

Causes of Admission And Clinical Outcomes Among Adult ICU Admitted Patients at Wollega University Referral Hospital

Research Article

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Abstract

Background: Intensive care unit is a part of the hospital where critically ill patients who require advanced airway, respiratory, and hemodynamic unstable were usually admitted for continues monitoring and better outcome than if the patients were admitted to other wards of the hospital. Evaluation causes admission, causes of death and the outcomes of medical interventions will help to assess the efficacy of treatment, making it possible to take better decisions, to further improve quality of care, to standardize conduct, and to ensure effective management of the high-level resources needed to deliver intensive care services- thereby optimizing resource utilization.

Objective: The objective of this study is to assess the causes of admission and clinical outcomes of patients admitted to Wollega University Referral Hospital adult intensive care unit from September 2017 to September 2019.

Methodology: Retrospective review of ICU admitted patient's log books and clinical charts at Wollega University Referral Hospital adult Intensive Care Unit from September 2017 to September 2019.

Result: A total of 496 of the patient charts were reviewed; 271 (54.6%) of the patients were males and 133 (45.4%) were females, a male: female ratio of 1.2:1. The median age at admission was 34 years with interquartile of 25-34 years and Standard deviation of 16.2. Meningitis (10.7%), Bronchial Asthma (9.7%), CHF (8.5%), Stroke (8.1%) and Eclampsia (7.3%) were the five commonest causes for ICU admission. The median length of ICU stay was two days and mortality rate of 29.0%.

Conclusions: The mortality at the Adult intensive care unit was high (29.0%). Meningitis and Bronchial asthma were main causes for ICU admission while Multi organ failure, brain death and respiratory failure were the main causes of death.

Keywords: Causes of Admission; Death; Adult ICU; Outcome.

Introduction

In developing countries, resources are scarce and provision of ICU care is very challenging. In Ethiopia, ICU care has been introduced only a few decades ago. The number of ICUs is increasing recently in government and private institutions across the country. However, the care delivered at the ICUs in the country has remained largely unstudied. This study aimed to assess the causes of admission, length of stay and treatment outcomes in Wollega University referral hospital Adult ICU. The results are compared with the current practice within Ethiopia and other settings.

An evaluation of the outcomes and hospital morbidity pattern is an important measure to guide improvements in patient care. In intensive care units (ICUs), the success of care can best be measured

by the outcomes such as survival or death among those admitted to the unit by using indicators such the proportion of deaths [1]. One should be aware of the prevalent conditions and set up the facilities and prepare treatment. The mean ICU stay was 4.9 ± 5.8 days (range 1–30 days) vast majority of patients admitted to ICU were admitted medical of which meningitis (44/400 pts., 11%), post-operative (43/400 pts., 10.8%) [2].

The number of cases with percentage of Hepatic diseases 12.9%, CCF and Pulmonary edema 6.2%, Cellulitis 0.8%, CVA 11.6%, Hypertensive Crisis 4.1%, Arrhythmias 0.8%, Diabetes with complication 2.5%, Carcinoma 0.4%, 2.1% Tb with complication, Respiratory issues 9.5%, ACS 5.4%, Kidney diseases 5.4%, Sepsis 10.4%, GI Bleed 3.3%, Heat stroke 0.4%, CNS Infection 7.9%, Poisoning 3.3%, Shock 1.2%, AGE with complication 5.8%, Sur-

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gical and Gynecological issues were 5.4% and 0.4% (related to medical issues).[8]

Among the adult patients, there were 23 (31%) patients with trauma. There were 45 (61%) surgical patients and 6 (8%) medical patients. Sixteen (19%) patients were mechanically ventilated. The overall mortality was 28 (32.9%). Sixty-four percent of the mortality occurred during the first 24 hours of admission. A mortality rate of 83.3% was recorded among medical patients and 62.5% in those referred from the wards [4].

In Ethiopia previous study shows which is done black lion teaching hospital in patterns of medical admission in toMedical ICU from 1985-2000 acute infection and cardiovascular disease accounted for half of the entire critical care admission with infectious disease accounted for 30% among specific diagnose diabetic ketoacidosis was the leading cause of admission followed by acute myocardial infection and severe and complicated malaria each accounting for (9.3)of all admission respectively.[3]

This study will provide a baseline data for future reviews, health workers and planners to give due attention to improving the outcome of care in critically ill patients as there is no previous study on this topic in this setting.

