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Research Article

Uncompleted Visits to the Emergency Department: A Retrospective Analysis of Patients Who Left Without Being Seen or Against Medical Advice

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Abstract

Objective: The purpose of this study was to characterize patients with Uncompleted Visits to The Emergency Department (UVTED) and investigate whether they were at increased risk of adverse outcomes compared to those who completed their visits to the Emergency Department (ED).

Methods: All patients aged 18 or above with UVTED between 1 July 2016 and 31 June 2017 were categorized into two groups: 1) left without being seen (LWBS) and 2) Left Against Medical Advice (LAMA). Patient and visit characteristics were compared to patients who completed their visits to the ED. Logistic regression was used to examine the association between UVTED and visit characteristics and adverse outcomes.

Results: Of 24,193 patients with an unscheduled ED visit, 213 (0.88%) had uncompleted visits (143 LWBS and 70 LAMA). Younger age, male sex, civil status not married, lower triage acuity level, and less comorbidity were factors associated with UVTED ($p<0.001$). Substance abuse was associated with a nine-fold risk of disrupting the visit (OR=9.0, 95% CI, 4.85–16.74). Revisit rates were higher for UVTED, but there was no increased risk of readmission to hospital, and 30-day mortality was zero.

Conclusion: Patients with UVTED make up only a small fraction of total ED visits. Younger unmarried males with low triage levels and patients with a history of substance abuse are likely to disrupt their visits to the ED. However, patients with UVTED do not pose a significant health concern.

Keywords: *Left against medical advice, LAMA; left without being seen, LWBS; emergency department, ED*

Abbreviations: AUH: Aarhus University Hospital; CCI: Charlson Comorbidity Index; CVTED: Completed visits to the Emergency Department; DEPT: Danish Emergency Process Triage; ED: Emergency Department; ICD-10: International Classification of Diseases, 10th revision; LAMA: Left against medical advice; LWBS: Left Without Being Seen; MTS: Manchester Triage System; STROBE: Strengthening the Reporting of Observational Studies in Epidemiology; UVTED: Uncompleted Visits to the Emergency Department

Introduction

Uncompleted visits to the Emergency Department (ED) are frequently encountered by healthcare professionals and have been suggested to represent a quality and safety concern. Patients who leave the ED without being seen by a physician (LWBS) and patients who Leave Against Medical Advice (LAMA) have been reported to make up between less than 1% and up to 15% of ED patients across the world; LWBS rates are higher than LAMA rates [1-3]. Recent studies have demonstrated a variability in risk factors and associated outcomes that may depend on both patient and hospital factors [1,4]. These factors include younger age, male sex, lower triage acuity level, substance abuse, overcrowding, long wait times, and dissatisfac-

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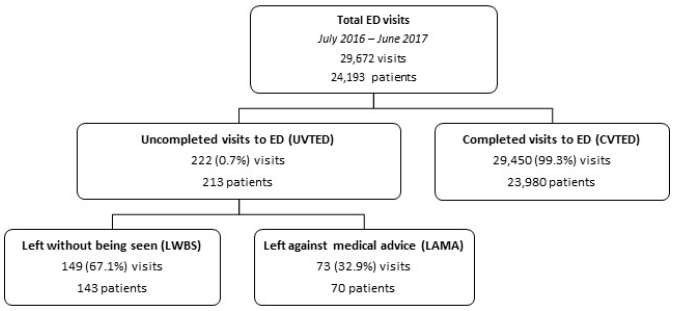

Figure 1: Emergency department visits between July 2016 and June 2017.

tion with the provided care [5,6]. Besides compromising patient safety due to potentially delayed diagnosis and intervention, higher short-term recidivism and admission rates, diminished trust in the healthcare system, and poor utilization of hospital resources are also of concern.

Understanding the underlying factors and detecting potential at-risk patients are crucial for enhancing the overall quality of the healthcare services provided in EDs and the optimization of hospital resources. Most studies concerning LWBS and LAMA patients have been conducted in North America and Australia [1]. Previous studies have identified risk factors associated with refusal of ED care. However, few studies have described the consequences of the uncompletion of ED visits, and the incidence of adverse outcomes remains to be further investigated.

