

“Should I stay or Should I go”: patient who leave Emergency Department of an Italian Third-Level Teaching Hospital

Alberto Carli¹, Francesca Moretti², Giulia Giovanazzi¹, Valentina Niero¹, Valeria Perilli³, Giovanna Ghirlanda⁴, Chiara Bovo⁴, Stefano Tardivo²

¹ School of Specialization in Hygiene and Preventive Medicine - University of Verona, Verona, Italy, ² Department of Diagnostics and Public Health, University of Verona, Verona, Italy, ³ Management Control Unit, University Hospital of Verona, Verona, Italy, ⁴ Medical Direction, University Hospital of Verona, Verona, Italy

Summary. *Background and Aim:* Patients could leave ED not receiving the desired care either Without Being Seen by a doctor (LWBS) or Against Medical Advice (DAMA). In term of care quality, LWBS may be related to inappropriate access and process of care, while DAMA may lead to increased risk of mortality and re-admissions. This study aims to identify frequency of patients who leave ED, determine their characteristics and identify associated factor. *Methods:* This was a retrospective observational study of patients that attended EDs of University Hospital Trust of Verona in 2017. Demographic and ED access associated variables were collected for LWBS, DAMA and completed-ED-treatment patients. Univariate and multivariate data analyses was based on EMUR-PS administrative data. *Results:* 5,901 of 127,180 ED accesses were uncompleted treatment (4.64%); LWBS were 4,664 (79.04%) and DAMA 1,237 (20.96%). Those who leave ED tended to be younger (39.35 vs. 45.56, $p < 0.01$). Independent factors associated with ED leaving resulted: i) non-urgent triage category (OR: 2.941, 95%CI: 2.405-3.596) ii) non-Italian-nationality (OR: 1.695, 95%CI: 1.493-1.924) and requiring psychiatric consult (OR: 6.16 95%CI 4.82-7.87); while protective factors resulted: i) female gender (OR: 0.713, 95%CI: 0.633-0.803); i) Paediatric ED (OR: 0.593, 95%CI: 0.437-0.805); ii) Obstetrics-Gynaecology ED (OR: 0.284, 95%CI: 0.193-0.416) iii) inclusion in fast track pathways (OR: 0.747, 95%CI: 0.602-0.927). Higher ED leaving rate were observed during night-time and Sunday, either overcrowding resulted not associated. *Conclusion:* Results show the necessity to implement primary care-ED integrated pathway, mainly in frail sub-population, improve awareness on healthcare service use and refine communication skills in ED-team. (www.actabiomedica.it)

Key words: Emergency Department, patients who leave emergency department, DAMA, LWBS, quality of ED care

Background

Emergency Departments need to provide adequate acute medical care in limited time frames; patients could leave ED not receiving the desired care either Without Being Seen by a doctor (Leave Without Being Seen by a doctor, LWBS) or Against Medical Advice (Discharge Against Medical Advice, DAMA). Self-discharge occurrence represents an im-

portant marker of emergency care quality; LWBS may be related to healthcare service inappropriate access and process of care, while DAMA rate may lead to an increased risk of mortality and re-admissions.

A survey analysis conducted by using the 2009-2011 National Hospital Ambulatory Medical Care Survey (NHAMCS) in the United States have shown that 2.62% of patients left ED without completing medical care; of these visits 67.7% were LWBS

and 32.3% were DAMA patients. Increased rates of LWBS patients were associated with higher ED volumes and ED crowding; these patients identified waiting times as a major reason for leaving before medical assessment. Conversely, high rates of patients DAMA have not been shown to correlate with ED overcrowding, but were older and had higher acuity visits than the LWBS patients (1). Previous research evidenced that many of these patients, who leave before completing ED care, were vulnerable, with poor overall access to care (2).

These data underline the importance to clearly identify the reasons that lead patients to leave ED, in order to optimize the quality of acute medical care. However only limited data have been published related to Italian context. Available evidence on this topic refer mainly to American or Australian healthcare system and it cannot be directly transferred to the National Italian healthcare system. Up to our knowledge the only Italian study on this issue is limited to LWBS patients and showed a rate of 1.34% (3).

This study aims to identify frequency of uncompleted ED admission, determine characteristics of self-discharged patients and subsequently recognise patient and organization factors associated with early ED leaving compared to completed ED care episodes.

Methods

A retrospective observational study was conducted. All admissions to EDs of University Hospital Trust of Verona during 2017 were included; accesses in General, Paediatric and Obstetrics-Gynecology Emergency Departments were considered. Admissions for non-medical purposes as work-related accident certificates (I.N.A.I.L. certificates), red triage category (life threatening conditions) and people dead on arrival at ED were excluded from the analysis.

