

A prospective observational study on Emergency Medical Admissions at Mater Dei Hospital, Malta

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BACKGROUND

Ambulatory Emergency Care is a novel healthcare paradigm that has not yet been adopted locally. The aim of this study was to determine how many patients admitted to medical wards in Mater Dei Hospital between January 2020 and December 2020 could have been managed in an ambulatory setting.

METHODS

We determined which patients had a length of stay of less than 24 hours as well as calculated the Amb score for each patient, postulating these two criteria as effective markers of patients that could be selected for ambulatory management. With the unfolding of the COVID-19 worldwide pandemic, data collection stopped in March 2020. A total of 54 patients were randomly sampled from post-take medical ward rounds and data pertaining to their medical admission was recorded.

RESULTS

20.37% of patients had a length of stay of less than 24 hours whilst 44.4% of patients had an Amb score of 5 or more. 18.5% of patients were found to have an Amb score of 5 or more AND a length of stay of less than 24 hours. A moderate negative correlation ($r_s = -0.66$) between a high Amb Score and a short length of stay was demonstrated. Lower respiratory tract infection and Chest pain were the two commonest provisional diagnoses making up 37.0% of all admissions.

Conclusions

One in every 4.6 patients could benefit from ambulatory emergency management. We hypothesize that such a service would help reduce pressures on the current local healthcare system, improving emergency department throughput and patient satisfaction.

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INTRODUCTION

Ambulatory emergency care (AEC) or Same Day Emergency Care (SDEC) is an evolving concept that does not yet exist within the Maltese healthcare system. As the scope and delivery of acute care services becomes ever more complex and the medical and social needs of an increasingly aging, comorbid population demand to be met, AEC might be the solution that clinicians at the acute interface between primary and secondary care are looking for.

AEC is defined as ‘acute clinical care which includes investigation, treatment and rehabilitation of patients for whom, in the absence of an ambulatory emergency care service, admission to hospital would have been the default option.’¹ It is a model within which a significant proportion of emergency department attendees are managed on the same or next day without being admitted to a hospital bed.² The implications of this are far-ranging: a reduction in the number of patients that are admitted to

hospital for less than 24 hours, a reduction in bed occupancy leaving more room for the sickest of patients, improved patient flow with less crowding in the emergency department and an overall better patient experience. AEC has been described as a ‘transformational change in care delivery’ and has the potential to be as significant to emergency care as day case surgery is to elective surgery.²

The aim of this study was to determine how many patients admitted to medical wards in Mater Dei Hospital between January 2020 and December 2020 could have been managed in an ambulatory setting. To do this we determined which patients had a length of stay of less than 24 hours as well as calculated the ‘AMB score’ (Figure 1), for each patient. This score, mentioned in the Royal College of Physicians’ (RCP) 2014 Acute Care Toolkit,³ is a tool developed by Ala et al. in their 2010 pilot study⁴ to help identify patients who can be managed in an ambulatory setting safely.

Figure 1 The ‘Amb’ Score – used to determine which patients can be managed safely in an ambulatory setting

			Score
Sex	Female	0	
	Male	-0.5	
Age	<80 years	0	
	≥80 years	-0.5	
Access to transport	Yes	2	
	No	0	
Will likely need IV Rx	Yes	0	
	No	2	
Acutely confused	Yes	0	
	No	2	
NEWS	NEWS=0	1	
	NEWS ≥1	0	
Discharged last 30 days	Yes	0	
	No	1	
Total			

If the AMB score is ≥5, consider ambulatory care.

With the unfolding of the COVID-19 worldwide pandemic, the data collection was cut short in mid-March. The results presented here therefore represent a small fraction of the total sample the authors had initially hoped to analyse.

MATERIALS AND METHODS

Approval from the Data Protection Office at Mater Dei Hospital was obtained prior to commencing data collection. Anonymized information from patient notes and electronic case summaries was transferred to a password-protected spreadsheet created using Microsoft Excel 2010 software. A total of 55 patients admitted to general medical wards between January 2020 and March 2020 were randomly sampled from post-take ward rounds. Data for this prospective study was then collected and included gender and age of patient, provisional diagnosis on admission, reason for admission,

length of stay in hospital and various criteria pertaining to the aforementioned AMB score. Direct intensive care unit admissions or patients reviewed for potential admission to the intensive care unit were excluded from the data collection.

RESULTS

Of the 55 patients that were randomly selected for the study, 1 patient passed away during their inpatient admission and was subsequently excluded from further analysis. 46.3% of patients were female and 53.7% were male. 23 out of 54 patients sampled (42.6%) were admitted during the month of January, 19 patients (35.2%) were admitted in February and 12 (22.2%) were admitted in March. Figure 2 shows the age distribution of these patients, with the highest number (24.1%) falling within the 71-80 age group. 12.9% ($n=7$) hailed from various nursing homes around the island.