The primary aim of this study was to describe the characteristics of patients with uncompleted visits (both LWBS and LAMA) to the ED of a Danish urban teaching hospital, including the frequency and severity of adverse outcomes. These characteristics were also compared to patients who completed their visits to the ED.

Methods

Study Design

This study was conducted as a single-center retrospective cohort study on patients with Uncompleted Visits to The ED (UVTED) at Aarhus University Hospital (AUH) over a one-year period. The data were reported according to the STROBE guidelines [7].

Data access was granted by the Danish Patient Safety Authority (no.: w3-3013-2615/1) and the Danish Data Protection Agency (no.: 1-16-02-371-18).

Study Setting

The study was undertaken at Aarhus University Hospital in Aarhus, Denmark. The hospital serves a population of 350,000 people and receives major trauma patients from the entire Central Denmark region (1.3 million people). Throughout the study period, the ED provided emergency medical care to all acute patients, except acute obstetric patients, psychiatric patients, and patients with suspected stroke or acute ST-elevation myocardial infarction.

All patients presenting to the ED are triaged by an experienced nurse according to the Danish Emergency Process Triage (DEPT), except for patients received by coded rapid-response teams (i.e., major traumas, medical, and surgical emergencies). DEPT is a clinical risk assessment tool that categorizes patients into five color-coded priority levels based on chief complaints and vital signs. It was modified from the Manchester Triage

Table 1: Study population characteristics and outcomes by UVTED: Uncompleted Visits to The Emergency Department; CVTED: Completed Visits to The Emergency Department; n: Number of Patients; CCI: Charlson Comorbidity Index.

	Uncompleted visits to ED		Completed visits to ED		p-value
	n	(%)	n	(%)	
Patient demographics					
No. of patients	213	(0.9)	23,980	(99.2)	
Sex					**< 0.001**
Male	158	(74.2)	12,275	(51.2)	
Female	55	(25.8)	11,705	(48.8)	
Age					**< 0.001**
≤ 60	183	(85.9)	17,117	(71.4)	
≥ 61	30	(14.1)	6,863	(28.6)	
Marital status*					**< 0.001**
Married or civil partnership	46	(22.4)	7,906	(35.9)	
Not married	159	(77.6)	14,120	(58.8)	
Visit characteristics					
Triage**					**< 0.001**
Blue or green	125	(76.7)	10,513	(54.6)	
Yellow or orange	38	(23.3)	8,578	(44.6)	
Red	-	-	159	(0.8)	
CCI					**< 0.001**
0	152	(71.4)	13,447	(56.1)	
1–3	57	(26.8)	8,359	(34.9)	
≥ 4	4	(1.9)	2,174	(9.1)	
Day of visit					0.378
Weekday	158	(74.2)	17,131	(71.4)	
Weekend	55	(25.8)	6,849	(28.6)	
Time of visit					**0.021**
Day (08–17.59)	122	(57.3)	15,569	(64.9)	
Evening (18–23.59)	66	(31.0)	5,519	(23.0)	
Night (00–07.59)	25	(11.7)	2,892	(12.1)	
Radiology					**< 0.001**
Yes	9	(4.2)	5,044	(21.0)	
No	204	(95.8)	18,936	(79.0)	
Mental health disorder					0.476
Yes	-	-	57	(0.2)	
Substance abuse					**< 0.001**
Yes	14	(6.6)	145	(0.6)	
Revisit within 7 days					**< 0.001**
Yes	47	(22.1)	1110	(4.6)	
Revisit within 30 days					**< 0.001**
Yes	57***	(26.8)	1903	(7.9)	
Admission within 7 days					0.264
Yes	8	(3.8)	610	(2.5)	
Admission within 30 days					0.446
Yes	12	(5.6)	1,089	(4.5)	

Significant *p-values* are marked in bold.
*A total of 1,962 patients were excluded due to missing data.
**A total of 4,647 patients were excluded due to missing data. 133 patients were not triaged and therefore excluded.
***A total of 1 patient revisited twice within 30 days, resulting in 58 total revisits.