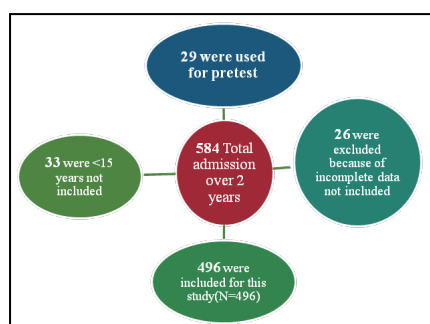
This study aims to assess the causes of admission and outcome of adult patients managed at the Adult intensive care unit of Wollega University Referral Hospital.

Methodology

Wollega University Referral Hospital (WURH) is the largest referral hospital in western Ethiopia. It started as a referral and teaching University hospital in 2017, providing service for about 5 million people. A two years retrospective cross sectional study was conducted in 8 bedded Adult ICU from September 2017 to September 2019 and the data was collected from ICU logbook and patient charts/cards.

Sample size and sampling techniques

All consecutively admitted patients to AICU from September 2017 to September t 2019 were included, based on the Inclusion and exclusion criteria. All patients admitted to AICU whose age is greater than 15 years were included in the study and patients with incomplete or missed data were excluded from the study. Other patients excluded from the study were, those who died on arrival (within 2 h of admission); this is not sufficient time to give optimal care in the ICU, and because the outcome of these patients is related to the emergency or other ward care.



Study variable

Dependent variable

Clinical outcome

Independent variable

Age, sex, length of ICU stay, diagnosis at admission, inotropes use, comorbid morbidities.

Admission sources, Glasgow Coma Scale (GCS) at admission, Blood pressure, Pulse rate, urine output, temperature on admission , blood transfusion, complication of blood transfusion, time of patient death, use of admission criteria , use weaning criteria, use of feeding guide ,who admitted the patient , patient out come and causes of patient death.

Data collection

The questionnaire containing the above variables was adapted by reviewing different similar literature. Two BSc anesthetists were hired for the data collection after one day training was given to them on the objectives of the study, the contents of the questionnaire how to fill the questionnaire and on issues related to the confidentiality. The principal investigator was continuously supervised the data collectors for completeness and consistency. Prior to the data collection, a pre-test was conducted at WURH on 5%(29 patient cards) of the sample size for completeness of the questionnaire and based on the findings of the pre-test, questionnaire was modified.

Data analysis

Data entry and analysis was done using SPSS software (version 25.0). The generated data compiled by frequency table, charts and graphs. Statistical significance was considered at a p value of < 0.05 where appropriate to use.

Ethical considerations

Prior to data collection, ethical approval was obtained from ethical review committee of Wollega University and WURH card room workers were informed about the purpose of the study and they were given a letter written by the Hospital director to give access to the cards identified from ICU logbook based on the study period.

Results

A total of 496 of the patient charts were reviewed; 271 (54.6%) of the patients were males and 133(45.4%) were females, a male: female ratio of 1.2:1. The median age at admission was 34 years with interquartile of 25-34 years and those >65 years accounts only 5% of the admission, regarding the ICU outcome 29.1 % (144) death, 61.9 % (307) improved while about 1.6 % (8) self-discharged. (Table 1)

The main causes of admission to WURH Adult ICU were Meningitis 10.7%, Bronchial Asthma 9.7%, CHF 8.5%, stroke 8.1% ,

Trauma 7.3% Other 9.9% (other includes :Uterine rupture, UTI, Suicidal attempt, Poisoning, esophageal cancer, Aspiration pneumonia.

Regarding patient source for ICU admission Emergency OPD accounts 65.3% and Operation theatre and Medical ward accounts for 15.3% ,14.1% respectively (Table 2). And 48.0% stayed less than 2days while only 3.6% stayed >10 days.

48.4%(74) of those stayed less than 2days has died while 33.3 % (4) of those stayed >10days died and there is association between the length of hospital stay and patient outcome (p<0.001) (Table 1).34.9% of the patient admitted to ICU from the emergency OPD and 15.7% from operation theatre were died while no death rate among the patients admitted from surgical ward (Table1) and there is association among the patient source (departments) and their ICU outcome. (p<0.001).