Figure 2 Age distribution of patients admitted through the Emergency Department

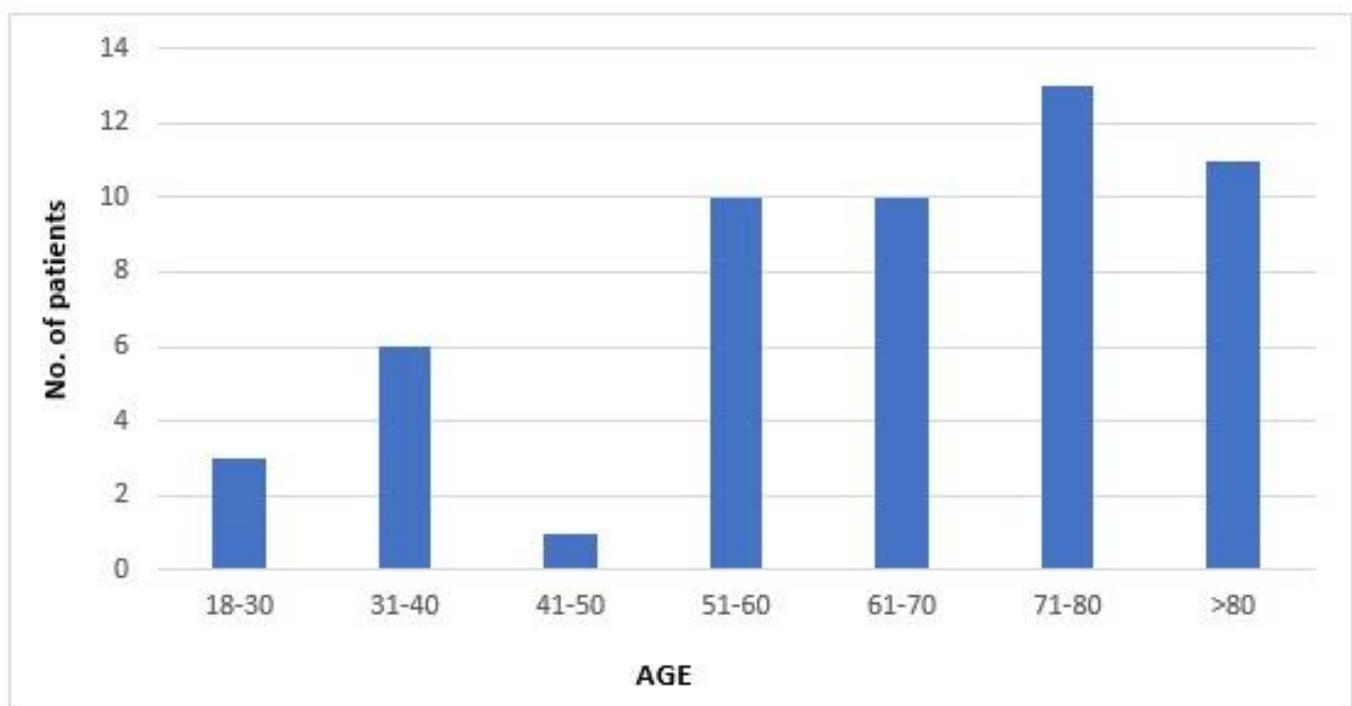


Figure 3 shows the provisional diagnoses with which patients were admitted to the medical wards. 'Lower respiratory tract infection' ($n=11$) and 'Chest pain' ($n=9$) were the two commonest provisional diagnoses making up 37.0% of all admissions. 23 other diagnoses, ranging from 'High INR' to 'Progression of Malignancy' made up the rest of the admissions. On discharge, 75.9% of the provisional diagnoses remained the same whereas 20.4% of patients had a different discharge diagnosis from their provisional one. 3.7% ($n=2$) had no completed discharge letter on the Electronic Case Summaries (ECS) online portal Mater Dei Hospital uses to log such documents, so their diagnosis on discharge

could not be compared to their provisional diagnosis on admission.

Further data analysis revealed that 20.37% of patients ($n=11$) were admitted to a general medical bed for less than 24 hours. 8 out of these 11 patients (72.7%) did not require any further investigations. The other 3 patients required further blood tests but no other imaging or diagnostic studies. All 11 patients had observations that were within normal limits on admission, scoring 0 on Mater Dei Hospital's Early Warning Scores on adult observation charts (Figure 4).