Table 2: Crude and adjusted logistic regression UVTED: Uncompleted Visits to the Emergency Department by triage, day of visit, time of visit, CCI, radiology, substance abuse, revisit, and admission to hospital within 7 or 30 days; n: Number of Patients; CCI: Charlson Comorbidity Index; OR: Odds Ratio; CI: Confidence Interval.

	Patients		UVTED		Crude OR		Adjusted OR†	
	n	(%)	n	(%)	OR	(95% CI)	OR	(95% CI)
All cases	23,980	(100)	213	(0.9)				
Triage'								
Blue + green	10,513	(43.8)	125	(76.7)	1	(ref)	1	(ref)
Yellow + orange	8,578	(35.8)	38	(23.3)	0.37*	(0.26–0.54)	**0.43***	(0.30–0.63)
Day of visit								
Week-end	6,849	(28.6)	55	(25.8)	1	(ref)	1	(ref)
Weekday	17,131	(71.4)	158	(74.2)	1.15	(0.84–1.56)	1.13	(0.83–1.55)
Time of visit								
Night (00–07.59)	2,892	(12.1)	25	(11.7)	1	(ref)	1	(ref)
Day (08–17.59)	15,569	(64,9)	122	(57.3)	0.90	(0.59–1.40)	0.97	(0.63–1.50)
Evening (18–23.59)	5,519	(23.0)	66	(31.0)	1.38	(0.87–2.20)	1.46	(0.92–2.33)
CCI								
0	13,447	(56.1)	152	(71.4)	1	(ref)	1	(ref)
1–3	8,359	(34.9)	57	(26.8)	0.60*	(0.44–0.82)	0.95	(0.64–1.43)
≥4	2,178	(9.1)	4	(1.9)	0.16*	(0.06–0.44)	0.24	(0.05–1.08)
Radiol-ogy								
No	18,936	(79.0)	9	(4.2)	1	(ref)	1	(ref)
Yes	5,044	(20.1)	204	(95.8)	0.17*	(0.08–0.32)	**0.19***	(0.09–0.38)
Sub-stance abuse								
No	23,835	(99.4)	14	(93.4)	1	(ref)	1	(ref)
Yes	145	(0.6)	199	(6.6)	11.56*	(6.57–20.37)	**9.0***	(4.85–16.74)
Revisit 7 days								
No	22,870	(95.4)	166	(77.9)	1	(ref)	1	(ref)
Yes	1,110	(4.6)	47	(22.1)	5.83	(4.2–8.11)	**6.64***	(4.71–9.37)
Revisit 30 days								
No	22,077	(92.0)	156	(73.2)	1	(ref)	1	(ref)
Yes	1,903	(7.94)	57	(26.8)	4.24	(3.12–5.76)	**4.95***	(3.59–6.82)
Admis-sion within 7 days								
No	23,370	(97.5)	205	(96.2)	1	(ref)	1	(ref)
Yes	610	(2.54)	8	(3.76)	1.50	(0.73–3.04)	**2.07***	(1.01–4.25)
Admis-sion within 30 days								
No	22,891	(95.6)	201	(94.4)	1	(ref)	1	(ref)
Yes	1,089	(4.5)	12	(5.63)	1.25	(0.70–2.25)	1.78	(0.96–3.30)

Odds-ratio > 1 indicates an increased risk of UVTED; significant ORs are marked with bold and "*." ref: reference groups

**p-value < 0.05*

† Adjusted for age, sex, and marital status

´A total of 301 patients were excluded if they had a triage level of red or not triaged. A total of 4,591 patients were excluded due to missing data.

Table 3: Study population characteristics and outcome by LAMA: Left Against Medical Advice; LWBS: Left Without Being Seen; n: Number of Ppatients; CCI: Charlson Comorbidity Index.