Figure 1. Causes of ICU admission.

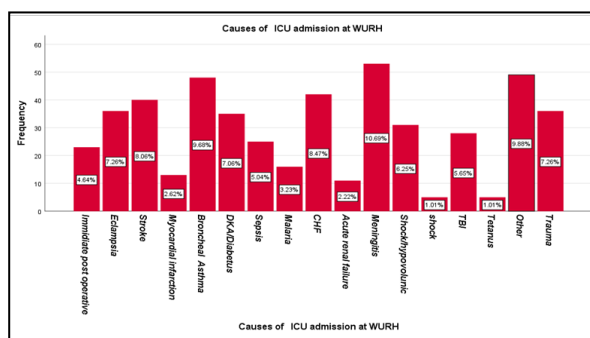


Figure 2. Causes of patient death in ICU.

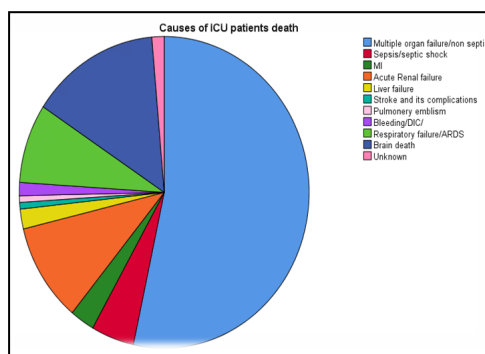


Table 1. Gender Age, length of ICU stay, Patient source , Conscious status and patients outcome.

		Patients out come				Pvalue
		Improved	Death	Referred	Self-discharge	
Patients length of ICU stay	< 2days	153(64.3%)	74(31.1%)	9(3.7%)	2(0.84%)	P<0.001
	2-5 days	77(58.3%)	43(32.6%)	10(7.6%)	2(1.5%)	
	5-10 days	65(60.2%)	23(21.3%)	18(16.7%)	2(1.85%)	
	>10 days	12(66.7%)	4(22.2%)	0(0.0%)	2(11.1%)	
	Total	307(61.9%)	144(29.0%)	37(7.5%)	8(1.6%)	
Gender	Male	171(63.1%)	78(28.8%)	17(6.3%)	5(1.8%)	P=0.68
	Female	136(60.4%)	66(29.3%)	20(8.9%)	3(1.3%)	
	Total	307(61.9%)	144(29.0%)	37(7.5%)	8(1.6%)	
Age distribution	16-25	110(68.8%)	40(25.0%)	10(6.25%)	0(0.0%)	P=0.001
	26-35	63(53.4%)	46(40.0%)	9(7.6%)	0(0.0%)	
	36-45	52(72.2%)	12(16.7%)	4(5.6%)	4(5.6%)	
	46-55	37(59.7%)	18(29.0%)	5(8.1%)	2(3.2%)	
	56-65	35(59.3%)	19(32.2%)	5(8.5%)	0(0.0%)	
	>65	10(40.0%)	9(36.0)	4(16.0%)	2(8.0%)	
Source of patient for ICU Admission	Operation theatre	63(82.9%)	12(15.8%)	1(1.3%)	0(0.0%)	P<0.001
	Medical ward	47(67.1%)	17(24.3%)	5(7.1%)	1(1.4%)	
	Emergency OPD	174(53.7%)	113(34.9%)	30(9.3%)	7(2.2%)	
	Surgical ward	4(100.0%)	0(0.0%)	0(0.0%)	0(0.0%)	
	Obstetric/GYN Ward	19(86.4%)	2(9.0%)	1(4.5%)	0(0.0%)	
	Total	307(61.9%)	144(29.0%)	37(7.5%)	8(1.6%)	
Conscious status on ICU admission	Conscious	204(73.9%)	62(22.5%)	8(2.9%)	2(0.7%)	P<0.001
	Unconscious	96(45.0%)	82(34.5%)	29(13.6%)	6(2.8%)	
	Unknown	7(100%)	0(0.0%)	0(0.0%)	0(0.0%)	
	Total	307(61.9%)	144(29.0%)	37(7.5%)	8(1.6%)	

Table 2. Distribution of coexisting disease among ICU admitted patients.