Data were collected from the information system for monitoring assistance in Emergency-Urgency (EMUR_PS) and from ED medical chart. From EMUR_PS dataset were collected the following information: gender, age, level of consciousness upon arrival, trauma or non trauma status, triage category (1-emergent/red, 2-urgent/yellow, 3-semi-urgent/

green and 4-not urgent/white), time of presentation, admission and discharge and patient's nationality. From ED medical charts were collected information regarding patient's admission in a fast track pathway (orthopedic and traumatological, ophthalmological, dermatological, ENT fast track pathways), mode of referral (own decision or referred by physician), requirement of a psychiatric consult. Patients were stratified in 9 age-groups. Moreover, the daily number of ED admissions was calculated and its percentile distribution was used to classify ED crowding in five classes (from 1-very low affluence to 5-very high affluence).

Data Analysis

All analyses were performed using ED Admission as unit of analysis. Patients who left ED at their own decision were classified by EMUR_PS "outcome status" variable into LWBS and DAMA; they were compared to admission of those who completed ED-treatment with respect to all collected variables.

Categorical data were compared using the Chi-squared test while T-test or Mann-Whitney test were performed for continuous variables. Logistic univariate analyses were performed to identify variables affecting decision to leave ED before completing all requested care; significant associated variables were included in the multiple logistic regression model to calculate adjusted Odds Ratio. A level of significant of 0.05 was considered for all the performed analyses. All analyses were performed using STATA version 15.

Results

A total of 133,418 episodes of care accesses to the AOUI Verona Emergency Departments occurred during 2017, involving 90,809 individual patients. Among these admissions, 4,345 were non-medical purposes referred accesses (issuing I.N.A.I.L. certificates) and 1,893 were red triage category; they were excluded leaving a final dataset of 127,180 ED visits among 89,595 patients. 121,279 episodes of care completed ED treatment while 5,901 (4.64%) resulted uncompleted; LWBS were 4,664 (79.04%) and DAMA were 1,237 (20.96%).

Table 1 shows ED Access general characteristics for completed and uncompleted ED treatment. Those who leave ED before or against medical advice compared to those who completed ED care tended to be younger (mean age of 39.35 vs. 45.56, $p < 0.01$). Among patient who leave ED higher frequencies were observed in the 35 to 44 years old (16.94%) and in the 55 to 64 years old age groups (16.04%). Those who leave ED tended to have a higher male proportion (54.65% vs. 47.11%, $p < 0.01$; OR: 0.739, 95%CI: 0.701-0.778), a higher prevalence of not Italian citizens (26.44% vs. 19.23%, $p < 0.01$; OR: 1.509, 95%CI: 1.422-1.602) and higher rate of patient referred by own decision (90.88% vs. 80.10%, $p < 0.01$; OR: 2.475, 95%CI: 2.263-2.708).

Among ED visits characteristics, self discharged patients showed an higher prevalence of white triage category (52.11% vs 24.43%, $p < 0.01$; OR: 17.576; 95%CI: 15.209-20.313), an higher requirement of a psychiatric consult (6.31% vs. 1.09%, $p < 0.01$; OR: 6.116, 95%CI: 4.832-7.740) and an higher proportion of traumatic complaints (26.40% vs. 22.30%, $p < 0.01$; OR: 0.800, 95%CI: 0.754-0.849). Self-discharged patients attended more frequently to General ED (92.17% vs. 77.74%, $p < 0.01$), out of a fast track pathway (1.95% vs. 9.28%, $p < 0.01$; OR: 0.183, 95%CI: 0.152-0.222), during evening time - from 6.00 pm to 11.59 pm (44.28% vs. 24.69%, $p < 0.01$; OR: 1.820, 95%CI: 1.650-2.007), with an higher proportion on Sunday and Monday (respectively 15.73% vs. 13.56%, $p < 0.01$ and 17.88 vs. 15.40%, $p < 0.01$; OR: 1.001, 95%CI: 0.914-1.096) and during spring and winter (respectively 29.57% vs. 25.78% and 27.37% vs. 24.83% $p < 0.01$). In January and April the highest self discharge frequency (10.34% and 11.15% respectively) was observed. Finally regarding "daily crowding", an increasing leaving risk trend was identified as increased the ED affluence (Table 1).

Once adjusted, according to Multivariate regression model, significant associated variables with the ED leaving resulted: lower age group, male patient, lack of inclusion in fast track pathway, General ED access, Sunday as day of presentation, triaged as non urgent or semi urgent, necessity of psychiatric consult, foreign origin and night and evening as time of presentation. Table 2 shows the results of multivariate analysis.