	LAMA		LWBS		p-value
	n	(%)	n	(%)	
Patient demographics					
No. of patients	70	(33.9)	143	(67.1)	
Sex					0.305
Male	55	(78.6)	103	(72.0)	
Female	15	(21.4)	40	(28.0)	
Age					0.082
≤60	56	(80.0)	127	(88.8)	
≥61	14	(20.0)	13	(11.2)	
Marital status*					0.438
Married	12	(19.1)	34	(23.9)	
Not married	51	(81.0)	108	(76.1)	
Visit characteristics					
Triage**					**< 0.001**
Blue + green	30	(53.6)	95	(88.8)	
Yellow + orange	26	(46.4)	12	(11.2)	
Red	-		-		
Not Triaged	-		-		
CCI					**0.016**
0	42	(60.0)	110	(76.9)	
1–3	25	(35.7)	32	(22.4)	
≥ 4	3	(4.3)	1	(0.7)	
Day of visit					0.091
Weekday	57	(81.4)	101	(70.6)	
Weekend	13	(18.6)	42	(29.4)	
Time of visit					0.721
Day (08-17.59)	39	(55.7)	83	(58.0)	
Evening (18-23.59)	21	(30.0)	45	(31.5)	
Night (00-07.59)	10	(14.3)	15	(10.5)	
Substance abuse					**0.010**
Yes	9	(12.9)	5	(3.5)	
No	61	(87.1)	138	(96.5)	
Radiology					**< 0.001**
Yes	8	(11.4)	1	(0.7)	
No	62	(88.6)	142	(99.3)	

Significant p-*values* < 0.05 are marked with bold.

*A total of 8 patients were excluded due to missing data.

**A total of 50 patients were excluded due to missing data.

System (MTS) and aims to prioritize patients according to the severity of their condition and ensure prompt treatment of the most urgent medical needs [8-10].

Participants

All patients aged 18 and above with an unscheduled visit to the ED between 1 July 2016 and 31 June 2017 with a Danish personal identification number were included. Patients with uncompleted visits to the ED were categorized into two groups: (1) patients who Left Without Being Seen (LWBS) and (2) patients who Left Against Medical Advice (LAMA), based on the World Health Organization's International Classification of Disease (ICD10). The index visit was defined as the first visit in which a patient appeared as either LWBS or LAMA. Patients with uncompleted visits were compared to patients who Completed their Visits to The ED during the study period (CVTED).

Data Source

Patients were identified through the Patient Administrative

System, and data were extracted from electronic medical records and the Danish Civil Registration System.

Outcome Measures

The primary outcomes were patient demographics (age, sex, and marital status) and ED visit characteristics, including patient health history (triage level, day and time of visit, time spent in the ED, Charlson Comorbidity Index (CCI) [11,12], mental health disorder, substance abuse, and radiology). Secondary outcome measures were revisit and admission to hospital within 7 and 30 days, and mortality within 7 and 30 days. A revisit was defined as a new ED contact without admission between 12 hours and 30 days, whereas admission to the hospital was defined as an unplanned admission between 12 hours and 30 days after the index visit.

Data Analysis

Descriptive analyses were performed to investigate the distribution of UVTED and CVTED. Categorical variables were given as numbers and proportions, and continuous data as mean and standard deviations. A chi-square test was used to compare patient characteristics between UVTED and CVTED. The same procedure was applied to LWBS and LAMA. Crude and adjusted analyses were conducted for UVTED using logistic regression to examine the association with triage level, day of visit, time of visit, CCI, radiology, substance abuse, revisit, and admission to the hospital within 30 days. The adjusted Odds Ratios (ORs) were aligned for sex, age, and marital status. The results were given in odds ratios (OR) with a 95% confidence interval (95% CI). All analyses were performed using STATA/BE version 17.0 (Stata Corp., College Station, TX). The significance level was set at p-value<0.05.

