paper about LWBS patients in Switzerland. This type of study should certainly be generalised to other ED centres in our country in order to identify LWBS patients' characteristics specific to each region and then develop appropriate interventions to reduce their rate.

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