

## The Influence Of The Use Of Personal Medication Record (Pmr) On Medication Appropriateness

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### ABSTRACT

**Objective:** To analyze the influence of Personal Medication Record (PMR) on medication appropriateness.

**Method:** This study used pre-experimental design with one group pretest-posttest design. This study involved 21 parents of epilepsy children, seven neurologist and four pharmacy personnel. The data was analyzed by using Mc Nemar test.

**Result:** Based on the Mc Nemar test, there is no statistically significant difference on the medication appropriateness before and after the use of PMR ( $p > 0,005$ ). Nevertheless, neurologist and pharmacy personnel can do medication reconciliation through PMR as a comprehensive documentation medium. PMR has also a clinically positive impact on improving the medication appropriateness for each patient.

**Conclusion:** The use of Personal Medication Record (PMR) does not give any influence towards medication appropriateness.

Keywords: epilepsy, medication appropriateness, personal medication record, pre-experimental.

### I. INTRODUCTION

Patients with chronic illness require health services from different health professionals. For example, every month patients with chronic disease receive a healthcare services and medication from general physician or specialist in primary care settings. The same patient may also receive

services from different health teams when they enter the hospital [1]. This is known as a transition of care, in which the patient experiences a shift from a health worker or a health care provider to a health worker or other health care facility according to the patient's condition and needs [2]. During this

transition process, patients are more susceptible to medication errors and medication discrepancies. It is caused by many factors such as therapeutic replacement, complex treatment regimen and incomplete information transfer between health personnel and caregiver of the patient during transition process [3,4]. A study by Corbett et al found that 94% of patients with chronic diseases had at least 1 medication discrepancy, with median medication discrepancy rates of 3.3 per patient when they moved from hospital to home [5]. Epilepsy is one of the most widely recognized chronic diseases and afflicted by approximately 50 million people worldwide [6]. In Indonesia there are at least 700.000-1.400.000 cases of epilepsy with an increase in new cases of 70.000 each year and an estimated 40%-50% of cases it occurs in children [7]. Epilepsy in children presents its own challenges for its medication. These challenges include the accuracy of diagnosis, treatment options, and also the cognitive and behavioral disorders that accompany epilepsy. The more prolonged the seizure, the more likely the brain is to suffer ischemia and brain damage [8]. Various challenges in the treatment of epilepsy children encourage a collaboration between patient and health worker to achieve optimal treatment goals [9].

One of the effort to improve patient safety during transition of health care is medication reconciliation [10]. Based on the Regulation of the Minister of Health No. 58 2014 on the standard of pharmaceutical

services in hospitals, medication reconciliation is the process of comparing medication instructions with medications that have been obtained by patients [11]. Medication reconciliation of treatment is a process whereby health workers collaborate on the concept of medication therapy management [10]. One of the core elements of medication therapy management is the Personal Medication Record (PMR). The PMR is a comprehensive record of patient treatment, such as prescription treatment, prescription treatment, herbal remedies and other supplements. Pharmacists can use PMR to communicate and collaborate with physicians and health workers to achieve optimal outcomes for patients. The use of PMR can support the uniformity of information among all health personnel and improve service continuity so that treatment conformity can be achieved, especially in patients with chronic illness [12]. Previous studies by Indah (2013) have found that medication errors in the prescribing and administration aspects can be decreased through the use of PMR [13]. This next study is done to analyze the influence of Personal Medication Record (PMR) on medication appropriateness.

## **II. METHOD AND PROCEDURE**

This study is an pre-experimental study using a one group pretest-posttest design to identify the differences of medication appropriateness frequency before

and after PMR use. The study was conducted at Neurology Clinic of Naval Hospital Dr Ramelan Surabaya from April to July 2015. The inclusion criteria in this study were parents of epilepsy children aged less than 12 months, neurologist and pharmacy personnel who is directly involved in the treatment of children. The exclusion criteria in this study were illiterate parents. Parents that involved in this study will get a PMR to be used for 2 months. Every time there is a change of treatment regimen, therapeutic substitution, addition or discontinuation of therapy, the parents have to write that changes into PMR [12]. The parents should always carry PMR every time they visit health care to ensure that neurologists and pharmacy personnel can access accurate information about the patient's treatment. Medication appropriateness was measured by a medication discrepancy identification sheet obtained from a study by Claeys et al [14]. Medication appropriateness is defined as compatibility between various data sources of patient treatment such as medical records, drug etiquette and verbal information from the parents. The results of the treatment will be analyzed through the non parametric Mc Nemar test.