Results

In the study period, a total of 24,193 patients with a unique personal identification number had an unscheduled visit to the ED, distributed on 29,672 visits (Figure 1). The cohort included 213 (0.88%) patients with an uncompleted visit to the ED, of which 143 patients left without being seen by a physician, and 70 patients left against medical advice. No patients appeared in both the LWBS or LAMA groups. During this one-year period, five patients disrupted their visits to the ED twice, whereas two patients had a total of three uncompleted visits to the ED.

UVTED vs. CVTED

Patient and visit characteristics are listed in Table 1. Patients with UVTED were predominantly males (74.2%), aged ≤60 years (85.9%), and not married (77.6%) (p<0.001, Table 1). Patients with UVTED were significantly likelier to have lower comorbidity scores and triage levels than CVTED. While 23.3% of the patients with uncompleted visits triaged yellow or orange, none of these patients had a triage level of red, requiring immediate attention. The day of visit presented no significant difference between the two groups. In both groups, most visits occurred during the daytime but with patients likelier to disrupt their visits during evening time compared to CVTED. The mean time spent in the ED for patients in the UVTED group was 3.17 hours (SD=3.69 hours), whereas the mean time spent in the ED for patients in the CVTED group was 6.22 hours (SD=15.75 hours) (p<0.0001). Patients with completed visits were likely to have undergone radiological examinations during their time in the ED. Substance abuse occurred in 6.6% of patients with UVTED compared to 0.6% for patients with CVTED (p<0.001). Mental health disorders were not registered in the UVTED group and were seen only in 0.2% of CVTED patients.

Table 2 lists the variables associated with UVTED compared to patients with CVTED. Yellow or orange triage level presented significantly less risk of an uncompleted visit to the ED (OR=0.43, 95% CI 0.03-0.63), whereas substance abuse presented a nine-fold increased risk of disrupting the ED visit (OR=9.0, 95% CI 4.85-16.74). Odds ratios were adjusted for age, sex, and marital status.

LAMA vs. LWBS

Overall, LWBS was more common than LAMA. No difference in sex, age, marital status, day, time of visit, or time spent in the ED was found between the LAMA and LWBS groups (Table 3). Of those with uncompleted visits to the ED, patients who left against medical advice were predominantly of higher CCI and triage levels (yellow/orange triage level 46.4% vs. 11.2%, p<0.001). Substance abuse was significantly more prevalent in the LAMA group (12.9% vs. 3.5%, p<0.010). Radiology was performed in 11.4% of the LAMA groups but only in 0.7% of LWBS cases (p<0.001). The mean time spent in the ED was 3.2 hours in both groups, with no significant difference.

Revisits, Hospital Admissions, and Mortality

In the LWBS group, five patients were admitted to the hospital within seven days from the index visit, whereas six patients were admitted within 30 days. In the LAMA group, three patients were admitted within seven days from the index visit, whereas six patients were admitted within 30 days. Patients with UVTED had significantly higher revisit rates compared to patients with CVTED (Table 1). The adjusted OR for revisit to the ED within seven days was 6.64 (95% CI 4.71–9.37) and 4.95 for revisit to the ED within 30 days (95% CI 3.59–6.82) (Table 2). The adjusted OR for admission to hospital within seven days was on the border of significance (OR = 2.07, 95% CI 1.01–4.25). No difference by admission to hospital within 30 days was found between the UVTED and CVTED groups (Table 1). Mortality within both 7 and 30 days was 0 among patients with uncompleted visits to the ED.

Discussion

The prevalence of UVTED in our study was 0.88%, thus at the lower end of the rates reported globally. In accordance with findings from previous studies, patients who abandoned the ED were predominantly younger unmarried males. No increased risk of adverse outcomes was found in patients with UVTED compared to CVTED.

