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[← previous issue contents](#) | [volume / issue list](#) | [next issue contents →](#)

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Volume 38, Issue 2, Pages 65– 118 (April 2013)

CONTENTS

Research Articles

EFFECT OF TRIMEBUTINE MALEATE ON ACETYLCHOLINE, POTASSIUM CHLORIDE AND ADENOSINE TRIPHOSPHATE INDUCED CONTRACTIONS OF RAT DETRUSOR SMOOTH MUSCLE

Seçkin ENGIN*, Merve KILIÇ**, Elif Nur GAZIOĞLU*,
Mine KADIOĞLU DUMAN**o

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Pages, 65-71 [Abstract](#) | [PDF \(377 KB\)](#)

FORMULATION AND EVALUATION OF ORODISPERSIBLE TABLETS OF TRAMADOL HYDROCHLORIDE

Satinder KAKAR*o, Ramandeep SINGH*, Manisha SHAH*

* Himachal Institute of Pharmacy, Paonta Sahib, India

oCorresponding Author Address: satinder.kakkar5@gmail.com

Pages, 73-81 [Abstract](#) | [PDF \(361 KB\)](#)

PROGNOSTIC SIGNIFICANCE OF CASPASE- 3, BCL-2, P53 AND GSTPI EXPRESSIONS IN LUNG ADENOCARCINOMA

Serpil OGUZTUZUN*o, Ahmet OGUZ ADA**,

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Pages, 83-89 [Abstract](#) | [PDF \(662 KB\)](#)

MEASUREMENT OF PATIENT ADHERENCE TO THE USE OF NTIHYPERTENSIVE DRUGS BY MMAS-8 NND PILL COUNT IN 5 PRIMARY HEALTH CENTRES OF SURABAYA

Umi ATHIYAH*o, Annisaa Rosyida MACHFUD*,

Fatma ALDILA*, Lia YUNITA*, Mila Resmi ANANDA*, Nuzulla Elfa RIZKA*

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Pages, 91-97 [Abstract](#) | [PDF \(183 KB\)](#)

THE PLACE AND IMPORTANCE OF PHARMACY SERVICES IN DISASTERS#

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#This manuscript is an extended version of our oral presentation named as "Afetlerde Eczacılık Hizmetleri" at 6. Tıp Etiği ve Hukuku Sempozyumu in 2014.

Pages, 99-105 [Abstract](#) | [PDF \(117 KB\)](#)

BIODEGRADABLE POLYMERIC NANOPARTICLES ARE EFFECTIVE SYSTEMS FOR CONTROLLED DRUG DELIVERY

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Pages, 107-118 [Abstract](#) | [PDF \(195 KB\)](#)

[← previous issue contents](#) | [volume / issue list](#) | [next issue contents →](#)

Measurement of Patient Adherence to the Use of Antihypertensive Drugs by Mmas-8 and Pill Count in 5 Primary Health Centres of Surabaya

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Fatma ALDILA^{*}, Lia YUNITA^{*}, Mila Resmi ANANDA^{*}, Nuzulla Elfa RIZKA^{*}

Measurement of patient adherence to the use of antihypertensive drugs by mmas-8 and pill count in 5 primary health centres of surabaya

Antihipertansif ilaçlara hasta uyuncunun surabaya' nın 5 temel sağlık merkezinde mmas-8 ve pill count yöntemleriyle belirlenmesi

SUMMARY

Patient adherence towards medication is an important health issue that the pharmacists need to give more attention to. In order to determine patient adherence to the use of antihypertensive drugs in 5 Primary Health Centres of Surabaya, a cross-sectional study was conducted on February 2015 by using accidental sampling technique. The adherence measurement was performed by using two methods: Pill Count (PC) and self-report using MMAS-8 which was proven valid and reliable. Patient adherence measured by PC detected 135 respondents (66.2%) who were non-adherent in taking the medicine. Meanwhile, MMAS-8 showed that 117 respondents (57.4%) had a low level of adherence. The correlation between patient adherences measured by the two methods could be observed after classifying the level of adherence in MMAS-8 into two categories: adherent and non-adherent. The reclassification result identified 87 respondents (42.6%) who were adherent to the use of antihypertensive drugs. Additionally, the Chi-square test showed that there was no correlation between the measurement results of the two methods (sig. 0.898 > α 0.05). Accordingly, it can be concluded that non-adherent patients identified by the PC and patients with low level of adherence according to MMAS-8 were on the highest number. Therefore, pharmacist as a health advisor has an important role in the improvement of patient adherence.