Discussion

Nowadays patient's dissatisfaction in the provided care is becoming a major concern for healthcare systems, that is particularly evident in service access. Whenever waiting time becomes too long in relation to perceived need to medical intervention, the Emergency department becomes the only citizen's opportunity to get immediate service's access; as a consequence, ED becomes overcrowded by low acuity pathologies (4). Reducing ED leaving occurrence represents a major goal of healthcare systems as regards to ED process quality and safety of care; identifying factor associated to higher rate of ED leaving is essential to implement targeted intervention.

Among patients who leave ED before completing care about eighty percent were LWBS, demonstrating a higher rate compared to previous studies; the reason could be found in different healthcare systems and the relative distinct patient payment participation (2).

Multivariate analysis evidences the highest risk of ED leaving among paediatric age group, up to more than three times higher than elderly; on the other hand, Paediatric ED access resulted a significant protective factor. This apparently contrasting result may be related to improper use of general rather than paediatric ED. Such result underlines the importance to realize dedicated pathway for paediatric subpopulation; moreover, awareness of the factors involved in ED service parent's perception should facilitate successful interventions for this potentially vulnerable group (5).

Patients requiring psychiatric consult, as previously evidenced by other studies, showed higher risk of self-discharge; this result refers only to DAMA patients since in LWBS patients it can't be estimated. According to literature, ED leaving among psychiatric patients is not ascribable only to patient's but also to provider's factors (6,7). The need to develop adequate communicative and relational skills is particularly important for this specific subgroup. Psychiatric patients represent a frail chronic population and an adequate management of acute state may be essential to prevent relapses; a sub-analysis on this population could be helpful to improve ED care with dedicated pathway.

Like other studies we found higher risk of LWBS and DAMA in male population and in foreign origin

Table 1. Characteristics of uncompleted and completed ED accesses

Characteristics	Uncompleted ED treatment	Completed ED treatment	Unadjusted Odds Ratio	p value	OR 95% CI
Age (yr.)	39,35 (±26.65)	45,56 (±21.31)			
Age Group (yr.)					
0-4	573 (9.73)	15,626 (12.89)	2.290	0.000	2.003-2.619
5-14	211 (3.58)	3,867 (3.19)	3.408	0.000	2.865-4.055
15-24	830 (14.09)	10,147 (8.37)	5.110	0.000	4.503-5.799
25-34	942 (15.99)	16,059 (13.24)	3.664	0.000	3.238-4.147
35-44	998 (16.94)	15,502 (12.78)	4.022	0.000	3.557-4.547
45-54	945 (16.04)	14,26 (11.76)	4.140	0.000	3.658-4.685
55-64	656 (11.14)	11,645 (9.60)	3.519	0.000	3.087-4.012
65-74	381 (6.47)	11,975 (9.88)	1.987	0.000	1.717-2.300
>74	355 (6.03)	22,179 (18.29)	1		
Gender					
Male	3,225 (54.65)	57,134 (47.11)	1		
Female	2,676 (45.35)	64,145 (52.89)	0.739	0.000	0.701-0.778
Fast Track Pathway					
Absent	5,792 (98.15)	110,025 (90.72)	1		
Present	109 (1.85)	11,254 (9.28)	0.183	0.000	0.152-0.222
Emergency Department					
General	5,439 (92.17)	94,285 (77.74)	1		
Paediatrics	402 (6.81)	15,312 (12.63)	0.455	0.000	0.410-0.504
Obstetrics-Gynaecology	60 (1.02)	11,682 (9.63)	0.089	0.000	0.068-0.114
Day of Presentation					
Sunday	928 (15.73)	16,442 (13.56)	1		
Monday	1,055 (17.88)	18,671 (15.40)	1.001	0.977	0.914-1.096
Tuesday	835 (14.15)	17,283 (14.25)	0.856	0.002	0.777-0.942
Wednesday	734 (12.44)	17,158 (14.15)	0.758	0.000	0.686-0.837
Thursday	735 (12.46)	17,331 (14.29)	0.751	0.000	0.680-0.829
Friday	766 (12.98)	17,479 (14.41)	0.776	0.000	0.704-0.856
Saturday	848 (14.37)	16,915 (13.95)	0.888	0.015	0.807-0.977
Month					
January	610 (10.34)	10,36 (8.54)	1		
February	539 (9.13)	9,398 (7.75)	0.974	0.666	0.864-0.109
March	504 (8.54)	10,554 (8.70)	0.811	0.001	0.718-0.915
April	658 (11.15)	9,748 (8.04)	11464	0.018	1.023-1.284
May	532 (9.02)	10,45 (8.62)	0.864	0.017	0.767-0.974
June	508 (8.61)	10,393 (8.57)	0.830	0.003	0.735-0.936
July	455 (7.71)	10,177 (8.39)	0.759	0.000	0.670-0.859
August	374 (6.34)	10,07 (8.30)	0.630	0.000	0.552-0.719
September	432 (7.32)	9,526 (7.85)	0.770	0.000	0.678-0.873
October	552 (9.35)	10,111 (8.34)	0.927	0.211	0.823-1.043
November	365 (6.19)	9,846 (8.12)	0.629	0.000	0.551-0.718
December	372 (6.30)	10,646 (8.78)	0.593	0.000	0.520-0.677
Season					
Winter	1,615 (27.37)	30,117 (24.83)	1		
Spring	1,745 (29.57)	31,269 (25.78)	1.040	0.261	0.970-1.115
Summer	1,277 (21.64)	30,635 (25.26)	0.777	0.000	0.721-0.837
Fall	1,264 (21.42)	29,258 (24.12)	0.805	0.000	0.747-0.868