We found a significant correlation between lower acuity levels and the risk of UVTED, indicating that patients who chose to leave the ED did not present with emergent problems. Even though patients with UVTED revisited the ED more frequently than patients with CVTED, they did not seem to require admission to the hospital upon their revisit more often than those with CVTED. Furthermore, no deaths occurred within 30 days of a UVTED, indicating that patients who abandoned the ED before attending or completing their visit were not at increased risk of adverse outcomes. A considerable fraction of LWBS (25%) and LAMA (16%) patients revisited the ED within seven days, which implies that these patients likely did not seek help elsewhere yet still had a medical complaint for which they were seeking medical consultancy. It is unknown whether the remaining patients with UVTED resolved their problems elsewhere, but

other studies have shown that these patients often go to their general practitioners after abandoning the ED [14]. Moreover, patients with UVTED were likely to revisit the ED within 7 and 30 days compared to patients with CVTED, whereas only 4.6% of patients revisited within 7 days, and 7.9% revisited within 30 days. These findings could again suggest that reducing UVTED rates might be of interest not in safety concerns but in terms of preventing short-term recidivism, leading to poor utilization of hospital resources.

Long wait times are reported as one of the most common reasons that patients choose to LWBS or LAMA [1,14-16]; unfortunately, data on the exact reasons why patients chose to disrupt their visits to the ED were not available in this study. However, for the LWBS group, the mean time spent in the ED corresponded to the wait time, but data on the actual wait time from triage to being seen by a physician in the LAMA and CVTED groups were not available. The mean time spent in the ED for both LWBS and LAMA patients was 3.2 hours, but during this time, a higher fraction of LAMA patients underwent radiological exams, indicating that they were evaluated by healthcare professionals. These findings may suggest that LWBS patients waited longer before being attended to, which might explain why they chose to leave. In comparison, the mean wait time for LWBS patients was 1.7 hours (104.2 minutes) at a Swiss tertiary facility [17]. One study showed that the quality of the wait time was more important than the actual wait time [18]. Suggestions for improvement included information about the time remaining and visits from a doctor while waiting. Some studies have demonstrated higher LWBS rates during weekends and public holidays, but that was not the case in our study [1]. However, we found that patients were likelier to have UVTED in the evening.

Our findings show that LAMA patients are more comorbid and have higher triage acuity levels than LWBS patients, suggesting that this group of patients requires more attention. This finding is contrary to a previous study showing that LAMA patients are quite similar to LWBS [2]. In general, more studies have been conducted on LWBS patients, whereas data on LAMA patients are limited. This might be due to the fact that LWBS is more common than LAMA. Factors such as dissatisfaction with the ED facility or provided care, negative interactions with medical staff, expectations not being met, or not wanting to undergo recommended tests/treatments have been stated as common reasons for LAMA patients [15,17]. Further investigations could be done on the LAMA group to identify such reasons in order to improve the quality of healthcare provided.

We found that patients with a history of substance abuse were at a significantly increased risk of abandoning the ED, confirming the findings of previous studies [19]. Surprisingly, a history of mental health disorders has rarely been registered. However, it should be taken into consideration that, at the time of the study period, psychiatric patients were seen in a separate psychiatry emergency department unless their primary complaint was of a somatical character. It has been suggested that patients with mental health disorders are likely to disrupt their visits to the ED, and further investigations are necessary to assess whether these patients are at risk of UVTED in Danish EDs [20].

In general, our findings do not raise a significant safety concern or the need for any major interventions; however, the number of individuals not getting the help they seek should not be neglected.

Limitations

This study was conducted as a single-center retrospective study, and our ability to draw conclusions on generalizability is therefore limited. Our results may not be applicable to EDs in countries with different healthcare setups and where private health insurance plays a central role. We did not have exact measures of wait time or qualitative information on why patients chose to LWBS or LAMA. In the context of emergency care, revisits after 30 days might be less related to index visits. Lastly, we were only able to determine revisit rates to the same facility.

Conclusion

Our study showed that patients with UVTED made up only a small fraction of the total ED visits. Younger unmarried males with low triage levels were likely to disrupt their visits to the ED, as were patients with a history of substance abuse. LAMA patients had higher comorbidity and triage acuity levels than LWBS patients. While revisit rates to the ED were higher for patients with LWBS or LAMA, they did not appear to be at increased risk of adverse outcomes.

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