Key Words: Patient adherence, pharmaceutical care, hypertension, MMAS-8, pill count.

ÖZET

Hastanın ilaca uyuncu eczacıların daha fazla önem vermesi gereken önemli bir sağlık sorunudur. Endonezyanın ikinci büyük şehri olan Surabaya'nın 5 Temel Sağlık Merkezinde antihipertansif ilaçların kullanımına hasta uyuncunu belirlemek için rastlantısal örnekleme tekniği kullanılarak Şubat 2015'de bir kesitsel çalışma yapılmıştır. Hasta uyuncu iki geçerli ve güvenilir yöntem olan Pill Count (PC) ve Morisky Medication Adherence Scale-8 (MMAS-8) öz-rapor metotları kullanılarak ölçülmüştür. PC yöntemi ile 135 hastada (%66,2) uyunç tespit edilememiştir. Diğer taraftan MMAS-8 yöntemi ile 117 hastada (%57,4) düşük düzeyde uyunç tespit edilmiştir. İki metotla ölçülen hasta uyunçları arasındaki korelasyon, MMAS-8' de uyunç düzeyini uyunçlu ve uyunçsuz olarak iki kategoride sınıflandırarak belirlenebilmektedir. Sınıflandırma sonrası 87 hastada (% 42,6) antihipertansiflere uyunç saptanmıştır. İlaveten ki-kare testi ile iki metodun ölçüm sonuçları arasında korelasyon gözlenmemiştir (sig. 0.898 > α 0.05). Sonuç olarak PC yöntemi ile uyunçsuz olarak belirlenen hastalar ve MMAS-8 yöntemi ile düşük düzeyde uyunç belirlenen hastalar sayıca çok fazladır. Dolayısıyla bir sağlık danışmanı olarak eczacıya hasta uyuncunu arttırmak konusunda büyük görev düşmektedir.

Anahtar kelimeler: Hasta uyuncu, farmasötk bakım, hipertansiyon, MMAS-8, pill count.

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INTRODUCTION

The positive development of pharmaceutical practice is characterized by changes in the focus of treatment. Initially, it was drug-oriented which then changed into patient-oriented. Patient-oriented treatment requires pharmacists to have a role not only as a provider of therapy in the form of medicines and medical equipment, but also to ensure patients to obtain appropriate therapy based on the indication as effective, safe and comfortable as possible. Therefore, pharmacists can contribute to the success of therapy and patients' quality of life by an approach called pharmaceutical care (1). Pharmaceutical care is a provision of drug therapy with the goal of reaching a definitive result to improve the patients' quality of life (2).

The pivotal role of pharmaceutical care practitioners is to prevent drug therapy problems in which one of the components of the drug therapy problems is non-adherence of drug use (3).

An example of disease that requires good adherence to therapy is hypertension (4). A person is considered to have hypertension if the systolic blood pressure is over 140 mmHg or the diastolic blood pressure is over 90 mmHg. The higher the blood pressure, the greater the risk the person to suffer from a heart attack, heart failure, stroke, and kidney disease. Blood pressure regulation requires a long-term period of therapy, so that patients tend to be non-adherent. Once the treatment is started, most patients must again undergo further examination and gain adjustment of drug dose for a period of several months or at least until the required blood pressure target is met (5). The cause of non-adherence in consuming antihypertensive drugs is very diverse, but usually non-adherence risk increases in patients taking more than one drug (6). In developed countries, e.g. the United States, there are only 51% hypertensive patients who adhere prescription drugs (7).

From a number of studies based on the diagnosis of health personnel, the prevalence of hypertension in Indonesia is 9.5%, and 25.8% is based on the results of blood pressure measurement. However, until now there is no valid incidence data (8). Surabaya is the second largest city in Indonesia. The Surabaya City Health Department included hypertension to the list of 10

most-occurred diseases on January - May 2004 (9).

