Herbal medicines: Prevalence and predictors of use among Malaysian adults

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Keywords
Herbal medicines; Prevalence; Predictors; Logistic regression

Summary
Objective: The aim of this study was to examine the prevalence and identify factors, which predict the use of herbal medicines among Malaysian adults.
Methods: Using a cross-sectional design, data were collected via face-to-face interview using structured questionnaire from convenience sample of adults from four towns in Malaysia. Multivariate logistic regression analysis was used to identify the significant predictors of herbal medicines use.
Results: From a total of 1601 respondents, 542 (33.9\%) reported use of herbal medicines in the previous 12 months. Multivariate logistic regression analysis revealed the following variables to be predictive of herbal medicines use: female gender [odds ratio (OR) 1.80, confidence interval (CI) 1.40--2.31], being married [OR 1.97, CI 1.44--2.71], having health problems [OR 2.31, CI 1.74--3.07] and having high-income levels [OR 4.21, CI 1.72--10.30]. The odds of someone using herbal medicines also increases though slightly if someone has favorable opinions about herbal medicines on the aspects examined. On the other hand, being Chinese [OR 0.74, CI 0.57--0.96] and Indians [OR 0.17, CI 0.11--0.27] were associated with decreased odds of using herbal medicines compared to Malays.
Conclusion: The prevalence of herbal medicines use is high. Respondents’ personal attributes and opinions influence their likelihood of using herbal medicines. These findings are important because knowledge of the predictors of herbal medicines use may help health care providers to identify patients at increased risk who would be candidates for receiving guidance on safe use of herbal medicines.

Introduction
Traditional Medicines, which includes herbal medicines, has been increasingly used worldwide including Malaysia. From 2000 to 2005, annual sales for traditional medicines increased from US$ 385 million (RM 1 billion) to US$ 1.29 billion (RM 4.5 billion).\textsuperscript{1} The prevalence and factors associated with its use is largely unknown, although the use is believed to be widespread.
Patients and the public have been known to self-prescribed herbal medicines for health maintenance\textsuperscript{2,3} for the treatment or prevention of minor ailments,\textsuperscript{2,4} and also for chronic illnesses.\textsuperscript{5--7} The increasing use of herbal
medicines by the Malaysian public is of special concern especially because herbal medicines are not rigorously regulated by the Drug Control Authority (DCA) of Malaysia. The evaluation of the quality and safety of herbal medicines by the DCA is limited to control on the content of specified adulterants and contaminants such as heavy metals and micro-organisms. Given that herbal medicines are often portrayed as being harmless, the public may be at additional risk. A lack in general of good quality information and scientific evidence on herbal medicines compounds the problem.

It is hypothesized that as the use of herbal medicines increases in the general population, so do the occurrence of adverse effects and herbal-drugs interaction. Knowledge of the predictors of herbal use may help health care providers to identify patients at increased risk who would be candidates for offering additional guidance on safe use of herbal medicines.

The aim of this study was to examine the prevalence and understand the use of herbal medicines among the Malaysian public and more specifically to identify factors which predicted the likelihood of using herbal medicines.

In this study the term herbal medicines is used to describe all plant-derived products which contain either raw or processed ingredients from one or more plants used to prevent or treat diseases. This definition of herbal medicines however does not include products that are intended to supplement the diet that contains one or more of the dietary ingredients such as vitamin, mineral, amino in combination with herbal ingredients.

**Methods**

**Study design, sample and survey instrument**

This study was based on a convenient sample of adults from four towns in Malaysia. Four towns were purposefully selected to represent four different geographical, demographic and socioeconomic situations in the country. From these four towns, our interviewers stationed themselves in busy pedestrian walkways. At least three different stations (post office, shopping mall and pharmacy) were used in each town to ensure broad representation of the people in each town. Face-to-face interviews were conducted using a structured questionnaire. Survey questions were adopted and modified from online questionnaires used by the Kennedy School of Government/Kaiser Family Foundation which assessed the perceived risks and benefits of herbal remedies use, and knowledge of government regulation.

Demographic data collected were age, gender, ethnicity, level of education, monthly personal income, health problem (if any) and perceived health status. To probe opinions on herbal medicines, nine statements were used which were divided into three categories as follows:

(i) **General usefulness**
- Do you think herbal medicines are good for people’s health?
- Do you think herbal medicines are safer than conventional medicines?
- Do you think herbal medicines are useful for women?
- Do you think herbal medicines are useful for children?

