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Factors Influence the Potential Drug Interaction Occurence among Hospitalized Patients with Cronic Kidney Disease at Labuang Baji Hospital Makassar

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Abstract

Drug interactions (DIs) is one category of drugs related problems that may affect the clinical outcome of patients. Individuals with chronic kidney disease (CKD) often require multiple classes of drugs being at important risk for the development of DIs.The objective ot this study was to determine the factors that influence to potential of drug interaction occurence in patients with CKD at Labuang BajiHospital Makassar. A cross-sectional study was conducted in April and May 2015. Number of sample was 82 medical records. The sample was selected by using a proportioned stratified sampling. The drug interaction was confirmed in the website http://www. drugs.com, Tatro Drug Interaction Fact, and Stockley's Drug Interactions. To determine the correlation between dependent and independent variables, Spearman's bivariate correlation (for, age, complication, number of drugs used, and lenght of stay) and Mann-Whitney's Comparative Test (for sex) were used. Results of analysis with Spearman Rho test found the three factors that influence to thepotential of drug interaction occurence were the number of drugs used ($p = 0.000$; $r = 0.60$) complications ($p = 0.001$; $r = 0.356$), and lenght of stay ($p = 0.000$; $r = 0.405$). This study conclusion that number of drugs used were risk factors strongly influence to the potential drug interaction occurence.

Keywords: drug interaction; chronic kidneydisease; Labuang Baji Hospital.

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1. Introduction

The increasing burden of patients with multiple disease conditions, drug therapy has grown more complex. In clinical practice, multiple drugs are often combined in the treatment of patients with chronic diseases. These associations generally produce drug interactions (DIs) with expected beneficial effects, but in some cases undesired outcomes may also occur, such as ineffective treatment and severe adverse events [1,2]. DIs are common in clinical practice. DI can be defined as the set of alterations introduced upon the therapeutic effect of a given drug stemming from the coadministration of one or more medications [2,3].

In the last decade, drug-drug interactions are progressive recognized as a very important part of the health services in most countries around the world [4]. This situation is caused by more evidence that indicate a great negative effects and serious clinical damage from various types of drug-drug interactions [5,6]. Drug-drug interactions appears as a cause of drug related problems (DRP) which, when present, produces negative impacts on morbidity, mortilitas, toxicity, liver and kidney damage, anemia, increased length of stay and cost of care, decreasing quality of life [7,8,9].

Drug interactions (DIs) are directly related to factors such as polypharmacy, aging, hepatic metabolism and decreased renal function. The incidence of kidney disease has increased significantly in recent years. Patients with renal impairment are at high risk against the potential of drug-drug interactions occurrence due to the large number and types of drugs they received and the effect of renal disease in drug excretion [10].

Several studies of drug-drug interactions in patients with chronic kidney disease have been conducted well in west and Asia Countries, including Indonesia. A study of drug interaction in patients with chronic kidney disease found 76.09% (474 cases) were detected drug interactions [11]. In the study was conducted in Centro clinical Hiperdia Minas at Brazil there were ten drugs most often prescribed for patients with CKD: furosemide (8.4%), simvastatin (7.1%), losartan (7.1%), acetylsalicylic acid (5 , 2%), captopril (4.7%), hidroklortiazid (4.7%), omeprazole (4.5%), enalapril (4.1%), amlodipine (3.3%), and nifedipine (3, 1%) (8). While the result of study at Dr. Soedarso Hospital, Indonesiawas foundthe potential of drug interactions occur as much as 20% on prescriptions with <5 types of drugs and 46% on prescriptions with $\geq$ 5 types of drugs of 240 total sheets prescription [12].

Therefore, the potential of drug interactions that are commonly found in patients with chronic kidney disease prescriptions can cause serious adverse event if it is not detected as early as possible. Finally Drug interactions need to be considered because it can affect the body's response to treatment [13]. The data obtained from this study will be very helpful for the nephrologists in the therapeutic management of patients with CKD effectively. Furthermore, the results of this study are very helpful physicians, clinical pharmacists, and nurses to intervene, prevent and reduce morbidity due to adverse effects of drug interactions.

2. Materials and Methods

This cross-sectional retrospective observational study was carried out at the Labuang BajiHospital Makassarcovering the period April and May 2015.The populationof this study wasallofmedical records of

inpatiens with CKD. The samples used weremedical recordsof inpatients.The samples wereselectedby using *Proportioned Stratified Sampling* technique. The samplewere determine by using Slovin formula with an error rateof 5%. The number of samples given by the formula were82 medical records.

2.1 Inclusion criteria

1) Medical records of inpatient in Labuang BajiHospital Makassar for the period of January-December 2014.
2) The patients of between 15 and 80 years of age.
3) The patients who were given two or more drugs.

2.2 Eexclusions criteria

1) The patients who were given one drug so that drug-drug interaction could not be identified.
2) Patientswith the strokedisease.
3) Incomplete records.