### III. RESULT

A total of 21 epilepsy children's parents, seven neurologists and four pharmacy personnel involved in this study. The majority of epilepsy children were male with the majority of age between 4-5 years.

years old who was directly involved in the treatment of children and have regular visits (control of treatment) at Neurology Clinic of Naval Hospital Dr Ramelan for the last three consecutive

The most common types of epilepsy suffered by the children are general idiopathic epilepsy and unspecified epilepsy. The parents who are most involved in the study were mothers, with the majority of ages ranging from 31-35 years old. The majority of mothers also have a high school education background and work as housewives. Demographic data from children and the parents are shown in table 1. Medication discrepancies and appropriateness on each type of discrepancy before and after the intervention is being measured by a medication discrepancy identification sheet. The number of medication discrepancies and appropriateness are shown in table 2.

Table 1. Sample Characteristics

Characteristics	F	%
Sample		
Gender		
Male	15	71,43
Female	6	28,57
Old (year)		
<1	1	4,76
1-3	6	28,57
4-5	8	38,09
6-8	1	4,76
9-11	3	14,28
12-14	2	9,54
Type of epilepsy		
General idiopathic epilepsy	5	23,79
Epilepsy unspecified	5	23,79
Tonic general	4	19,08
Complex partial	3	14,28
Absence seizure	2	9,54
Tonic-clonic general	1	4,76
Focal secondary generalized	1	4,76
Parents		
Mother	15	71,43
*Father and mother	6	28,57
Mother's age (year)		
20-25	1	4,76
26-30	1	4,76
31-35	11	47,63

36-40	4	19,08	Occupation		
41-45	3	14,28		Housewife	17
46-50	1	4,76	Government employee	1	4,76
Education			Shop employee	1	4,76
Senior High School	17	80,92	Nurse	1	4,76
Diploma 2	1	4,76	Lecturer	1	4,76
Diploma 3	1	4,76			
Bachelor's degree	2	9,54			

**Table 2. Percentage of Medication Discrepancies and Appropriateness**

No	Types of Medication Discrepancy	Before Intervention				After Intervention			
		Discrepancy		Appropriateness		Discrepancy		Appropriateness	
		F	%	F	%	F	%	F	%
1.	Omission	5	23,81	16	76,19	0	0	21	100
2.	Addition	2	9,52	19	90,48	0	0	21	100
3.	Generic-Brand Substitution	5	23,81	16	76,19	3	14,28	18	85,72
4.	Therapeutic substitution	2	9,52	19	90,48	0	0	21	100
5.	Dosage	2	9,52	19	90,48	0	0	21	100
6.	Frequency of administration	0	0	21	100	0	0	21	100
7.	Route of administration	0	0	21	100	0	0	21	100
8.	Formulation	0	0	21	100	0	0	21	100
9.	Time of administration	7	33,33	14	66,67	4	19,04	17	80,96
10.	Length of treatment	0	0	21	100	0	0	21	100

The percentage of medication appropriateness from the frequency of administration, route of administration, formulation, and length of treatment are 100%. After the intervention is given, the omission, the addition of drugs, therapeutic substitution and the dosage can achieve 100% appropriateness. The next step performs a

statistical analysis by the Mc Nemar test to analyze the differences between the medication appropriateness on each type of discrepancy before and after the intervention. Mc Nemar test results for each type of discrepancy are shown in table 3, while the causes of medication discrepancies are shown in table 4.