(ii) **Usefulness for chronic illnesses**
- Do you think herbal medicines can generally help people with arthritis?
- Do you think herbal medicines can generally help people with high cholesterol?
- Do you think herbal medicines can generally help people with diabetes?

(iii) **Knowledge on adequacy of regulation**
- Do you think that herbal medicines are adequately tested for safety?
- Do you think herbal medicines are adequately tested for quality?

**Statistical analysis**

Data were coded, entered and subjected to statistical analysis using Statistical Package for the Social Sciences (SPSS), version 11.5 (SPSS Inc., Chicago IL, USA). Descriptive statistics such as percentages and means were used to describe the sample on the various variables. To explore differences between groups which involve comparing percentages, independent \(t\)-test or ANOVA were used. For post hoc comparison of percentages, Tukey test was used. The conventional \(p < 0.05\) level of was used to determine statistical significance.

**Model building**

The dependent variable, herbal use (operationalised as use of herbal medicines for the past 12 months) is a dichotomous measure. Univariate logistic regression analysis was then performed to identify variables for inclusion into the model. Statistical significance at \(p < 0.10\) level was used to determine significance of variables for inclusion into the model. “Health problem” was regarded as dichotomous variables and coded 0 = "No" response and 1 = "Yes" response. Nominal scale variable with more than two levels (such as ethnicity) were entered as \(k-1\) dummy variables. For the ethnic variable, Malays was treated as the reference group. For ordered categorical data with more than two

levels, the variable was entered as \( k - 1 \) dummy variables with the lowest level used as the reference group.

A multivariate logistic regression analysis was performed with an initial model that included as independent variables all factors found to be significant \((p < 0.10)\) from the univariate logistic regression analysis.

**Results**

**Socio-demographic differentials in herbal medicine use**

One thousand six hundred and one adults agreed to participate in the face-to-face interview using the structured questionnaire. The sample consisted of 55.4% females with mean age of 33.4 (S.D. = 12) and 44.6% males with mean age of 37.5 (S.D. = 12.3). The ethnic distribution of the sample was almost the same as that of the Malaysian population as a whole. Malay respondents made up about 53% of the total.

Table 1 shows that the percentages of herbal medicines use among respondents that rated their health status as poor were higher than that of those who rated their health status as excellent \((54\% \text{ vs. } 26\%)\). ANOVA test conducted to explore the influence of self-rated health status on use of herbal medicines showed a statistically significant difference in percentage of user for the five groups \([F(4, 1596) = 3.8, p = 0.004]\). The actual difference in percentage between the groups was quite small although it was found to be statistically significant. Post hoc comparisons using the Tukey test indicated that the only significant difference was between the group that rated their health status as "fair" \((41.4\%)\) and the group that rated "good" \((32.4\%)\). Respondents who used herbal medicines were older \((M = 37.8, \text{ S.D.} = 11.4)\) than those who did not use \((M = 33.9, \text{ S.D.} = 11.9)\). This difference in mean age was significant \([t(1599) = 6.42, p < 0.001]\).

**Varimax rotation**

Using principal components analysis with Varimax rotation on the nine statements, a clear breakdown into three independent components (Table 2) was observed. The total variance explained by the three factors was 61.5%. Component 1 named as Opinion 1 was made up of four items related to statements on general usefulness of herbal medicines [eigenvalue, 2.9], with factor loading of 0.52—0.74. Component 2 named as Opinion 2 consisted of three items related to statements on the usefulness of herbal medicines for chronic illnesses [eigenvalue, 1.5] with factor loading of 0.72—0.75. The third component named as Opinion 3 consisted of two items related to statements on knowledge on the adequacy of herbal medicine regulation [eigenvalue, 1.1] with clear factor loading of 0.92 and 0.93. The interpretation of these three factors was consistent with statements loading on the three categories of opinions on herbal medicines under study.

**Reliability of opinions scales**

Cronbach’s \( \alpha \) value are quite sensitive to the number of items (e.g. scales with fewer than 10 items) and value greater than 0.7 indicates an acceptable level of internal reliability. Only Opinion 3 has value greater than 0.7 (Table 3). Two factors (Opinions 1 and 2) have scores less than 0.7.

Table 3 shows the mean opinion scores for all the three opinion categories exceed the neutral values implying favorable opinions on herbal medicines.