(continued)

Table 1 (continued). Characteristics of uncompleted and completed ED accesses

Characteristics	Uncompleted ED treatment	Completed ED treatment	Unadjusted Odds Ratio	p value	OR 95% CI
Daily Crowding					
Very Low Affluence	1,007 (17.06)	24,328 (20.06)	1		
Low Affluence	967 (16.39)	22,449 (18.51)	1.040	0.386	.951-1.138
Medium Affluence	1,254 (21.25)	24,898 (20.53)	1.216	0.000	1.117-1.324
High Affluence	1,168 (19.79)	22,718 (18.73)	1.242	0.000	1.139-1.353
Very High Affluence	1,505 (25.50)	26,886 (22.17)	1.352	0.000	1.246-1.467
Triage Category					
2-Urgent/Yellow	198 (3.42)	31,55 (26.45)	1		
3-Semi-Urgent/Green	2,576 (44.48)	60,39 (50.62)	6.796	0.000	5.878-7.858
4-Not Urgent/White	3,018 (52.11)	27,36 (22.93)	17.576	0.000	15.209-20.313
Psychiatric Consult					
Absent	1,159 (93.69)	119,959 (98.91)	1		
Present	78 (6.31)	1,32 (1.09)	6.116	0.000	4.832-7.740
Mode of Referral					
Referred by physician	538 (9.12)	24,129 (19.90)	1		
Own decision	5,363 (90.88)	97,15 (80.10)	2.475	0.000	2.263-2.708
Nationality					
Italian	4,34 (73.56)	97,951 (80.77)	1		
Foreign	1,56 (26.44)	23,325 (19.23)	1.509	0.000	1.422-1.602
Continent for Foreigner					
Europe	731 (48.47)	10,796 (46.44)	1		
Africa	391 (25.93)	5,961 (25.64)	0.968	0.623	0.853-1.099
Asia	290 (19.23)	5,106 (21.97)	0.838	0.014	0.729-0.964
America	91 (6.03)	1,342 (5.77)	1.001	0.990	0.799-1.254
Oceania	5 (0.33)	41 (0.18)	1.801	0.216	0.709-4.571
Type of Complaint					
Trauma	1,558 (26.40)	27,05 (22.30)	1		
No Trauma	4,343 (73.60)	94,229 (77.70)	0.800	0.000	0.754-0.849
Time of Presentation					
Night 00.00-05.59	506 (8.57)	10,554 (8.70)	1		
Morning 6.00-11.59	952 (16.13)	39,391 (32.48)	0.504	0.000	0.451-0.562
Afternoon 12.00-17.59	1,83 (31.01)	41,393 (34.13)	0.922	0.115	0.833-1.019
Evening 18.00-23.59	2,613 (44.28)	29,941 (24.69)	1.820	0.000	1.650-2.007

ED: Emergency Department, yr.: years

patient's (3, 7, 10). Non-Italian citizens are at higher risk to have a limited access to primary care assistance, consequently they tend to overuse ED service for low acuity situations (8).

Finally, among patient related factors, non-urgent triage category resulted at higher risk of uncompleted ED care, as confirmed by literature.

Considering service's related factors, ED type and fast track pathway resulted strongly associated to ED

leaving; specifically, Paediatric and Obstetric-Gynaecologic ED demonstrated lower leaving risk as the patient inclusion in a fast track pathway. Such result underlines how the development of a patient centre emergency organization have generalised positive impact on the quality of care and specifically may reduce LWBS and DAMA rate (9).

