

# Utilization of Ministry of Health Medication Return Programme, Knowledge and Disposal Practice of Unused Medication in Malaysia

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## Abstract

**Objective:** (1) To report the awareness on MRP and its utilization rate. (2) To assess environment awareness with regards to improper disposal. (3) To explore practices toward unused medication. **Methods:** A cross-sectional study was conducted in 33 out-patient pharmacies in Sabah healthcare facilities. Quota sampling was used to recruit 244 subjects. Data collector from each facility was identified and trained prior to data collection. Self-reporting questionnaire captured data of socio-demographic, awareness on MRP and patient's knowledge and practice towards unused medication. Independent t-test and chi square test were performed to detect differences and association. **Result:** Subject mean (SD) age was 45.1(15.5) years and almost two-third (60%) of the subjects were female. Majority (73%, 95%CI 67-78%) knew that inappropriate disposal of medication will cause environmental hazard. Only 54% (95% CI 47-60%) had heard of MRP, 26% (95%CI 21-32%) had utilized MRP to return unused medication. Subject's awareness on environmental hazard and MRP were associated with their practice to return unused medication ( $p=0.001$  and  $p<0.001$  respectively). Mean years of education and median family income were significantly different between the aware and unaware group respectively [11.3(6.0) vs 8.9(4.5) yrs,  $p=0.003$ ; RM2000 vs RM1260,  $p<0.001$ ]. The most common unused medication were analgesics (27.1%), antihypertensive (24.4%), antiglycemic (14.7%) and supplements (12%). The two predominant methods to "dispose" unused medication at home were through garbage (47.8%) and return to healthcare facilities (30.0%). **Conclusion:** This study has established the evidence for public awareness on MRP, environment awareness and disposal practice of Malaysian citizen. Creative and innovative recommendations have been made for MRP promotion and to improve public knowledge on safety disposal of unused medication.

**Key words:** Medication return programme, Pharmacy service, Unused medication, Knowledge, Disposal, Malaysia.

## INTRODUCTION

Medication return program (MRP) was first introduced in year 2010 as an initiative from Pharmaceutical Service Division, Ministry of Health Malaysia. With its objectives to preserve the environment from hazardous pharmaceutical compounds and to prevent accidental ingestion, misuse and abuse of extra medication, the core function of MRP is to provide public a safe place to dispose unused medication.<sup>[1]</sup> Unused medication collected by pharmacies is managed as clinical waste and incinerated by waste management company. On the other hand, inappropriate disposal of unused medication has led to the traces of pharmaceutical waste like analgesic, anticonvulsant, antiepileptic, antibiotics accumulated in landfills and leached into freshwater environment.<sup>[2]</sup> This detrimental effect can be expected in countries where landfilling is the predominant method to manage municipal solid waste, such as Malaysia.<sup>[3,4]</sup>

Fatokun *et.al* reported in 2014 that the leading method to dispose unused medication in Malaysia is through garbage.<sup>[5]</sup> There is insufficient research that evaluates the awareness and utilization of MRP. One local study, with its subjects only restricted to university students, has reported that 93% of the subjects are unaware of MRP.<sup>[6]</sup> Another local qualitative study reported only 16% of the patients are aware of MRP and utilizing it.<sup>[7]</sup> A US-based study reported that 40% of patients were aware of a proper location to send

unused medication and only 15% had utilized it.<sup>[8]</sup> However, these findings had its limitation and cannot be generalized to Malaysian population. Thus far, no Malaysian study has evaluated the public awareness on MRP and its utilization rate.

More importantly, Malaysian's awareness on environmental hazard caused by unsafe disposal and their medication disposal practices are largely unknown. Several international studies have shown that 48-75% of their population are aware that improper disposal of unwanted medication will lead to contamination of the environment.<sup>[9-12]</sup> The most common way to discard unwanted medication in majority of the countries is to throw it into the trash,<sup>[13-16]</sup> except for the Swedish where returning to the pharmacy is the predominant method to "dispose" unused medication.<sup>[17]</sup> A systematic review reported that due to the paucity of evidence, connection between knowledge on environment impact of inappropriate disposal and the preference toward disposal method cannot be established.<sup>[4]</sup> Hence, this is one of the knowledge gaps that this study endeavors to fill.

This study addressed a few objectives, namely (1) to evaluate awareness on the presence of MRP and its utilization, (2) to assess awareness on environment with regards to improper disposal, (3) to explore practices toward unused medication and (4) to explore the factors associated with knowledge on

environmental awareness and choice of disposal method.