Coexisting disease	Frequency	Percent
CVS disease	121	24.4
Respiratory disease	16	3.2
Infection	29	5.8
Neurologic disorder	7	1.4
Endocrine disease	9	1.8
No coexisting disease	209	42.1
Hypertension	90	18.1
Other	15	3
Total	496	100

CVS disease (24.4%) is the main coexisting disease ICU admitted patients have and 42.1% has no coexisting disease.

22.5% of those conscious on admission were died while 38.5% of those unconscious on admission where died and there is statistically significant association among patient's conscious status on admission and their ICU outcome p value <0.001 (Table 3 above).

Regarding blood transfusion in ICU only 3.6% (18) patients received PRBC and 16.7%(3) of those transfused were died.

The common vasopressors used were adrenaline and dopamine; they were used for 139 patients of which 36.0% Adrenaline and 64.0% dopamine; 46.0% (23) treated with adrenaline and 37.1%(33) treated with dopamine were died.

Multiple organ failure 53.4%, Brain death 14.4%, Acute renal failure 10.3%, Respiratory failure 8.2% and sepsis/septic shock 4.8% were the five major causes of ICU patient death in this setting.

Discussion

An Intensive Care Unit (ICU), is a specialized section of a hospital that provides comprehensive and continuous care for persons who are critically ill and who can benefit from treatment. Patients are generally admitted to an ICU if they are likely to benefit from the level of provided care. Intensive care has been shown to be beneficial for patients who are severely ill and medically unstable that is, they have a potentially life threatening disease or disorder. About one third of hospital mortality occurs /in critically ill patients inside Intensive Care Unit (ICU)[7].

In this study setting we have used age lowest limit 16years because there are also some patients admitted to ICU with age <15 years and those where currently managed in separate pediatric ICU and also similar studies used 16years as start age of adult cases.

In this setting there were about two mechanical ventilators during the study period and no patients were mechanically ventilated because of malfunction (biomedical engineers warned not to use) and currently there are about eight functional mechanical ventilators for eight bedded Adult ICU and three other functional mechanical ventilators for six bedded pediatric ICU.

Majority of the patients were admitted by senior physician evaluation without ICU consultant critical care specialist or anesthesiologist and there is no admission and discharge criteria consid-

eration to admit or discharge the patients, similarly there is no feeding guideline use in this setting.

In this study majority of the patients were males (54.6%) while females accounts about (45.4%) which is similar with the one year retrospective study done at Jimma university medical center 134 (53.17%) were males and 118 (46.38%) females[9]and there is no association between gender and patient outcome (p=0.68).

The median age was 34 with interquartile of 25-34 years, majority of ICU admitted cases where less than 25 years accounts 160(32.3%) while 25-35 years and there is association between age and patient outcome (p<0.001).

Sources patient for admissions Emergency department majority of causes accounts 324 (65.3%) the flowed by operation theatre 76(15.3%) and medical wards 70(14.1%) while the retrospective study done at the University of Calabar Teaching Hospital, Nigeria where 64 (75.3%) patients from the operating room, 8 (9.4%) from the inpatient wards, and 13 (15.3%) from the accident and emergency department.

Regarding mortality rate it is about 29% which is similar to the mortality rate Calabar Teaching Hospital, Nigeria which is mortality of 28 (32.9%)[4]. and other study in najeria teaching hospital [7] in this study setting which is 29.0%.("Abstract," n.d.) One year retrospective study done at Jimma university medical center ICU showed mortality rate of 50.4% where trauma is the leading admission cause accounting about (19.2%) total admission but in our setting trauma accounts only (7.2%) [9] and this is much bigger than our setting and ICU mortality varies across the world depend on ICU infrastructure, staff availability, and training, pattern, and cause of ICU admission [1].

In developed contents like North America, Oceania, Asia and Europe in ICU mortality relatively low with the rate of 9.3%, 10.3, 13.7% and 18.7% respectively, while in the Middle East the mortality found to be 21.7% and 26.2% [14] and the study conducted at hospital of Sergipe, northeastern Brazil identified a 21% ICU mortality rate which is comparable with this study finding [10].

