

Results

Unused medications in 453 households were investigated. Of these, 281 households were located in rural and 172 in urban area. Five hundred and twenty three of medication owners or their parents in the case of young children were interviewed. The age of medication owners were distributed in all age groups with the mean \pm SD of 27.6 ± 22.1 years and the median of 25.5 years. Only 9.8% of them were more than 60 years. Table 1 reveals the distribution of age groups and other characteristics of medication owners. Levels of education in most of medication owners were primary school or equivalent. Medication owners with chronic diseases were found to be 23.3 %.

One thousand and four items of unused medications were collected for identifying and calculating their quantities and costs. One hundred and fifty medication items that were accounted as 19.4% had no label of medication names or indications on their packages; all of them came from doctor clinics and community pharmacies. Nine of these items could not be identified because their colors and shapes could not matched with any known medication. Nine hundred and ninety five medication items could be identified and calculated with a total cost of 15,297 bahts (approximately 239 pounds; 64 bahts/pound). These consisted of 11,278 tablets (or capsules), 16,494 ml of oral liquid medications and other dosage forms as shown in Table 2. Nine hundred and fifty one (95.6%) of the items were oral preparations which could be calculated as 14,284 doses. The median item, oral doses and costs per person and per household were presented in Table 3. The cost of anti-infective drugs was highest, followed by gastrointestinal drugs and respiratory drugs as demonstrated in Table 4. The highest unused medication costs was amoxicillin which accounted as 1,384 bahts, followed by stomachic mixture with 950 bahts and cloxacillin with 854 bahts.

Table 5 demonstrated the statistical data of the number of dose of oral unused medication and all unused medication costs categorized by drug names, dosage forms, pharmacological classification, usage pattern, type of payment and sources of medications. The percentage of unused medication could be not determined in this study because the number of dose dispensed was hardly stated on the label. Paracetamol was accounted as 137 items (13.8%) was the most often unused medications, 72 items were tablets and 65 items were liquids. It was followed by 76 items (7.6%) of chlorpheniramine, with 32 items as tablets and 44 items as syrup. It was also found that

the third, fourth and fifth items were antibacterial with amoxicillin, penicillin V and cloxacillin as 6.9%, 2.8% and 2.7%, respectively. These medications were classified as ant-infectives that have to be used all of dispensing amounts. We found 242 (24.3%) items were medications to be used continuously. This reflected the problem of medication noncompliance that requires interventions to resolve the problems.

Most of unused items were free medications paid by their employers or the government, paid for civil servants, low income groups, children under 12 years, and people over 60 years who were treated in the governmental hospitals. It also found that 79.8 % of unused medication came from governmental sectors.

The variables in Table 6 were used for analyzing by the logistic and multiple regression. It existed moderately correlation between age and being tablet dosage form (coefficient of correlation was - 0.625). Since tablet dosage forms are usually not used in young patients, so this moderate collinearity is not unexpected, we considered this level of collinearity to be important and remove the variable of being tablet from the models.

The most frequency reason for not taking all prescribed medication was the patients' perception that their symptoms or diseases had resolved, so the medications were useless as presented in Table 7. It was followed by the reason that it was mild disease and unnecessary to take all received medications. It should be noted that 21.1% of medication owners thought that they had received too much of medication quantities and 15.2% of them said that dispensers did not tell them to use all of medications.

From logistic regression analysis (see Table 8), the termination of medication are due to several reasons. Each reason has several related factors. The Table 8 shows only some related factors that has statistical significance.

The first and most important reason (medications were stopped when patients feel that their symptoms or diseases had resolved) had its related factor as: lower age group; being male; without chronic diseases; receiving medication to be used as needed. The second reason (medications were stopped because of mild disease): lower age; being male; without chronic disease; free medication. The third reason (medications were stopped because of lacking information from dispenser): lower age; being Muslim; with chronic disease; receiving medication from governmental sectors. The final reason (too much of medication quantity): being female; living in urban area; receiving medication from governmental sectors. This may reflected that there were over

prescribed medications. This problem was also reflected by the unused medication doses from governmental sectors were more than private sectors as shown in Table 9.

From regression analysis of unused oral doses (see Table 9), the remaining quantities were related to several factors: higher age group; having chronic disease; getting medication for continuous usage; and getting medication from governmental sectors. Regression analysis of cost of unused medication (see Table 10) revealed that the costs of unused medication were related to several factors: living in urban area; getting medication for continuous usage.

Continuity of medication (getting medication for continuous usage) was the common explanatory factor for both the number of oral doses and costs of unused medication in Table 9 and 10.