## METHODS

It was a cross-sectional study conducted throughout Sabah state of Malaysia. The study results<sup>[18]</sup> were obtained by self-reporting questionnaire survey. A data collector was identified from each facility. They were trained via email and phone instruction prior to data collection.

**Participants:** Patients who collected their medications using repeat prescriptions, i.e. prescription for chronic illness to be refilled on monthly basis, from 33 out-patient pharmacies of specialist hospitals, district hospitals and health clinics in Sabah.

**Sample size calculation:** Prevalence sample size calculator was employed for calculation.<sup>[19]</sup> The prevalence of patient's awareness towards MRP was 15%,<sup>[7]</sup> with precision of estimation set at 5%, the calculated sample size was 195. This figure was rounded up to 200 to ease the calculation for quota sampling. Sample quota was assigned to each out-patient pharmacy according to the prescription load of that facility. This sample size was further rounded up to 238 after assigning quota to each facility.

**Instrument:** A two-page questionnaire was developed by investigators based on the findings from previous literature.<sup>[8,12,20,21,22]</sup> Content validation of the questionnaire was carried out by 5 pharmacists who had experience in running MRP. Questionnaire content was edited according to their feedback. Then, the questionnaire was translated to Malay language and proof-read by two bilingual (English-Malay) pharmacists. Pre-test was carried out with 5 patients to ascertain the user-friendliness of the questionnaire.

The questionnaire comprised of 4 domains:

- (i) Socio-demographic data
- (ii) Awareness and utilization of MRP
- (iii) Knowledge on environment hazards caused by improper disposal
- (iv) Practice on the management of unused medication.

**Data analysis:** Analysis was conducted using SPSS software version 19. Numerical variables are presented in mean (SD) whereas categorical variables are summarized in frequency and percentage. Prevalence data are presented using 95% confidence interval. Inferential analysis such as independent *t*-test and chi-square test were employed, *P* value more than 0.05 is considered statistically significant.

**Ethics approval:** This study was conducted in accordance to the ethical principles outlined in the Declaration of Helsinki and Malaysian Good Clinical Practice Guideline. The National Medical Research Registration (NMRR) code for this study is NMRR-15-1894-27960.

## RESULTS

The survey was conducted from 1-31 August 2016. A total of 244 responses were recorded and included in analysis. Table 1 summarizes the sample characteristics of all subjects.

Of the 244 subjects, 54% (95% CI 47-60%) were aware of MRP offered by the pharmacy department. Those who were aware of the program claimed to have heard about this service through posters, leaflets and advocacy from pharmacy staff. Others have heard from friends, family members and doctors. Only 26% (95% CI 21-32%) of the subjects have utilized this service

to return their unused medicine to the pharmacy. Those who have utilized the service have returned their medication biannually on average. Of all the subjects, 73% (95%CI 67-78%) knew that inappropriate and unsafe disposal of medication will leave hazardous impact to the environment. Approximately 40% (n=100) of the patients ever informed healthcare professional at clinic or pharmacy that they have unused medication at home.

Analysis was conducted to find out if knowledge on environmental impact of unsafe disposal and awareness on presence of MRP was associated to the utilization behavior of the MRP. Table 2 illustrates that subjects who were aware of environmental impact by medication are more likely to utilize the service to return unused medication to healthcare facilities (32.2% vs 10.4%,  $p=0.001$ ). Of those who knew about the presence of MRP, 38.9% have utilized it, its utilization was significantly higher proportion when compared to those who were unaware about MRP (38.9% vs 11.5%,  $p<0.001$ ).

Five sociodemographic factors were tested for their association with knowledge on environmental impact and utilization of MRP. The factors tested were age, years of education, number of household member, household income and travel time to nearest health facility. Table 3 summarizes the significantly associated factors with subject's knowledge on environmental impact and MRP utilization. Subjects who has higher years of education (11.3 vs 8.9,  $p=0.003$ ), higher household income (RM 2000 vs RM 1260,  $p<0.001$ ) and more family members staying under one roof (5.7 vs 4.9,  $p=0.031$ ) were found to have better environmental awareness; lesser household members (4.7 vs 5.7,  $p=0.002$ ) was found to be significantly associated to MRP utilization.

Table 4 illustrates the common types of unused medications that patients have at home. The most common drug classes were analgesic (27.1%), antihypertensive (24.4%) and antiglycemic (14.7%).