**Table 3. Mc Nemar Test Results on Each Type of Medication Discrepancy**

	OB & OA	AB & AA	GBB & GBA	TSB & TSA	DB & DA	TB & TA
N	21	21	21	21	21	21
Exact Sig. (2-tailed)	0,063	0,500	0,625	0,500	0,500	0,250

**Notes:**

OB & OA : Omission Before & Omission After  
 AB & AA : Addition Before & Addition After

GBB & GBA : Generic-Brand substitution Before & Generic-Brand substitution After  
 TSB & TSA : Therapeutic Substitution Before & Therapeutic Substitution After  
 DB & DA : Dosage Before & Dosage After  
 TB & TA : Time of administration Before & Time of administration After

**Table 4. Percentage of the Causes of Medication Discrepancy**

The Cause of Medication Discrepancy	Before Intervention		After Intervention	
	Frequency	%	Frequency	%
<b>Patient Level</b>				
Unintentional nonadherence	4	17,39	0	0
Self-medication	1	4,34	0	0
Intentional nonadherence	3	13,04	0	0
<b>System Level</b>				
Instructions to patient at transfer	7	30,43	3	13,04
incomplete/inaccurate/illegible	2	8,69	0	0
Instructions between prescribers at transfer	6	21,73	3	13,04
incomplete/inaccurate/illegible				
Administrative problems				

According to Table 4, the most common causes of medication discrepancy before intervention is an instruction to the patient at transfer incomplete / inaccurate / illegible at the system level. After the intervention is given, the medication discrepancies are still caused by an instruction to the patient at transfer incomplete / inaccurate / illegible and administrative problems at the system level.

#### IV. DISCUSSION

Parents of children with epilepsy have an important role in helping children to adapt to their condition. Parents play an important role in giving the best treatment, ensuring the child adheres to therapy, facilitates the social functioning of children inside and outside the home [15]. In this study, the parents that most involved in the study were mothers. Mother is

known as the primary caregiver because the mother has a responsibility for the treatment of children with chronic illness, especially if the mother works as a housewife (17). The other six were a collaboration between father and mother, where the mother was responsible for the treatment of the child at home and filled out the PMR while the father met the doctor every month for control and showed the PMR that already filled by the mother at home. Each complaint regarding the treatment (for example, side effects), time of administration and frequency of recurrence of the child's seizures is recorded by the mother in the PMR but the mother and child do not take control to the doctor every month. In this case, the father acts as a mediator to convey information related to the child's treatment

from the mother to the doctor indirectly through PMR.

Prior to the use of PMR, the frequency of administration, route of administration, formulation, and length of treatment had a 100% appropriateness. In other words, the discrepancy for these four aspects was not found. The most common discrepancy that being identified before the use of PMR was the time of administration (33.33%), followed by omission and generic-brand substitution with 23.81% each of them, addition, therapeutic substitution and dosage with 9.52% each of them. The causes of medication discrepancies are divided into two parts that are the patient level and the system level. At the patient level, medication discrepancies before the use of PMR are due to intentional and unintentional nonadherence and self-medication. At the system level, medication discrepancies before the use of PMR are due to instructions for patient and instructions between prescribers at transfer incomplete/inaccurate/illegible and also administrative problems.

After the use of PMR, the aspect that can achieve 100% appropriateness has increased. These aspects are the omission, addition, therapeutic substitution, dosage, the frequency of administration, route of administration, formulation, and length of treatment. The two other aspects such as time of administration and generic-brand substitution have not been able to achieve the 100% appropriateness, but the frequency of

discrepancy in both aspects has decreased. These two aspects are caused by instructions to a patient at transfer incomplete/inaccurate/illegible and administrative problem at the system level.

The discrepancy from the time of administration is the most common discrepancy identified prior to PMR use. It happened because the parents never get an explanation from the pharmacy personnel about the right time of administration so that the parents tend to give anti epileptic drug according to the child's waking time or the child's feeding time, so the time of drug administration becomes inconsistent. Some of this case can be solved because the neurologists write down the rules of drug use, for example, "every 12 hours" in PMR. However, some also claimed to be still unaware of the time of drug administration because they did not carry the PMR when they met the neurologist or simply took the prescription without met the neurologist so there were no records. Therefore, the discrepancy of administration time has decreased in frequency but still can not achieve 100% appropriateness.