This study aims to determine patient adherence to the use of antihypertensive drugs in Primary Health Centres. In the adherence measurement, generally there are several methods that can be used to measure patient adherence, particularly the elderly, to the use of drugs, such as pill count, pharmacy claims data, or self-report. The most widely used instrument on self-report is Morisky Medication Adherence Scale-8 (MMAS-8) questionnaire by Morisky (10).

According to a study conducted in Canada by Grimonprez et al., adherence to the drugs use measured by pill count method is much lower than that by self-report method. In the study, it is stated that the most accurate method to measure adherence is by testing the drug level in the blood, which is then followed by pill count, and self-report method is claimed as the one with the lowest accuracy (11). In contrast, the study conducted by Vik et al. in Croatia concluded that measurement by pill count is as well as by self-report (12).

Each method basically has limitation. For example, the determination of drug level in the blood tends to interfere patients' comfort, is costly and quite difficult to perform (12). Accordingly, it is advisable to measure adherence by using at least two different methods to overcome the limitation of each method and provide more convincing information (13).

Based on the facts and the data showing that adherence to the drug use is important for the hypertension treatment, a research on patient adherence to the use of antihypertensive drugs was conducted by using self-report method with MMAS-8 instrument and pill count method in PHCs in Surabaya.

The chosen hypertensive patients in the clinic as the research subject are in accordance with the Decree of the Minister of Health of the Republic of Indonesia Number 128/Menkes/SK/II/2004, which establishes Primary Health Center as a center responsible for providing health service at the primary level (14). PHC is easily found in every subdistrict and it is a primary health care center first visited by the community before visiting advance health care unit such as a district general hospital.

MATERIAL AND METHODS

This research is a cross-sectional study which was conducted in Primary Health Centers in Surabaya and in respondents' houses. The data were collected during February 2015. The population in this study was patients with hypertension visited Primary Health Centers in five regions of Surabaya during February 2015. The samples used were hypertensive patients in Primary Health Center, at the above-mentioned time that met the inclusion criteria. In this study, the sampling technique used was accidental sampling. At the time of the delivery of the drug in the clinic, pharmacist helped the researchers to identify hypertensive patients from the prescriptions received by the patients. The patients were then confirmed whether they had taken the antihypertensive drugs minimum for two weeks, had an ability to communicate well, and were willing to become the respondents. If so, then the patients were included in the inclusion criteria.

The source of the data was primary data obtained from the calculation of the amount of drugs consumed during a visit at the respondents' houses and the answers of the respondents obtained from guided interviews. Guided interviews were carried out based on the guidelines of MMAS-8 questionnaire (15). The calculation of the amount of drugs was performed twice with an interval of 3-5 day visit.

The variables, indicators, and adherence scale used in the study are described in Table 1. The research instrument

used in the pill count method was a form with a table of the amount of drugs list of the respondents at the house equipped by the table of prescription records from the Primary Health Centers. Meanwhile, the research instrument used in self-report method was MMAS-8 questionnaire that had been translated into Indonesian. The MMAS-8 questionnaire provided 8 questions consisting of 7 questions using dichotomous scale and one question using *Likert* scale. The questionnaire was not be filled solely by the respondents, but was asked verbally through interviews. Filling the questionnaire this way was done by the interviewer based on oral answers of the respondents (15).

The MMAS-8 questionnaire used in this study was proven valid and reliable to be used as an adherence measure of drug use in hypertensive patients with the sensitivity value of 93% and specificity value of 53%, as well as the reliability of α of 0.83 (16-18).

In this research, the data obtained from demographic information and pill count and MMAS-8 measurement were then analysed. From the pill count data, the percentage of adherence of each respondent was obtained, while from MMAS-8 data, the MMAS-8 scores for each respondent were obtained. These data were presented in a table with the number of digits (n) and percentage (%).