Figure 3 Provisional Diagnoses on Admission

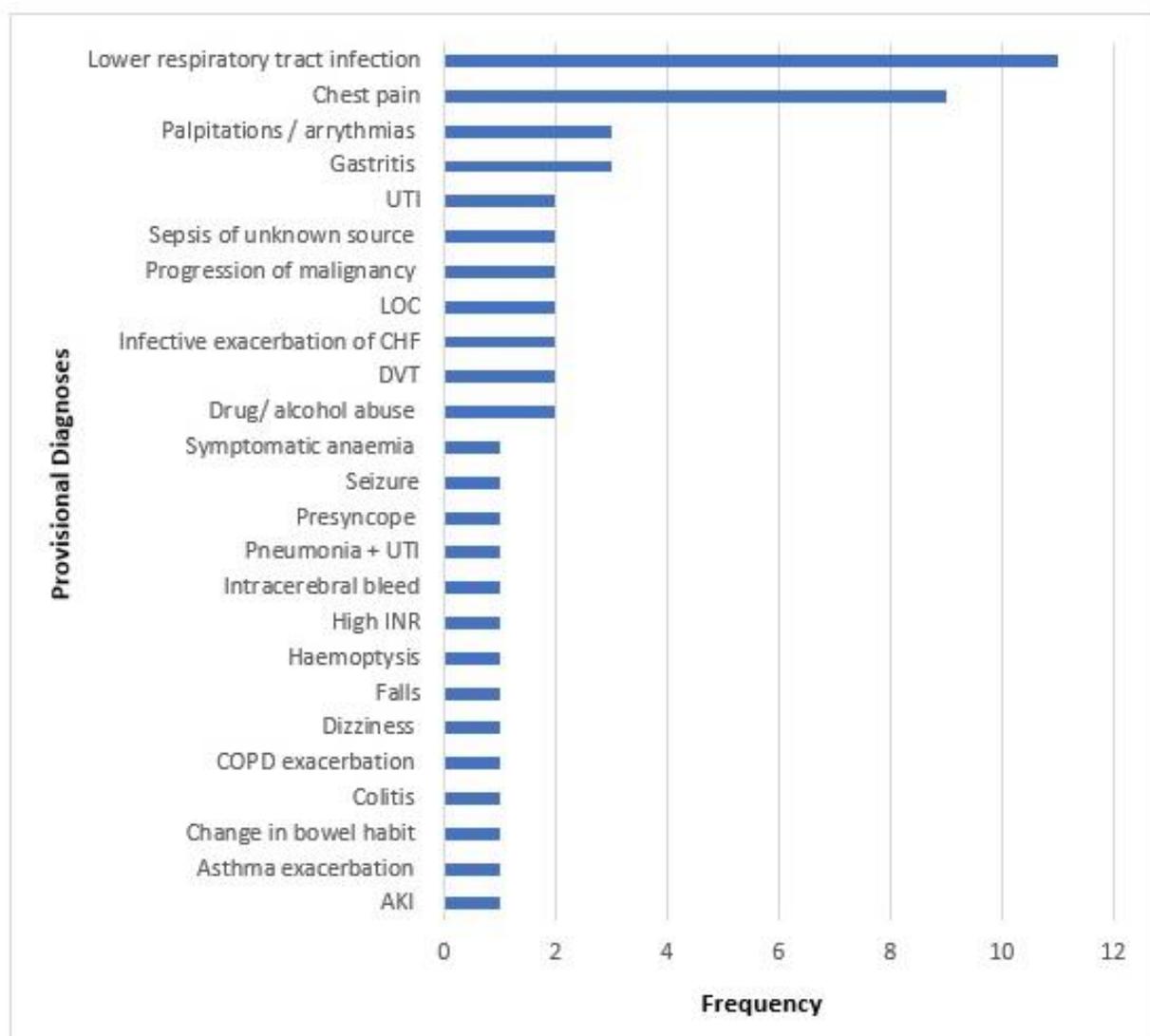
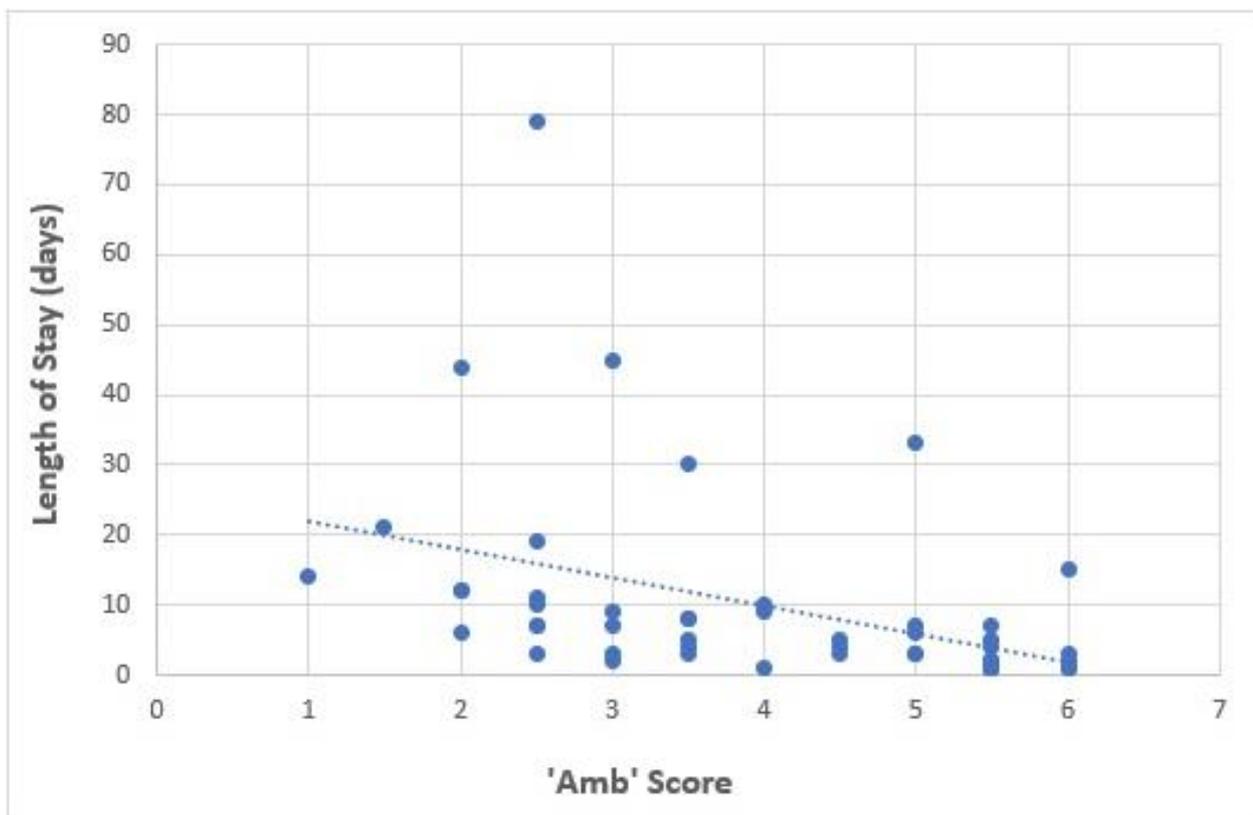