Another medication discrepancy which also has not been able to achieve 100% appropriateness is the generic-brand substitution. This substitution is closely related to the national health insurance system applicable in hospital, where the drug may be replaced by a pharmacy department according to a national formulary [17]. Through the use

of PMR, pharmacy personnel may provide explanations to the patient through special notes when there is a change in drug names, so the patient does not feel confused over the drug renaming.

One of the discrepancy which able to achieve 100% appropriateness is omission caused by the unintentional nonadherence because of forgetting to take medication. Through the list of drug administration in PMR, the parents can remember the time for the children to take medicines. Neurologists and pharmacy personnel can also collaborate to monitor drug administration to ensure that medication is always taken daily. Therefore, after the use of PMR, omission does not occur anymore and achieves 100% appropriateness. In contrast to the omission caused by unintentional nonadherence, the addition of drugs actually occurs due to intentional nonadherence because the remaining drug that has stopped by the neurologist is still being used by the parents for their child. Another cause of the addition of drugs is the self-medication by the parents without a prescription because the drugs commonly prescribed for patients are no longer prescribed by the neurologist. Through PMR, the neurologist knows that the parents are still using a medication that has been discontinued or the patient buy his own drug without a prescription, so they will ask the parents about the reason. From this information, the neurologist will consider

whether the drug will be prescribed again or not.

Another problem of the discrepancy is the therapeutic substitution and dosage, which result from instruction between prescribers at transfer incomplete. The reason why therapy or dosage is changed is very important to be known by all health care provider who involved in the treatment of patients because all of them have a responsible for continuous monitoring of the medication [18]. Through the use of PMR, the neurologist may reconcile the medication to compare previous prescribing with prescribing recently given by another prescribers. When there is no clear reason for the change of therapy or dosage then the neurologist may confirm to the prescribing doctor.

In the process of transition of care, any health care provider who involved in the treatment of the patient have to do a medication reconciliation to prevent medication discrepancies. This reconciliation process is a comprehensive evaluation by comparing the medication history with current medication of the patients, especially if there is a change in therapy or therapeutic regimen [10]. Medication reconciliation has been proven to reduce discrepancies, that shown in the research conducted by Van den Bemt et al (2013). It showed that through medication reconciliation, the percentage of discrepancy decreased from 62% to 32% in hospitalized patients (OR = 0,29; 95% CI = 0,23-0,37) [19]. Another study by Murphy et al (2009)

obtained a decrease in the percentage of medication error after reconciliation from 90% to 47% in the surgical unit and from 57% to 33% in the care unit [20].

The medication reconciliation process can be well implemented if there is a documentation or record of patient accurately, so that the reconciliation process can run optimally [10]. Medication reconciliation refers to a pharmaceutical care philosophy that provides responsible and patient-centered care. This pharmaceutical care philosophy also provides an opportunity for patients and parents to be actively involved in the medication process. Therefore, the process of reconciliation involves not only collaboration among health care providers but also involving cooperation with patients because the patient is an important part of ensuring that the reconciliation process is effectively implemented during the transition of health services [14,21]. The differences in medication appropriateness before and after the use of PMR were not statistically significant by the Mc Nemar test, but PMR could be a patient medication information medium to support the implementation of reconciliation. In addition, PMR also has a clinically positive impact on improving the medication appropriateness for each patient. A non-statistically significant discrepancy has the potential effect for patient's clinical outcomes, even threatening patient safety. Through the use of PMR, any cause of

medication. An inconsistent documentation of patient medication history will potentially lead to discrepancies. PMR, in this case can be a comprehensive documentation medium that can accommodate all information of medication completely, consistently and medication discrepancy can be identified and resolved, so that the appropriateness may increase. This study is a new study so that the parents of epilepsy children and health care provider need socialization and further assistance during the use of PMR so that they can use PMR more optimally.

## V. CONCLUSION

Based on the results of the analysis, there is no statistically significant difference on the medication appropriateness before and after the use of Personal Medication Record (PMR) in children with epilepsy so it can be concluded that the use of Personal Medication Record (PMR) does not give any influence towards medication appropriateness. However, PMR has been proven to be a comprehensive documentation medium that holds all patient medication information completely so medication appropriateness can be increased.

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