The adherence percentage was calculated based on the formula: adherence percentage = amount of drug consumed / amount of drug should be consumed x

Table 1. Variable, indicators, instruments, and adherence scales

Variable	Indicators	Instruments		Adherence Scales
Adherence	Forget to take the medicine	MMAS-8	no. 1, 4, and 8	Score 0 - < 6 : Low 6 - < 8 : Medium 8: High Dichotomy: No = 1, Yes = 0 Likert: Never = 4 Occasionally = 3 Sometimes = 2 Normally = 1 Every time = 0
	Not taking the medicine		no. 2 and 5	
	Stop drinking the medicine		no. 3, 6	
	Disturbed by the schedule of taking the medicine		no. 7	
	The accuracy of the amount of drug	Pill Counter Form		Adherence percentage <80%:Non-adherence 80-100%: Adherence

100%. The adherence percentage was generally obtained by calculating the average of the adherence percentage of each drug consumed by the respondents. When there was an excess of drug consumption (overuse), the correction of the adherence percentage was performed by recalculating the adherence percentage using a numerator which was the result of a reduction in the amount of drug that should be consumed with the excess amount of drugs consumed. The respondents were considered adherent to antihypertensive treatment if the adherence percentage reached 80-100% (12).

The analysis of MMAS-8 was conducted by scoring the answers of 8 MMAS-8 questions. The scoring followed the regulation set by Morisky (copyright) with the maximum score of MMAS-8 was 8 (16, 17, 18). The adherence levels were classified based on the MMAS-8 score and a scale of adherence in Table 1. In this case, Saepudin et al. (4) reclassified these adherence levels into two simpler categories, namely adherent and non-adherent. Medium and high levels of adherence in MMAS-8 were classified into adherent, while the low level of adherence was classified into non-adherent.

After reclassifying the MMAS-8 adherence level, the *Chi-Square* test (or the alternative *Fisher* test) was done to test the adherence level by pill count method and the adherence level by MMAS-8 to strengthen the analysis in order to see if there was a correlation between the patient adherence level through pill count and self-report (with MMAS-8 questionnaires) measurement methods. There is no correlation between the measurement results of adherence through self-report method using

MMAS-8 and pill count method, and this means that the measurement results of adherence through these two methods are different, so the patients identified as adherent according to the self-report method using MMAS-8 are not necessarily identified as adherent according to pill count method.

RESULTS AND DISCUSSION

The respondents whose data could be processed in this research were 204 people. At the community aged less than 45 years, the percentage of men who suffered from hypertension is higher than that of the women, but the opposite applies to people whose age is over 55 years. In general, the prevalence of hypertension in Indonesia tends to be higher in women than that in men (19; 8). The prevalence of hypertension that is likely to be higher found in lower educational groups and non-working groups is probably due to the ignorance of a good diet and lack of knowledge about hypertension (8, 4). It can be seen in Table 2 that the results correspond to those things, in which the majority of patients are 45-64 years old (58.3%) and female (73.0%).

In providing hypertensive therapy service, Primary Health Centers provide several classes of drugs as indicated on Kepmenkes RI No. 296/Menkes/SK/III/2008 regarding Guidelines for Basic Medication at Primary Health Centers, e.g. diuretics, β -blocker, ACE-Inhibitor, and Calcium Channel Blocker (20). PHCs also implement algorithm for hypertension treatment in accordance with JNC7 by giving first drug based on the level of hypertension and whether there is any indication of complications of therapy. If the result of

Table 2. Demographic data of the respondents

Characteristics	Categories	n (%)
Age (in year)*	15-24	1 (0.5)
	25-44	9 (4.4)
	45-64	119 (58.3)
	≥65	75 (36.8)
Sex	Male	55 (27.0)
	Female	149 (73.0)
Total		204 (100)

*Age classification based on the guidelines regarding age classification standards internationally (UN, 1982)

Table 3. The amount of antihypertensive drugs consumed by the respondents

Amount of antihypertensive drugs	n (%)
Single	111 (54.4)
Combination	93 (45.6)
Total	204 (100)

Table 4. The total amount of drug items received by the respondents

Total amount of drug items	n (%)
1	2 (1.0)
2	11 (5.4)
3	50(24.5)
4	78 (38.2)
5	45 (22)
6	14 (6.9)
7	4 (2.0)
Total	204 (100)

Table 5. Patient adherence measured by pill count method

Categories	n (%)
Adherent	69 (33.8)
Non-adherent	135 (66.2)
Total	204 (100)