Figure 4 Mater Dei Hospital's Early Warning Score (EWS)

EWS SCORE	3	2	1	0	1	2	3
Respiratory Rate	≤8		9-11	12-20		21-24	≥25
Oxygen Saturation	≤91	92-93	94-95	≥96			
Extra Oxygen		YES		NO			
Temperature	≤35.0		35.1-35.5	35.6-38.0	38.1-39.0	≥39.1	
Systolic BP	≤90	91-100		101-180	≥181		
Heart Rate	≤40		41-50	51-90	91-110	111-130	≥131
Level of Consciousness				Alert, Verbal			Pain, Unresponsive

Figure 5 Scatter correlation plot of 'Amb' score against length of stay in days for 54 patients. There is a negative correlation between high 'Amb' Score and a short length of stay



A further 9.26% of the total number of patients ($n=5$) had a length of stay (LOS) of between 24 to 48 hours. 1 patient did not require any further investigations, 1 patient required further blood tests, 1 patient required an exercise stress test, 1 patient required further blood tests and imaging to be undertaken and 1 patient required further blood tests as well as an invasive procedure such as a 'lumbar puncture/angiogram/endoscopy'.

Of note, 27.8% of the total number of patients had no further investigations done during their inpatient admission whilst 77.8% had no specialty consultations performed on Day 1 of admission.

The 'AMB Score' (Figure 1) was calculated for all 54 patients. Using the revised 2015 version of the AMB score, 44.4% ($n=24$) of our patients scored 5 or more. 18.5% of patients ($n=10$) were found to have an AMB score of 5 or more AND a LOS of less than 24 hours. Figure 5 shows the negative correlation between a short LOS and a high AMB score as depicted on the scatter plot graph. Spearman's rho value was then calculated as neither AMB scores nor LOS fitted parametric data distribution. A value of -0.66 was obtained using Microsoft Excel 2010 software, showing moderate negative correlation between LOS and AMB score.