This study also explored subject's practice on medication disposal methods. The most predominant method was to dispose the unused medication into trash (47.8%) followed by returning to healthcare facilities (30.0%). Other methods that subjects used to "dispose" their unwanted medication were flushed away in toilet (5.1%), kept it as stockpile (5.1%), gave to friends and family (4.7%), discarded in sink (2.4%), dispose to open environment (3.2%) and burnt it (1.6%).

The 6 most common reasons for patient to return unused medication were "I forgot to take my medication" (19%), "too confusing with many medicines at home" (18%), "doctors changed my regime" (17%), "for the safety of younger

**Table 1: Sample characteristic (n=244).**

Demographic data	n (%)	Mean (SD)
Gender female	148 (60.7%)	
Age (yr)		45.1 (15.5)
Years of education (yr)		10.4 (4.6)
Household pax (n)		5.5 (2.8)
Travel time to nearest health center (min)		15.0 (20.0)*
Family monthly income (RM)		2000 (2000)*

\* Distribution is skewed to the right, hence presented in median (IQR).

**Table 2: The association of knowledge on environmental hazard and awareness on presence of MRP against the utilization of MRP service provided by pharmacy.**

Variable	n	Utilization of MRP		$\chi^2$ statistics (df)	P value
		Yes	No		
Knowledge on environmental hazard					
Yes	177	57 (32.2%)	120 (67.8%)	11.89 (1)	0.001
No	67	7 (10.4%)	60 (89.6%)		
Aware of MRP					
Yes	131	48 (38.9%)	80 (61.1%)	23.59 (1)	<0.001
No	113	13 (11.5%)	100 (88.5%)		

**Table 3: Social demographic factors associated with patient's knowledge on environmental hazard.**

Variable	Knowledge on environmental hazard		Mean differ. (95% CI)	t statistics (df)	P value
	Yes	No			
Years of education (yrs)	11.3 (6.0)	8.9(4.5)	2.4 (0.8,4.0)	3.00 (242)	0.003
Household income (Rm)	2000 (3000)*	1260 (1200)*	-	-	<0.001†
Household member, n	5.7 (2.8)	4.9 (2.6)	0.8 (0.1,1.6)	2.2 (242)	0.031
Utilization of MRP					
Household member, n			1.0 (0.4,1.7)	2.14 (164)	0.002
	Yes	No			

\*The distribution is skewed to the right, hence presented in median (IQR).

† Non-parametric Mann-Whitney test is used.

**Table 4: Types of unused medication at home (n=299)**

Medication class	Percentage (%)
Analgesic	27.1
Antihypertensive	24.4
Antiglycemic	14.7
Supplement	12.0
Anti-infection	8.0
Cardiovascular	4.0
Cough and cold	3.7
Gastro protective	2.3
Dyslipidemia	1.3
Others*	<4.0

\* Others include: Anticoagulant, antiepileptic, topical preparation and antipsychotic.

kids at home" (11%), "doctor discontinued my medicine" (11%) and "I get extras from pharmacy" (10%). The 3 predominant reasons for not returning unused medication were "I don't know where and how" (44%), "I am not aware of MRP" (29%) and "I want to keep as spare" (24%). Only 4% stated "Fear of getting scold by staff" as the reason that hindered them from returning medication.

## DISCUSSION

This study has shown, despite about half (54%) of the subjects were aware of MRP provided in pharmacy department, only a low percentage (26%) of patients have utilized the service to return unused medication

to pharmacy for safe disposal. In short, MRP service provided by the pharmacy department is not very well known to the public and hence the low utilization rate of the service. Secondly, there was a significant association between awareness on MRP and utilization of MRP. Therefore, if public are more aware of the medication disposal service provided by pharmacy department, they are more likely to opt for this disposal method.

Since the inception of MRP, there is lack of research to evaluate the utilization and impact of this service. There is a national guideline on standard procedures to handle returned medication in pharmacy but without an agenda to promote public awareness on this service and safe medication disposal. It is noticeable that there is variation in the promotion of MRP in different health facilities. The effort to promote MRP varies across regions (city vs suburb) and facilities (hospital vs health clinic). It is suggested to enlist a better awareness-building strategy in MRP agenda and standardize it across all health facilities. A better strategy should not be limited to just posters, leaflets and collection box. One of the suggestions is to incorporate creative educational program into "Know Your Medicine" campaign (*Kempen Kenali Ubat Anda*). In this campaign, pharmacists should relay to the public information on safety drug use and safe disposal practice. A little incentive can be provided to public who returns unused medication to health facilities.<sup>[15]</sup> Incentive should be of non-monetary value, for example an opportunity to use the "rapid-lane" when refill medication or shopping/food voucher from corporate companies who are willing to collaborate as part of the corporate social responsibility (CSR) effort.