Table 6. Distribution of answers of MMAS-8 questionnaire items

No	Questions	n (%)	
		Yes	No
1	Do you sometimes forget to take your hypertension drug?	94 (46.1)	110 (53.9)
2	If you recall in the past two weeks, are there days when you do not drink your hypertension drug?	89 (43.6)	115 (56.4)
3	Do you ever stop taking the drug without consulting your doctor because you feel worse when continuing to consume the drug?	47 (23.0)	157 (77.0)
4	When you travel or leave the house, do you sometimes forget to take along your hypertension drug?	55 (27.0)	149 (73.0)
5	Did you take your hypertension drug yesterday?	167 (81.9)	37 (18.1)
6	When you feel your hypertension is resolved, do you sometimes stop taking the medicine?	106 (52.0)	98 (48.0)
7	Have you ever felt annoyed because fixated on the treatment plan?	78 (38.2)	126 (61.8)
8	How often do you have trouble remembering to take medication?		
	- Every time	3 (1.5)	
	- Usually	15 (7.4)	
	- Sometimes	39 (19.1)	
	- Occasionally	28 (13.7)	
	- Never/rarely	119 (58.3)	
	Total	47 (100)	

therapy is not appropriate for the blood pressure level, optimizing dose or providing additional drug therapy is done to achieve the required blood pressure level. Table 3 showed the majority of patients received a single antihypertensive drug therapy. However, Table 4 showed that some patients still needed to consume drugs for other therapy, such as drugs for headache symptoms or other concomitant diseases, for example diabetes mellitus. The risk of non-adherence in the treatment increased more drug intake among patients (6).

Table 5 shows that according to pill count analysis, there was only 69 of the 204 respondents who were adherent to the treatment (33.8%). The number of adherent patients according to pill count method is less than the number of non-adherent patients.

After scoring, the distribution of responses to MMAS-8 can be seen in Table 6. In general, the result of the adherence analysis with the MMAS-8 is illustrated in Table 7, which shows that more than half of the respondents have a low adherence rate (57.4%) and only 26 respondents (12.7%) have a high level of adherence.

Table 7. Patient adherence measured by self-report method using MMAS-8

MMAS-8 Scores	Categories	n (%)
0 - <6	Low	117 (57.4)
6 - <8	Medium	61 (29.9)
8	High	26 (12.7)
Total		204 (100)

Table 8. Comparison of patient adherence level by pill count and MMAS-8 analyses

CategorieS	n (%)		Sig. value
	MMAS-8	Pill count	
Adherent	87 (42.6)	117 (19.1)	0.898
Non-adherent	69 (57.4)	135 (80.9)	

In order to see the correlation between the results of pill count and MMAS-8 analyses, the adherence level of MMAS-8 was reclassified into two simpler categories: adherent and non-adherent. The result of the reclassification of patient adherence categories can be seen in Table 8. It can be seen that the percentage of adherent patients according to MMAS-8 is 42.6%. This finding is in line with the one estimated by WHO that the level of adherence to the long-term drug use in patients in developing countries is less than 50% (7).

The *Chi Square* test shows that the significance obtained is $0.898 > \alpha (0.05)$, so it can be concluded that there is no correlation between the measurement results of adherence through self-report method using MMAS-8 and pill count method. It shows that adherent patients identified by self-report method using MMAS-8 are not necessarily identified as adherent by pill count method.

From this research, it is known that the non-adherence in patients is mostly due to the lack of knowledge of the

respondents about the detrimental effects that can occur when respondents do not adhere to the treatment, and thus the respondents are generally not motivated to carry out a treatment plan. In addition, some respondents who have experienced a decline in cognitive function also require special attention because generally these respondents face difficulties in taking the medicine.

From the research regarding patient adherence to the use of antihypertensive drugs in 5 Primary Health Centres Surabaya involving 204 respondents, it can be concluded that according to pill count measurement method, 135 (66.2%) respondents did not adhere to consume drugs by the amount of drug usage rules. In addition, according to self-report measurement method using MMAS-8 questionnaire, 117 (57.4%) respondents indicated to have a low level of adherence to obey the rules of drugs use.

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