The highest rate of uncompleted care was observed on Sunday and during evening/night time; at

Table 2. Multivariate analysis of completed and uncompleted ED accesses

Characteristics	Adjusted Odds Ratio	95% CI
Age Group (yr.)		
0-4	3.679	2.535-5.339
5-14	3.423	2.299-5.096
15-24	3.058	2.267-4.125
25-34	2.445	1.813-3.297
35-44	3.282	2.475-4.352
45-54	3.036	2.292-4.021
55-64	2.031	1.485-2.778
65-74	1.570	1.120-2.201
>74	1	
Gender		
Male	1	
Female	0.713	0.633-0.803
Fast Track Pathway		
Absent	1	
Present	0.747	0.602-0.927
Emergency Department		
General	1	
Paediatrics	0.593	0.437-0.805
Obstetrics-Gynaecology	0.284	0.193-0.416
Day of Presentation		
Sunday	1	
Monday	0.749	0.589-0.951
Tuesday	0.798	0.643-0.990
Wednesday	0.759	0.611-0.942
Thursday	0.852	0.690-1.052
Friday	0.744	0.597-0.926
Saturday	0.805	0.653-0.993
Month		
January	1	
February	0.822	0.632-1.070
March	0.755	0.561-1.016
April	1.175	0.752-1.837
May	1.102	0.707-1.720
June	1.152	0.746-1.781
July	0.914	0.551-1.517
August	0.830	0.496-1.389
September	0.763	0.476-1.222
October	0.815	0.512-1.298
November	0.824	0.517-1.311
December	0.731	0.520-1.029
Season		
Winter	1	
Spring	0.840	0.581-1.214
Summer	0.729	0.473-1.124
Fall	0.763	0.524-1.111

(continued)

Table 2 (continued). Multivariate analysis of completed and uncompleted ED accesses

Characteristics	Adjusted Odds Ratio	95% CI
Daily Crowding		
Very Low Affluence	1	
Low Affluence	1.060	0.871-1.290
Medium Affluence	1.056	0.870-1.282
High Affluence	1.014	0.826-1.246
Very High Affluence	1.163	0.938-1.442
Triage Category		
2-Urgent/Yellow	1	
3-Semi-Urgent/Green	1.906	1.586-2.289
4-Not Urgent/White	2.941	2.405-3.596
Psychiatric Consult		
Absent	1	
Present	6.161	4.821-7.873
Mode of Referral		
Referred by physician	1	
Own decision	1.004	0.845-1.194
Nationality		
Italian	1	
Foreign	1.695	1.493-1.924
Type of Complaint		
Trauma	1	
No Trauma	1.109	0.957-1.285
Time of Presentation		
Night 00.00-05.59	1	
Morning 6.00-11.59	0.673	0.547-0.827
Afternoon 12.00-17.59	0.771	0.632-0.942
Evening 18.00-23.59	0.867	0.707-1.063

ED: Emergency Department, yr.: years

these time span patient access to primary care is limited to continuity of care services as doctor on duty. This raises questions on whether territorial services are actually perceived by patients as a valid alternative to ED for low acuity care; this result confirms the need to strengthen primary care services in order to guarantee appropriate care use.

In our study the multivariate analysis did not confirm the correlation between uncompleted care and ED overcrowding observed in univariate analysis. This result seems to be in contrast with other observational studies which found a significant correlation with waiting time (2, 3).

This study suffers from some limitations. First of all, it took place in a single third level hospital trust;

this might limit results generalization, since larger hospitals tend to have higher proportion of LWBS (10). Secondly, data were mostly collected from administrative EMUR_PS dataset even if when available they were supplemented with clinical charts information. Differently from DAMA patients, it was possible to recognize only a few clinical information on LWBS patient; this impeded to perform sub-analysis including all collected variables with limited possibilities to plan specific interventional strategies as already underlined by other observational studies (10). Despite these limitation, the study was able to provide an overall view of risk factors associated to ED leaving in a universalistic healthcare system; results have shown the necessity to implement primary-ED integrated pathway care, to develop patient's awareness on appropriate use of Emergency Care, and finally to improve communication strategies for HCP and specific non-technical skills for ED team. In conclusion these interventions need to be oriented to frail sub-population such as foreign origin, paediatric and psychiatric patients according to our results to be at higher risk of uncompleted ED treatment.

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Correspondence:

Alberto Carli

School of Specialization in Hygiene and Preventive Medicine - University of Verona, Strada Le Grazie 8 - 37134 Verona, Italy

Tel. +39 045 802 7660

E-mail: alberto.carli88@gmail.com