DISCUSSION

With an increasing focus on overcrowding, hospital bed availability and patient safety, healthcare systems are required to find innovative ways of reducing pressure on their services. We set out to identify which patients presenting to the Emergency Department at Mater Dei Hospital could be managed in an ambulatory setting without the need for an in-hospital admission.

In our study, we used a LOS of less than 24 hours and an AMB score of 5 or more to be effective markers of patients that could have been seen in an

ambulatory setting. The latter criteria was taken from the original study by Ala et al.^[4] where a score of 5 or more was found to have a 96% sensitivity and 62% specificity in identifying such patients. 20.37% of our patients had a LOS of less than 24 hours whilst 44.4% of patients had an AMB score of 5 or more. Therefore, at least 1 in every 5 patients could have been spared a hospital admission when taking into account the LOS only. When the AMB score alone is considered, this goes up to 1 in every 2.25 patients. When both are taken in tandem, 1 in every 4.6 patients could have benefitted from referral to an ambulatory emergency care service. Although not the primary aim of this study, we did find a negative correlation between the LOS and the AMB score. The calculated coefficient shows a moderate inverse correlation and we predict that with larger sample sizes this correlation might be stronger.

Out of the 10 patients who had a hospital stay of less than 24 hours and an AMB score of 5 or more, 7 were admitted with chest pain. All 7 of these patients could have been seen in an ambulatory setting thus highlighting the potential for an ambulatory Chest Pain Pathway. Our major limitation is our sample size however we estimate that other clinical pathways may have scope depending on patient presentation patterns.

AEC services, mainly in the UK, have taken on many forms ranging from specific clinics tackling singular pathology, such as lower limb DVTs, to more generalised non-bedded units seeing patients with deranged liver function tests, asymptomatic anaemia, limb cellulitis, high INRs, electrolyte disturbances, low risk chest pains and low risk pulmonary embolisms. So streamlined are some of these processes that advanced nurse practitioners now lead some of these clinics, of which a few are even virtual. A directory has been developed by the 'Ambulatory Emergency Care Network'⁵ which lays

out all potential pathology that can be managed successfully in an ambulatory setting whilst emphasizing key principles such as interspeciality collaboration and rapid access to diagnostics. Apart from reduction in admissions and improved patient throughput in the ED, there are reductions in adverse effects of hospitalisation such as deep vein thrombosis, hospital-acquired infections, confusion and pressure sores.⁶⁻⁸

NHS England has recognised the importance of integrating AEC services to the more traditional emergency care services provided by emergency departments nationwide. Their *Long Term Plan (2019)* requires all type 1 EDs to have adopted some form of ambulatory emergency care strategies by 2020.⁹ The NHS Data Dictionary¹⁰ defines a Type 1 ED as 'a consultant-led 24hour service with full resuscitation facilities and designated accommodation for the reception of accident and emergency patients.' In Malta, a short-lived trial of a Clinical Decision Unit (CDU) was introduced in 2016 as an extension to the main Emergency Department at Mater Dei Hospital. However this only allowed for patients to be moved to a different area to wait for results and/or treatment with the purpose of helping to reduce overcrowding in the main department.

Consideration of the local context is paramount. Our short distances allow for such a model of care to be even safer than what other European countries can provide. What we need is not the presence of a separate physical building, although having such a unit may well provide a better service for patients, but rather robust and effective clinical care pathways that do not create new work but allow for the same work to be streamlined and done more efficiently. Above all a change in mindset and work culture might be the first challenge that needs overcoming. We firmly believe that a similar study

with a larger sample size would reinforce our findings and help pave the way for the introduction of ambulatory emergency care in Malta

ACKNOWLEDGEMENTS

The authors would like to thank Dr.M.Cassar, Consultant in Emergency Medicine, for her support during the initial stages of this project.

SUMMARY BOX

1. Ambulatory emergency care is a healthcare paradigm in which patients are managed on the same or next day without being admitted to a hospital bed.
2. Several models of ambulatory care have been devised, ranging from Emergency Department Observations Units to highly specific DVT clinics.
3. We postulated that an inpatient length of stay of less than 24 hours and an AMB score of 5 or more would be effective markers to screen for patients who could be managed in an ambulatory setting safely.
4. This study showed that 20.37% of patients had a length of stay of less than 24 hours whilst 44.4% of patients had an AMB score of 5 or more.
5. 18.5% of patients were found to have an AMB score of 5 or more AND a length of stay of less than 24 hours.
6. We hypothesize that an ambulatory care management model would help reduce pressures on the current healthcare system although further feasibility studies would have to be performed.

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