

Discussion

Few published reports have focused exclusively on the issue of unused medications at home. A study conducted in a village of 139 households in Papua New Guinea. This study focused on the prevalence of orally used household and discussed about danger and drug waste in home.⁹ Other reports were the results of the campaigns in the period of months to 1 years for returned-medicines for proper disposal or donated-medicines to poor patients.¹⁰⁻¹⁵ The wasted drugs in HIV infection and AIDs are increasing interested.^{11-12,15} Our study carried out at home and focused on patients' reasons and factors are associated to unused medications including money loss from this problem. This study was a one-off measurement study and might not reflect routine behaviour of medication owners. However, the study could reveal some important aspects of unused medication problems that addressed patients' attitudes including poor compliance, over prescribed or dispensed medications and unnecessary economic loss that is preventable proper measures from all related health professionals and governmental policy.

The first problem that we had to mention although it was not the objective of our study, we found almost 20% of unused medications had no label of medication names, dispensing date and dispensed amounts on their packages, all of them came from doctor clinics and community pharmacies. Many medication owners could not remember medication names, indication, and the date that they received them. This is a serious problem that should be resolved as soon as possible. Patients should have the rights to know what medications they take and the drug name should be clearly labeled on the packages to prevent taking wrong medications or to be part of a decision process in resolving medication-related problems. Although the patient's rights has been together announced by the Thailand council of all health professionals for the past few years to disclose treatment information to patients, we still found in our study that some health professionals do not realize the important of this issue at all.

Only one report of unused medication has been published in Thailand. The study was carried out in a hospital in Bangkok to study medication usage behaviour from three-month campaign for donating unused medications for poor patients. These donated medications included medication, which their owners died. The report revealed 1,550 items of donated medications with the costs of 140,202 bahts. The three most donated items were medications used for muscular and joints, cardiovascular system

and gastrointestinal.¹⁴ Our study found only 1,004 unused items with the cost of 15,297 bahts and the three most items were medications used for respiratory system, muscular and joints and anti-infection, respectively. Antiretroviral drugs, the very expensive drugs, were not been found in our study. These antiretroviral drugs usually return to pharmacy departments by public campaign with the reasons of their adverse effects and their owners died.^{12,15} Socioeconomic factors, cultural attitudes, drug availability and study design can also be influence the prevalence. The average medical care expenditures of people lived in Bangkok from the year of 1981 to 2000 is 2 - 3 times of those lived in the south of Thailand.¹⁶ Death was the main reason for returning or donating medications in some reports.^{12,13} Our study did not include medications which their owner died. A number of interviewees in the households with no drugs in our study stated that they threw away unused medicines. These several factors seem to explain in part why the prevalence rates in our study were lower than the previous reports.

Total costs of all medications used in Thailand in 1999 were 29,442.98 million bahts.² The three highest costs when categorized by pharmacological groups were 6,908.09 million bahts of systemic anti-infectives; 4,176.56 million bahts of alimentary tract and metabolism; 3,707.46 million bahts of cardiovascular system. Our study also similar found that the three highest unused medication costs were anti-infectives, gastrointestinal drugs and respiratory drugs respectively. Anti-infectives were found to be approximately 20% of unused items. This will accelerate antimicrobial resistance which is the main problem for treatment the infectious disease nowadays.^{17,18} Patient medication compliance and over prescribing medications may be accountable for the causes of this problem. These problems were also reported by many studies in Thailand and other countries.^{14,17,19-21} This important issue is preventable by giving education and counseling to make patients realize the important of medication adherence including healthcare provider education to tailor a medication regimen to fit a patient's need. Physicians and pharmacists should also strictly comply with their standard practices. The government and professional councils should use strategies to encourage health workers to be more complied with the standard practices.

Another point should be concerned was medication owners who received medications from governmental sectors tended to feel that they received too much of medication quantities and dispensers did not tell them to use all. This also demonstrated by the number of unused doses of medications more related to those be received from

governmental sectors than private sectors. Most of health workers who could prescribe medicines in governmental sectors are physicians working in hospital, and some are trained public health personnel working in primary care unit.

Several type of health workers who could prescribe and dispense medicines in private sectors such as pharmacists at community pharmacy (Type I drug stores), trained personnel at Type II drug stores and physicians at doctor clinics and private hospitals. It is an interesting issue to further study the prescribing behaviour of these health workers in different setting.

The medication costs in this study were not the real total costs; they did not include package and other indirect costs. These costs were the standard set-up prices per unit by Thai Public Health Ministry that used for buying medications from drug companies. They were usually the lowest price paid by governmental hospitals. This will make the unused medication costs in this study were the minimum money that would be lost. Costs of all unused medication in 453 households were 15,297 bahts. We found that about 48 % of surveyed households had unused medication. The number of households in the Songkla province in the year of study were 311,407.²² The projected money of unused medications may be loosed will be 5.0 millions bahts and if projected to all over the country which consisted 16,516,322 households, it will be lost as 266 millions bahts.²² Although this figure was accounted as 0.82 % of total cost of medications in Thailand which was 32,398 million bahts but this was a lot of money for the country that had encountered economic crisis since 1997.² When considering in another aspect, the average cost of unused medications per household in this study was 31.4 bahts that accounted as 12% of average medical care expenditure which was 260 bahts per months for the southern households in Thailand in the year of study.¹⁶

Unused medications at home may be dangerous to the residents especially children and there are increasing problems to proper dispose. Public campaign for returning unused medications for disposal could increase the public's awareness of this problem and it could be organized every 1 or 2 years.^{10,13,15}

It should also be noted that cost of unused medications in each household follows log-normal distribution. Some statisticians stated that this phenomena could be commonly found.²³ Our finding is in good agreement with such remark. This implies that one would expect to find abnormally high cost of money waste in certain cases. This also suggested that using median should better reflect the real situation than using arithmetic mean, for one abnormal data point with very high value may severely affect

the arithmetic mean. The more meaningful descriptive statistics may be either median value for nonparametric expression or an alternative is to use logarithm of the cost of unused medication as a new variable instead. This new variable could be reported as if it were a real quantitative unit.

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