2.3 Data collection

The data were collected by gathering medical records of pediatric inpatient at Labuang Baji hospital, Makassar for the period of January-December 2014. The kinds of data collected were demography, number of drugs used, complication, length of stay, and and duration of disease. The drugs written in the medical records were checked for the potential drug interaction in website http://www.drugs.com and Tatro Drug Interaction Facts (2014) andStockley's Drug Interaction (2014).

2.4 Data analysis

Descriptive analysis was performed using frequencies for categorical variables. Sperman bivariate correlation analysis using to determine independent variablesofage, complications, number of drugs used, length of stay, and the dependent variable, that is, the number of potential drug interaction occurrences. In addition, Mann-Whitney of comparative test was used to find out the correlation between sex and potential drug interaction occurrences.

3. Results

3.1 Characteristics of subjects

Based on study has been conducted, 82 medical records of inpatients with CKD were included. Characteristics of subjects was shown in Table 1.

3.2 The factors related to potential drug interaction occurrences

Based on statistical analyses, the factors-related to potential drug interaction occurrences wasshown in Table2.

Table1: Distribution of potential drug interactions occurence of characteristics of subjectsat Labuang Baji Makassar Hospital for period January-December 2014 (n = 82)

Variables	Interaction				Total
	Yes		No		
	n	%	n	%	
Sex					
Male	16	37.2	19	48.7	35
Female	27	62.8	20	51.3	47
Age (Year)					
< 35	5	11.6	5	12.8	10
35-55	20	46.5	22	56.4	42
> 55	18	41.9	12	30.8	30
Complication					
uncomplication	3	7.0	9	23.1	12
1	12	27.9	18	46.2	30
≥ 2	28	65.1	12	30.8	40
number of drugs used					
3	2	4.7	16	41.0	18
4-6	7	16.3	15	38.5	22
> 6	34	79.1	8	20.5	42
Length of stay (days)					
< 3	3	7.0	16	41.0	19
4-6	19	44.2	15	38.5	34
> 6	21	48.8	8	20.5	29

Table 2: The Factors related to potential of drug interactions occurrence of inpatient with CKD at Labuang Baji Hospital Makassar for period January-December 2014(n =82)

Variables	Interaction				Analysis	Correlation (r)
	Yes		No			
	n	%	n	%		
Sex					*Mann Whitney*Cmparative test (p = 0.296)	
Male	15	36.6	20	48,8		
Female	26	63.4	21	51.2		
age (year)					Spearman bivariate correlation (p = 0.369)	0.101
< 35	4	9.8	6	14.6		
35-55	19	46.3	23	56.1		
> 55	18	43.9	12	29.3		
Complication					Spearman bivariate correlation (p = 0.001)	0.356
uncomplication	3	7.3	9	22.0		
1	12	29.3	18	43.9		
≥ 2	26	63.4	14	34.1		
Number of drugs used					Spearman bivariate correlation (p = 0.000)	0.600
3	1	2.4	8	19,5		
4-6	8	19.5	16	39.0		
> 6	32	78.0	17	41.5		
Length of stay (days)					Spearman bivariate correlation (p = 0.000)	0.405
< 3	3	7.3	16	39.0		
4-6	16	39.0	17	41.5		
> 6	22	53.7	8	19.5		

4. Discussion

The factors related to the potential drug interaction occurrences, according to Spearman, the potential of drug interaction occurence were the number of drugs used (p=0,000), lenght of stay (p=0.000), and complication (p=0.000).The number of drugs used has a strong correlation and influence with potential drug interactions (r=0.600), while lenght of stay and complication has weak correlation (r=0.405) and (p=0.365). This conclusion is confirmed by the standard proposed by [14], which states that r= 0.50-1.00 shows a strong correlation and r<0.50 shows weak correlation. On the other hand, the age factor did not show any significant correlation with potential drug interactions (p=0.369), which means that the correlation is not significant since p >0,05.

This studyaccording to by [11. 15. 16] which state that the number of drugs used have correlation with the potential drug interaction (p = 0.000), (p=0.006), and (p=0.026). Anotherresearch by [17] also support this study that state the patients with greater number of prescribed medications is very high potential for drug interactions with AOR = 4.09 and p = 0.000. The study was conducted by [18] also shown the number of drugs sed significantly influence topotential drug interaction which the risk of drug interactions increase of 3-5 drugs given with OR = 4.74 and for the number of drug given ≥ 6 has OR = 23.03 and p = 0.001. While the study was conducted by [19]) wasshown there is a significant correlation between the number one prescription drug with potential of drug interactions occurrence with p <0.05 and the drug interactions occurence was increased 6 times higher in recipes containing ≥ 5 type of drugs than < 5. The Mann-Whitney comparative test results showed that sex and potential drug interaction occurrences did not show any significant difference (p>0.05), which means that sex factor has no connection with drug interaction occurrences.

5. Conclusion

Based on the statistical analysis on factors influencing drug interactions at Labuang Baji Hospital, Makassar, it can be concluded that: the number of drugs used has a strong influence and correlation with the potential drug interactions occurencewhile length of stay and complication has weak correlation. However, age and sex do not have any correlation with the potential drug interaction occurrences

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