**Predictors of using herbal medicines in the multivariate logistic regression**

Preliminary univariate logistic regression analysis indicated herbal use was associated with gender, age, race, marital status, income level, health status and the three categories of opinions (Opinions 1, 2 and 3) at significant level of \( p = 0.1 \). The education level and disclosure of use was found not to be statistically predictive of herbal use and therefore excluded for inclusion into the multivariate model. The
Table 2 Rotated component matrix

<table>
<thead>
<tr>
<th>Component</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opinion 1 &quot;General usefulness&quot;</td>
<td>0.742</td>
<td>0.328</td>
<td>0.933</td>
</tr>
<tr>
<td>Opinion 2 &quot;Usefulness for chronic illnesses&quot;</td>
<td>0.710</td>
<td>0.352</td>
<td>0.920</td>
</tr>
<tr>
<td>Opinion 3 &quot;Knowledge on adequacy of Regulation&quot;</td>
<td>0.699</td>
<td>0.751</td>
<td>0.736</td>
</tr>
</tbody>
</table>

Useful for children: 0.742
Safer compared to conventional medicine: 0.710
Useful for women: 0.699
Good for health: 0.518
Useful for diabetes: 0.716
Useful for high cholesterol: 0.736
Useful for arthritis: 0.699
Adequately test for safety: 0.933
Adequately test for quality: 0.920

Table 3 Reliability analysis on nine statements of opinions on herbal medicines

<table>
<thead>
<tr>
<th>Factor</th>
<th>Number of items</th>
<th>Cronbach's α</th>
<th>n</th>
<th>Neutral value (Range)</th>
<th>Mean ± S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>General usefulness (Opinion 1)</td>
<td>4</td>
<td>0.66</td>
<td>1601</td>
<td>12 (4—20)</td>
<td>14.9 ± (1.9)</td>
</tr>
<tr>
<td>Usefulness for chronic illnesses (Opinion 2)</td>
<td>3</td>
<td>0.63</td>
<td>1601</td>
<td>9 (3—15)</td>
<td>11.1 ± (1.6)</td>
</tr>
<tr>
<td>Regulation (Opinion 3)</td>
<td>2</td>
<td>0.87</td>
<td>1601</td>
<td>6 (2—10)</td>
<td>6.6 ± (1.6)</td>
</tr>
</tbody>
</table>

* Above this value: tendency towards more favorable opinion.

Two variables excluded on this basis were not judged to be essential to force into the model because previous studies did not consistently show them to be strong predictors of use.

Table 4 shows the results of multiple logistic regression model predicting use of herbal medicines. The odds ratio for the variables, ETHNIC (Chinese), ETHNIC (Indian) are less than 1. This indicates that the odds of a Chinese and Indian being in a "using herbal medicines" category were less compared to the Malays, all other factors being constant. The odds of a Malay being in a "using herbal medicine" category were 1.35 times higher than the Chinese and were 5.81 times higher than the Indian.

The odds of woman to be in a category of "using herbal medicines" were 1.8 times higher than that of men, holding all other factors constant. Similarly, the odds of those with health problem to be in a category of "using herbal medicines" were 2.3 times higher compared to those without health problems, all other factors being constant.

The odds of a respondents being a herbal medicine user is about four times higher for someone who earns more than RM5000 compared to a person who earns less than RM500, all other factors being constant (Table 4).

Opinion 1 (four statements related to general usefulness of herbal medicine) is also a significant predictor. The odds ratio for this variable is about 1.2 which indicates that the more someone agrees with the four statements in Opinion 1, the higher the odds the person is likely to use herbal medicines. For every one point someone agreed with Opinion 1, the odds of the person was going to use herbal medicines increases by a factor of 1.2, all other factors being equal.
Similarly the more someone agrees with Opinion 2 (three statements related to usefulness of herbal medicines for chronic illnesses) and Opinion 3 (two statements related to regulation of safety and quality of herbal medicines), the more likely the person will use herbal medicines.

Discussion

The data show common use (33.9%) of herbal medicines in each of the four towns in Malaysia. This figure is lower than the prevalence reported by others.13–15 However, direct comparisons are inappropriate. For example, both the 40% figure in the USA study15 and the 49% in the Australian study14 included other CAM therapies such as acupuncture and vitamins.

People who used herbal medicines appear to share similar characteristics. Factors found to influence use of herbal medicines include gender, ethnicity, age and perceived health status. Various studies have shown consistently that women were more likely to be users of herbal medicines than men16–21 and our results are consistent with these. Differences in attitudes of the two genders towards overall health may explain this gender difference.20 Results from our bivariate analysis are in agreement with those of other studies17,18,20,22,25 in identifying associations between gender, age, ethnicity, educational levels, health status and incomes with use of herbal medicines. However, our multivariate highlighted some differences. For example, in the bivariate analysis use of herbal medicines was found to be associated with age. However, when the influence of age was adjusted for the other potential predictors, no significant effect was observed.

