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Preventing Med-Related Errors in the ER

INCIDENCE AND PREVENTABILITY OF MEDICATION RELATED VISITS TO THE EMERGENCY DEPARTMENT

A range of factors likely contribute to the incidents of medication related visits to the ER, prescribers instructions, the patients adherence to those instructions, the drugs themselves and many more. How serious are many of these events though. How can medical professionals help prevent these episodes. You are listening to ReachMD, the channel for medical professionals.

Welcome to focus on pharmacy I am your host, Dr. Charles Turck, PharmD and our guest is Dr. Peter Zed PharmD is a pharmacy specialist in emergency medicine and an associate professor in the Department of Emergency Medicine and College Of Pharmacy at Dalhousie University in Halifax Nova Scotia. Dr. Zed is the lead author of research published in the Canadian Medical Associates internal and medication related visits to the emergency room.

Dr. TURCK:

Welcome Dr. Zed.

Dr. ZED:

Thank you for having me.

Dr. TURCK:

We are discussing the incidence and preventability of medication related visits to the emergency department. Dr. Zed briefly what was your study about?

Dr. ZED:

Our study attempted to prospectively evaluate the magnitude of medication related problems that resulted in emergency department visits. We attempted over a 12 week period to look at a population of just over 1000 patients that presented to large tertiary care teaching hospital in Western Canada which resulted in more than 12% rate of adverse drug related events meaning the reason that they presented to that emergency department was in fact related to the medication.

Dr. TURCK:

Which medications or classes of meds were most commonly implicated in ED visits?

Dr. ZED:

We certainly saw in our study wide range of medications involved the mix; however, if you break it up into larger classes, central nervous system acting agents, opioid containing analgesics, antipsychotics, benzodiazepines, drugs of the central nervous system class was the largest population of class that was about 40% of the population that was followed by number of medication classes that kind of were close together with regards to the rate, cardiovascular agents were almost 13%, antimicrobial agents about 11%, and hormone modifying agents and musculoskeletal agents at around 10%. So there was a representation that was not unlike previous work looking at adverse drug events and things like hospitalizations and emergency room visits, and ambulatory visits, but it was also the big drug classes that we observed.

Dr. TURCK:

How severe were the drug related cases.

Dr. ZED:

We looked at kind of standard classification system of kind of mild, moderate, severe in state, but unfortunately for a patient none of the patients had resulted in a fatality as a result of their emergency department visit due to medications; however, we did have a population of patients that sat in the severe range that looked upwards of the 15% range and the severe range was defined as something that could have been life threatening or resulted in a permanent disability as a result of their presentation, so these have been things such as serious bleeding complication potentially from anticoagulation therapy or hypoglycemic episodes that resulted in some type of resuscitation because of oral hypoglycemic agents or insulin. So the biggest class was moderate in severity, which was simply an intervention was required to manage their presentation, but more concerning I think is that group of 15% that was severe.

Dr. TURCK:

Just from a frequency perspective how did adverse drug-related adverse events most commonly manifest clinically.

Dr. ZED:

Kind of an extension of the drug classes that were affected, central nervous system presentation often times resulted in things such as increasing pain, problems with confusion. We had a number of cases of seizures as a result of being noncompliant with antiepileptic medications that was kind of some of larger classes within the central nervous system class, gastrointestinal problems as we all commonly see with medications nausea, vomiting, diarrhea, constipation, abdominal pain were kind of large within that group. Within the cardiovascular medication group we saw couple of arrhythmias, some problems with blood pressure both being elevated blood pressure as well as hypotension and then we also saw a number of patients experience heart failure exacerbations because of problems with the medications, failure to use the medications, or simply not being on best practice medications that they should have in fact been on to manage their heart failure and so it was really an extension of the drug classes of the types of things that we saw as a result of their presentation.

Dr. TURCK:

And how do you determine casualty.

Dr. ZED:

Casualty was a difficulty one in this area because for some of these adverse events because we used a comprehensive definition of adverse drug events we simply could not use a single validated tool because one does not exist for capturing all the things that could happen so we ended up using 2 different tools one is the Naranjo probability scale, which most healthcare professionals have seen or heard up in the past, but it is truly been designed and validated in patients that are specifically having an adverse drug reaction and so as a result of previous work from members of our group we have modified Naranjo scale obviously not validated, but modified it to the

point were some of the general principles of determining casualties such as temporal course, challenge, de-challenge were incorporated into the modification of the Naranjo scale because we did that modification we also used a world health organization casualty score as well just to make sure that we were robust in determination of casualty and the two actually came out quite good was with regard to its correlation for ability to predict the causation of the drug and the emergency department visit.

Dr. TURCK:

How often did you find a drug-related event resulted in a hospital admission from the ED?

Dr. ZED:

The hospitalization rate was one of our surprise findings and the general population within our emergency department had about a 23% rate of hospitalization as a result of their other presentation to the emergency department. When the patients presented with a drug-related cause, we found the rate of hospitalization was about 36%, so it was actually surprising to us that we actually saw a greater number of patients being admitted to the hospital. When those patients were admitted we also observed about a medium 3-day length of stay that was in fact longer than the patients that would have been admitted for non-drug related cause.

Dr. TURCK:

How often did you find that a drug-related adverse event was actually preventable?

Dr. ZED:

Our preventability rate for this particular study was found to be 68%. We first hear that number I am sure many of listeners will think that such a high number, but in fact the 68% preventability rate that we did observe was consistent with previous work that has been done in a number of different settings. There has been preventability rates are consistently described as being between 50% and 70%, some previous work we had done in our area also suggested 70% preventibility rate. So we fell as expected in that range that has been previously described and from our previous work.

