

Angela Palitto

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Introduction: Making the choice to admit to the hospital or to discharge home is a key decision that emergency physicians face for every patient every single shift. Sometimes this decision is very straight forward, but quite often it can be disconcertingly unclear. A multitude of factors influence how to properly disposition a patient and each patient presents his/her unique set of circumstances. Due to this complexity, it is difficult to have a set of rules to follow or to teach someone how to do it. Unfortunately, making the wrong decision cannot only lead to bounce backs, but it can increase patient morbidity and mortality. Therefore, any guidance in this area could prove to be a real benefit to patients. In the United States, people over the age of 65 have the highest rate of ED visits among adults. With this elderly age comes increased risk due to usual medical comorbidities. Due to the lack of data describing what factors influence poor outcomes after discharge, this study uses clinical records to identify these factors particularly in the elderly population. Poor outcomes are considered to be either death or an ICU admission with 7 days of discharged from the emergency department.

Methods: This study was conducted using a matched case-control study of patients aged 65 and older. To be eligible for the study, patients had to be treated and discharged from any of 13 Kaiser Permanente Southern California and then either have died or had an ICU admission within 7 days. Patients also had to be a member of the health plan. After exclusion criteria were applied, there were 1,055 eligible cases. Those cases were then paired 1:1 to eligible controls using a daisy chain algorithm that matched certain variables. There were 171,108 eligible controls and a total of 1,027 case-control visit pairs. Of those, 300 were chosen due to the researchers' power analysis that was based on previous literature. Using an odds ratio of 1.8 for a poor outcome within 7 days, 300 case-patient visits with 1 matched control per case were needed to reject the null hypothesis with a power of 0.8 and type 1 error of 0.5.

Results: Out of the 300 matched cases, the factors that were found to cause a combined poor outcome included presence of cognitive impairment (including acute or chronic mental status changes), a fall in the 30 days before the ED visit, or change in disposition of "admit" to "discharge". Of note, the change in disposition could be from either the physician changing his/her mind, or the patient leaving against medical advice. The researchers also present adjusted odds ratios and looked at individually at death only, ICU admission only, or the presence of both ICU admission and death. The variables that were found to be significant were race/ethnicity, vital signs of systolic pressure and pulse rate, measures of cognitive impairment, and change in disposition plan. For either death only, or ICU and death combination, a pulse rate greater than 90 and systolic blood pressure less than 120 were associated. The same was true for cognitive impairment and disposition changes. For the outcome of ICU admission only, only change in disposition plan was associated. As far as ethnicity/culture differences, Asian/Pacific Islanders were more likely to have a combined poor outcome when compared to whites.

Limitations: Although there were many benefits of this study, such as being high-powered at a lower cost than a cohort study, there were also limitations. First, all of the patients were from the same geographic location in Southern California. These patients could have different characteristics than those in other regions. Second, all of the patients in this study were in the health plan and had access to reliable outpatient follow up. This is not the case in every system and results could be much different in patient populations with little to no access to follow up. Third, vital signs are constantly changing for a variety of

reasons and this study only looked at the vital signs closest to discharge. Fourth, because this study was done by chart review, it depends on the accuracy and thoroughness of the documentation, which may not always be accurate or complete. Finally, even though hospice patients were excluded, this study did not distinguish between expected and unexpected outcomes. There could be instances in which the patient knew they were going to have a poor outcome if they went home, but chose to leave anyway.

Discussion/Conclusions:

Disposition of patients is a critical skill emergency physicians must have. Unwarranted admissions can lead to increased nosocomial infections, unnecessary costs, and iatrogenic complications. On the other hand, discharging sick patients home can lead to avoidable death or disability. This study helped identify multiple factors that we can use in the emergency department to decrease the likelihood of a bad outcome in the elderly population. Taking care not to change the disposition plan from admit to discharge is important. The researchers found that making this decision in consultation with a specialist actually proved to be helpful. It is important to note however, that if the ED physician feels strongly about the patient being admitted, they shouldn't give in to a specialist or hospitalist who isn't there seeing the patient, as that has shown poor outcomes. For cognitive impairment, several tools can be used to help make this decision. The Six-Item Screener has been shown to have similar sensitivity to the Mini Mental Status Exam but is much more practical in the ED setting. As far as vital signs, this study reaffirmed that it is imperative to re-address abnormal vitals prior to discharging any elderly patient and if the vitals remain under 120 for systolic blood pressure or greater than 90 for heart rate, admission should be considered. Ethnicity differences are not as clearly definable. There are many characteristics that could be to blame for varying outcomes, which include a culture's approach to medicine, different social supports, or bias when being treated.