The multivariate analysis showed income level to be the strongest predictor of use of herbal medicines. The odds of being a herbal medicines user is about four times higher among those earning more than RM5000 than among those earning less than RM5000, when all other factors were fixed. Other studies17,18,20,22,25 have shown similar differences. Since most of our respondents were from urban areas, and therefore more likely on higher income, they were also more likely to use, the more expensive, branded herbal products sold in pharmacies and drugs stores than herbal home remedies. The majority of authors of studies conducted in the West showing higher usage of herbal medicines among wealthier and educated respondents have attributed this to personal preference for more natural treatments with fewer side effects, among this group. Since we did not explore the reasons for using herbal medicines, we can only speculate that the high-income earners in urban Malaysia also use herbal medicines as a personal preference rather than forced choice.

Since our sample did not include many respondents from rural areas we are unable to confirm the common notion suggested by WHO investigators that widespread use of herbal medicines in developing countries is attributable to poor access to health care services. Little data is available to test this hypothesis by comparison of use of herbal medicines in rural and urban areas in Malaysia.

Not surprisingly, use of herbal medicines by different ethnic groups varies widely, given cultural differences.21,29,30 In this study, ethnicity is also a significant predictor of such use. The odds of Malay being a user was about 6 times higher than that of an Indian and 1.5 times higher than that of a Chinese.

The traditional method of measuring opinions or attitudes is by means of attitudinal statements.31 In this study, measurement of opinions was attempted by using nine statements associated with herbal medicines. Principal component analysis identified three constructs of opinion: opinion relating to general usefulness (Opinion 1), opinion relating to usefulness for chronic illnesses (Opinion 2) and opinion related to adequacy about herbal medicines regulation (Opinion 3). Even though the reliability of the nine-item scales used to examine opinions in this study was adequate, measurement of opinions along different constructs will need to be further developed and refined before use in future research.10

The strength of this study lies in its focus on the use of herbal medicines rather than on CAM use in general. However, the findings from this study should be interpreted in the context of three limitations. First, the sample was mainly of urban adults. The estimates may not be applicable to the general population, which include respondents from rural areas. Therefore, other population-based studies will be needed to identify any differences. Second, the concept of herbal medicines is difficult to define. There are significant differences between countries in the definition and categorisation of herbal medicines. Depending on the regulation of herbal medicines in a particular country, a particular herbal product may be classified as a dietary supplement in one country and as a herbal medicine in another. As this difference in categorisation may confuse respondents, we have conceptualised herbal medicines as products which contain either raw or processed ingredients from one or more plants used for therapeutic or other health benefits. Our definition of herbal medicines does not include products that are intended to supplement the diet that contain one or more of the dietary ingredients such as vitamins and minerals in combination with herbal ingredients. Even though we have used a specific definition of herbal medicines in this study, some respondents might still have difficulty understanding this definition. Precautions were taken to minimise this problem by giving further explanation and clarification during the face-to-face interview by our four, final-year pharmacy student, interviewers, who were able to guide their respondents with illustrations. Third, the classification of responders into users and non-users of herbal medicines also posed a problem. Even though participants were asked whether they had used herbal medicines in the past 12 months, information about frequency and duration of use was not assessed. Thus, survey respondents classified as users probably included some infrequent and irregular users.

In 1997, Malaysian consumers spent USD 0.53 billion on herbal products, about twice as much as United States consumers (USD 3.24 billion), per capita, with their respective populations of 22 and 273 millions.32 These statistics and our findings that approximately one in three Malaysian adults in urban areas uses herbal medicines highlight the substantial health-economic implications for our country. Indeed, the herbal medicines industry is expected to be worth USD 2.5 billion by 2010 and the industry is growing faster than the general economy, at more than 15–20% per year.33

Our findings confirm the high prevalence of use of herbal medicines by the urban population and identify factors which predict their use. Knowledge of these predictors may help health care providers identify patients in need of additional guidance on their safe use. Our findings may also be helpful to governmental policy-makers planning and managing the healthcare system of the country.

Conclusions

Among Malaysian adults, being a woman, Malay, suffering from health problem, earning a high income, and having favorable opinions about herbal medicines were significant positive predictors of use of herbal medicines. Further research is needed to validate and replicate the findings. The development and validation of a broader instrument to further probe the attitudinal characteristics of respondents with respect to herbal medicine use may also be worthwhile.

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References

Use of herbal medicines among Malaysian adults


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