If your are just joining us you are listening to focus on pharmacy on ReachMD. I am your host, Dr. Charles Turck our guest is Dr. Peter Zed PharmD, pharmacy specialist in emergency medicine and an associate professor in the department of emergency medicine and college of pharmacy at Dalhousie University in Halifax Nova Scotia. We are discussing the incidence and preventability of medication related visits to the ED.

Dr. TURCK:

Dr. Zed where there any independent predictors of drug related ED visits that you found in your study.

Dr. ZED:

We actually did number of different analysis to try to determine the factors and what we found is that when we univariantly looked at the factors the three big ones that came out were the number of comorbidities, number of medications the patient received as well as the use of multiple prescribers for the medication. When you are going to put those back into a multivariant regression only the number of medications independently associated with a drug related visit. The more medication the patient was receiving the more likely they were to have a medication related visits to the emergency room.

Dr. TURCK:

What did you consider to be potential confounders that you took into account in the regression analysis?

Dr. ZED:

We looked at number of factors both patient factors as well as prescriber factors and system factors with some drug factors so thing such as age, gender were evaluated from patients perspective and having a family physician or regular general practitioner that cared for the patient versus not was one of our factors using multiple prescribers, being on a medication regimen that involved multiple medications was back to be in to the model in addition to the use of compliance aid, so we looked at patients that were actually use the compliance aid versus did not. Other factors that may have been contributory to medication related problems such as renal dysfunction or liver dysfunction they were also reevaluated as potential confounders that may have in fact predicted medication misadventures the model was robust and looking at number of different factors from a patient system, drug, and prescriber perspective.

Dr. TURCK:

How does your study compared to the other literature on this matter.

Dr. ZED:

_____ in the middle with the percentage rate that we found, the rate of drug related visit has been reported as high as 28% in some studies. The problems with some of those studies that report a rate that is that high, is often times they select out patient population that is inherently high risk to begin with. Retrospective studies will report rates much lower than that somewhere in the 5% or less range and the problem with the retrospect design is you would likely going to underreport the events simply due to data loss or inaccurate documentation or inability to actually determine the nature of visit at a single point in time in the emergency department. Our goal was to really look at all comers and we wanted to know not in high risk patient population we wanted to know that in the general population that visits in emergency department what is the percentage of patients that are there because of the medication related visits, so our 12% rate kind of falls in as to what we expected to find, but does kind of fall in the middle of the range as to what has been previously described.

Dr. TURCK:

Your study as I read a little bit earlier, was conducted in Canada is there any reason to believe that there are any national differences that would prevent generalizing your findings to the United States or any other countries.

Dr. ZED:

There are healthcare differences that exist between Canada and US, but the reality is the patients that are being managed with medications should theoretically be the same in both countries and so there is really we took some steps in our study to try to improve the generalized ability to general populations of patients, so what you would expect in a small rural versus an urban setting, a tertiary care center versus a primary care center or secondary care center are certainly usually we do not expect there to be large differences. I will say; however, that the study that was conducted in essence that did not care for pediatric patients and so the pediatric patient population was not represented on our study and it would probably be inaccurate to extrapolate our findings to pediatric patient population.

Dr. TURCK:

So how do you feel your study contributes then to the understanding of drug related ED visits?

Dr. ZED:

I think what our study does now is I think it fills a gap that has existed in the literature with regards to really appreciating what the

magnitude of the problem is. There have been other well-conducted studies prospectively designed that look at the number of hospitalizations that occur because of medications. There are studies that have attempted to look at adverse drug related events after patients leave the hospital as well as ambulatory care setting. I think what our study attempts to do now is to fill in that last piece and together we can now appreciate the fact that we have large a problem facing us with regards to adverse drug related events. These visits will take up a significant amount of resources in our emergency departments and I think that we need to take steps and these steps are not easy ones, but we will have to start to take steps to try to reduce the magnitude of the visits and kind of move past this epidemiologic assessment start to look at interventions that we can do within our healthcare system to try to reduce these patients from coming into the emerg.

Dr. TURCK:

Have you identified at your institution any off shoot studies or future research that you are interested in conducting on the basis of your findings from this study?

Dr. ZED:

Yeah there is number of different areas that I think that you can go with future work. The solution to this problem is not an easy one and coming up with the magic bullet to reduce the drug related visits is simply not there. There is a number of things that we are going to attempt to look at over the next 2 years and one of them probably an earliest ones we will look at is some interventions that can be done to patient population and I say intervention meaning how can we set this patient up to be on best practice to be monitored properly when they leave the institution have their medications adjusted as need be in a timely manner so almost in a chronic disease type of management scenario so that every member of the healthcare team can contribute to that patient having and giving him the best chance for the best patient outcomes from the drug therapy and I think that is some of the things that we will start to look at probably in a randomized control through out type of model where we will look at interventions that may impact the reduction of adverse drug events in general and emergency department is only one place that they could land, but it could ultimately have less visits to the family physician, less hospitalizations, and hopefully less emergency department visits as well.

Dr. TURCK:

We have been talking with Dr. Peter Zed about the incidence and preventability of medication related visits to ED. Thank you Dr. Zed. Thanks so much for joining us.

Dr. ZED:

My pleasure. Thank you for having me.

I am Dr. Charles Turck you have been listening to focus on pharmacy on ReachMD, the channel for medical professionals. Please be sure to visit our web site at reachmd.com featuring on demand podcasts of our entire library. For comments and questions please call us toll free at 888MDXM157 and thank you for listening.