Regarding length of ICU stay majority 238(48.0%) stayed less than two days while 132(26.6%) stayed 2-5 days and 18(3.6%) stayed greater than ten days with median ICU stay of two days and

interquartile of 1-2 days and there is association between length of ICU stay and patient outcome ($p < 0.001$); while the study done at University of Gondar where median length of ICU stay (IQR) was 4 (2–5) days. The most frequent stay (19.8%) was 1 day and cardiogenic shock and ARDS accounts (57.1%) (54.4%) respectively, [12] the median stay on mechanical ventilator is 4.5 days the difference may be due to mechanical ventilator use for the above main causes of admission. This study finding is similar to study done at Jimma medical center showed median length-of-stay (interquartile range) was 3.0 (1.0–7.0) days.[9]

Regarding the conscious status on ICU admission about 213 (42.9%) Unconscious among this 82 (34.5%) were died and there is association between conscious status on admission and patient outcome ($p < 0.05$); disturbance level of consciousness is related with severe decompensated disease, cerebral hypo-perfusion due to sepsis, blood loss, poisoning, and neurological disorder .

The main causes of admission to ICU at this study setting were Meningitis 10.7%, Bronchial Asthma 9.7%, CHF 8.5%, stroke 8.1% , Trauma 7.3%; while the study done at Armed Force General Teaching Hospital Ethiopia showed TBI had the major admission accounts for 25(8.9%), DKA, 18(6.3%) and MI 17(6.1%), [3] the study done at Ayder hospital (medical ICU) Ethiopia shows (DKA), constituting 194 (16.0%) of all admissions. Heart failure accounted for 193 (16%), all types of stroke for 185 (15.2%), myocardial infarction for 119 (9.8%) and septic shock for 61 (5%) of the admissions.[5] Cardiovascular, Respiratory Neurologic and Digestive 193 (28) 182 (26) 169 (24) 135 respectively where the main causes of ICU admission [13].

Similar studies at university of Gondar shows Cardiovascular disease accounted 36% of all ICU admission followed by respiratory (17.9%) which is similar to the studies done in Mekelle and Jimma [9] However, it was different from studies done in Uganda and Nigeria, infectious illness and post-operative care were the main reasons for admission [12] similar study done at Bahrain shows on Causes of Mortality among Critically Ill Patients Admitted in Intensive Care Unit.

Mohammed Cerebro vascular Accident (CVA) 100 (19.96%) Renal Failure.

99 (19.76%) Myocardial Infarction (MI) 60 (11.97%) Malignancy 34 (6.78%) Hepatic Encephalopathy 32 (6.38%) [6].

The common vasopressors used were adrenaline and dopamine; they were used for 139 patients of which 36.0% Adrenaline and 64.0% dopamine; 46.0% (23) treated with adrenaline and 37.1% (33) treated with dopamine were died.

Regarding blood transfusion in ICU only 3.6% (18) patients received PRBC and 3(16.7%) of those transfused were died.

Time of death, there is no association between the time of death and patient outcome 76(52.8%) died day time while 68(47.2%) died at night.

Regarding coexisting disease of ICU admitted patients Cardiovascular disease (24.4%), Hypertension (18.1%) were the two common coexisting disease and about (42.1%) has no coexisting disease and other study shows CVS disease 26%, respiratory 27%

and infection 13% [12] which is almost similar to this study setting .

Multiple organ failure 53.4%, Brain death 14.4%, Acute renal failure 10.3%, Respiratory failure 8.2% and sepsis/septic shock 4.8% were the five major causes of ICU patient death in this setting. Prospective Multicenter Study done on Causes and Characteristics of Death in Intensive Care Units: total of 698 patients were included during the study period. At the time of death, 84% had one or more organ failures (mainly hemodynamic) and 89% required at least one organ support (mainly mechanical ventilation). [13] similar study at Bahrain shows Circulatory System Disorders 1215 (42.91 %) Renal Failure 102 (20.36%) Malignancy 235 (6.99 %) Infectious Diseases 34 (6.79%) Hepatic Encephalopathy 32 (6.39%) Head Injury 25 (4.99%) [6].

Conclusion and Recommendation

Meningitis and bronchial asthma were among the main causes of admission while multiple organ failure is the main causes of death Mortality rate was 29.0% and the time of death (day/night) has no association with the patient outcome.

There is no admission, discharge and feeding guideline on use in this setting which resulted unnecessary ICU admission and bed saturation.