This study confirmed the significant association between environment

awareness and public behavior to utilize safe disposal method provided by pharmacy department. Similar to the findings of two studies,<sup>[12,23]</sup> current study suggests that the perception regarding environmental implication from pharmaceutical threats affects public decision to utilize MRP service as a safe disposal method for unused medication. A Swedish study revealed that “returning unused extra medication to pharmacy” is the predominant method for Swedish citizen to “dispose” unused medication because citizen were concerned about the environmental implication.<sup>[4,17]</sup> Therefore, education on environmental awareness should be incorporated into MRP promotion syllabus. A suggestion from study team is to include visual factual education clips on “where do unused medication go” and “why should I care” topics into MRP promotion syllabus. In order to draw the attention of wider population to this issue, animation or info-graphics presentation in social media should be considered in addition to the existing posters and pamphlets. It is conceptualized that public should understand and concern about the harmful consequences of pharmaceutical threats towards environment, they are more likely to be careful when disposing unused medication.

Table 3 illustrates that population who has lesser years of education, household income and household family members tend to lack the environmental awareness of improper disposal. In Sabah, apart from the 4 major cities, largely of the population still resides in rural area with scarce connection. Many of them are farmers or labor workers with lesser years of formal education but they are inclined to be obedient with the instructions of healthcare professional when counseling is understood. Therefore, pharmacists play a major role among these group of people to enhance their understanding on medicine and safety disposal. This can be achieved through detailed counseling and effective two-ways communication.

Result highlights the top 4 self-reported unused medication class at home were analgesic (27.1%), antihypertensive (24.4%), antiglycemic (14.7%) and supplement (12.0%). This finding was comparable to the MRP annual report generated by Sabah Pharmaceutical Services Division, whereby in 2016, the top 3 medication classes returned by patients were antihypertensive, antiglycemic and supplement. It is interesting to note that the 3 classes of medication appeared in exact descending order except for analgesic. This finding indicates that even patients have a stockpile of unused analgesic at home, they are not returning it to the pharmacy for disposal. Unused analgesic at home is likely from overprescribing or over dispensing (prescription with PRN basis) and patients are keeping the extra analgesic at home for “just-in-case” purpose. However, one limitation of this finding was researcher couldn't identify the analgesic drug classification, whether it was majority of paracetamol, NSAIDs, opioids or others. As for chronic diseases medication like antihypertensive and antiglycemic, frequent regimen change and patient non-compliance are often observed in clinical practice. Frequent dose changes can confuse patients especially elderly and when patient has stockpiles of same medication at home. It is good practice to encourage patient to return their extra chronic medication from home in order to prevent confusion. Lastly, hospital-prescribed supplement medication as the fourth most common unused medication class should alarm prescribers and pharmacists about patient's compliance and the rationale of supplement prescription. According to 2016 annual report from Pharmaceutical Services Division, the returned supplement medication included calcium carbonate used in end stage renal failure, calcium lactate as bone supplement, vitamin B1/B2/B6 (combined tablet) and vitamin B12 as neurological supplement. There is a need to assess patient's compliance towards these medicines and more importantly, to assess the indication of supplement prescription. Is there a trend of supplement overprescribing in public health facilities where the indication is not according to drug formulary?

The strength of this study design is the use of quota sampling to calculate sample size and to sample from patients with repeat prescription. Quota sampling and multi-centered data collection enables the findings to be generalized to wider population. In addition to that, inferential analysis in this observational study provides insights to improve the awareness and utilization of medication return program among Malaysian public.

In order to promote awareness on MRP and safe medicine disposal, continue effort and budget allocation is essential. In long run, it will be interesting to evaluate the effectiveness of MRP. Future research may set to evaluate the public health benefits and reduction of environmental threats by the implementation of MRP.

## CONCLUSION

This study has established the evidence for public awareness on MRP and disposal practice of Malaysian citizen. The awareness and utilization of MRP is, however, only satisfactory and we have discussed a few recommendations for improvement. As significant association has been found between environment awareness and disposal practice, recommendation has been made to include patient education on potential environment contamination when redesigning MRP agenda. MRP promotion should be enhanced in a more creative and innovative way.

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## CONFLICTS OF INTEREST

The Authors declare that there is no conflict of interest.

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