This setting need to used standard guidelines for patient safety and effective resource use.

Limitation of the study

The limitations of this study include the retrospective design; the mortality rate may be falsely low in resources limited setting due to sample size.

Competing interests

The authors declare that there is no competing interest.

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References

1. Agalu A, Woldie M, Ayele Y, Bedada W. Reasons for admission and mortalities following admissions in the intensive care unit of a specialized hospital, in Ethiopia. *Int J Med Med Sci.* 2014 Sep 30;6(9):195-200.
2. Haftu H, Hailu T, Medhaniye A. Assessment of pattern and treatment outcome of patients admitted to pediatric intensive care unit, Ayder Referral Hospital, Tigray, Ethiopia, 2015. *BMC research notes.* 2018 Dec;11(1):1-6.
3. Haile S. One Year Retrospective Review of Disease Patterns and Clinical Outcomes of Patients Admitted in Intensive Care Units of Armed Force General Teaching Hospital in Addis Ababa, Ethiopia (Doctoral dissertation, Addis Ababa University).
4. Ilori IU, Kalu QN. Intensive care admissions and outcome at the University of Calabar Teaching Hospital, Nigeria. *J Crit Care.* 2012 Feb;27(1):105. e1-4. Pubmed PMID: 22304993.
5. Gidey K, Hailu A, Bayray A. Pattern and outcome of medical intensive care unit admissions to ayder comprehensive specialized hospital in tigray, ethiopia. *Ethiopian Medical Journal.* 2018;56(1).
6. Omar MA, Aram FO, Banafa NS. Causes of mortality among critically ill patients admitted in intensive care unit. *Bahrain Medical Bulletin.* 2015

- Sep;37(3):178-80.
- [7]. Onyekwulu FA, Anya SU. Pattern of admission and outcome of patients admitted into the Intensive Care Unit of University of Nigeria Teaching Hospital Enugu: A 5-year review. *Niger J Clin Pract.* 2015 Nov-Dec;18(6):775-9. Pubmed PMID: 26289516.
- [8]. Rajput T, Sohail F, Qabulio SN, Zakir MF, Soomro MY. Admission Patterns and Outcomes in an Adult Intensive Care Unit in Medical Patients in Karachi.
- [9]. Smith ZA, Ayele Y, McDonald P. Outcomes in critical care delivery at Jimma University Specialised Hospital, Ethiopia. *Anaesth Intensive Care.* 2013 May;41(3):363-8. Pubmed PMID: 23659399.
- [10]. Soares Pinheiro FGM, Santana Santos E, Barreto ÍDC, Weiss C, Vaez AC, Oliveira JC, et al. Mortality Predictors and Associated Factors in Patients in the Intensive Care Unit: A Cross-Sectional Study. *Crit Care Res Pract.* 2020 Aug 1;2020:1483827. Pubmed PMID: 32802502.
- [11]. azebew, Ashenafi, Tigist Bacha Heye, Ashenafi Tazebew, Biniyam Chakilu Tilahun, and Tigist Bacha Heye. "ORIGINAL ARTICLE ADMISSION PATTERN AND OUTCOME IN A PEDIATRIC INTENSIVE CARE UNIT OF GONDAR UNIVERSITY HOSPITAL" 2019;57 (2): 1-5.
- [12]. Lema GF, Tessema HG, Mesfin N, Fentie DY, Arefaynie NR. Admission pattern, Clinical outcomes and associated factors among patients admitted in medical intensive care unit at University of Gondar Comprehensive and specialized hospital, Northwest Ethiopia, 2019. A retrospective cross-sectional study.
- [13]. Orban JC, Walrave Y, Mongardon N, Allaouchiche B, Argaud L, Aubrun F, et al. Causes and Characteristics of Death in Intensive Care Units: A Prospective Multicenter Study. *Anesthesiology.* 2017 May;126(5):882-889. Pubmed PMID: 28296682.
- [14]. Vincent JL, Marshall JC, Namendys-Silva SA, François B, Martin-Loeches I, Lipman J, et al. Assessment of the worldwide burden of critical illness: the intensive care over nations (ICON) audit. *Lancet Respir Med.* 2014 May;2(5):380-6. Pubmed PMID: 24740011.