Original Article

Knowledge, Attitude, and Practice of General Population toward Complementary and Alternative Medicines in Relation to Health and Quality of Life in Sungai Petani, Malaysia

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INTRODUCTION

Complementary and alternative medicine (CAM) is basically a combination of diagnostic and therapeutic disciplines that are used together with allopathic or a conventional therapy.[1] In societies and regions where multiple religion and different races

Purpose: The demand of complementary and alternative medicine (CAM) has increased drastically over the past few decades. The perceptions about CAMs among general population are positive. However, the literature highlights that effectiveness and acceptance of alternative therapies among the general population is still a subject of debate. Materials and Methods: This is a cross-sectional study and the response along with demographic details was collected through a validated questionnaire; the results were analyzed by using a validated data collection tool. The results were concluded based on good, moderate, and poor responses, which were evaluated through data analysis by using the Statistical Package for the Social Sciences software version 20.0., SPSS Inc., Chicago, III, USA. A value of $P < 0.05$ was considered statistically significant.

Results: In total, 182 (44.4%) of male and 228 (55.6%) of female respondents were selected for this study. Studies showed that a greater knowledge level was observed among female respondents ($15.55 \pm 2.7$; $P < 0.001$). The selected Chinese population had relatively good knowledge (i.e., $15.63$, $P = 0.006$). People practicing Buddhism had also good knowledge. Rural population had lesser family income and showed a good practice pattern and understanding ($P = 0.006$). The positive attitude was identified among women ($P < 0.001$) with a mean score of $15.55 \pm 2.7$. Postgraduate participants were found to have diverse results with $SD \pm 6.23$, and $77.1\%$ had a good attitude. A statistically significant association was observed between religion and attitude of respondents ($P < 0.001$).

Conclusion: Although a better practice was noticed in Malaysian population, more awareness is required and knowledge should be disseminated among the population to improve the overall health and quality of life in Malaysia.

KEYWORDS: Complementary and alternative medicine, knowledge, attitude, perception, quality of life
coexist in a community with larger populations, they are more likely to have more pronounced requirement of alternative therapeutic options. However, in general population an increased use has been found with their own personal beliefs and understanding.

Materials and Methods
This cross-sectional observational study aimed to evaluate the knowledge and practice among the general population. The study was conducted in Sungai Petani Malaysia, because of existing multiple races living in rural as well as urban areas. This survey-based study conducted through a validated questionnaire was designed to evaluate the knowledge, attitude, and practice (KAP). The questionnaire was initially prepared based on previous literature,[2-4] and the modified questionnaire was validated by the experts in the field of CAMs. A score of 0 was awarded to each wrong question, whereas a score of 1 was awarded to each right answer. The scoring criteria were taken from a former study performed in Malaysia by Abdullahi et al. and Aziz et al., and in India by Gawde et al. The scoring criteria were as follows:

- 0–5 right answers (<59%), which was considered poor KAP
- 6–7 right answers (60%–79%), which was considered as moderate KAP
- 8–10 right answers (≥80%), which was considered as good KAP

Data analysis
The normality of data was tested using the Statistical Package for the Social Sciences software version 20.0 (SPSS Inc., Chicago, III, USA) and Kolmogorov–Smirnov test. A value of \( P > 0.05 \) was considered statistically significant, which showed that data were nonparametric. Thus, nonparametric tests were applied for the analysis of data. The statistical significance was obtained through the chi-squared test, Mann–Whitney U test, and Kruskal–Wallis test, and the effect size was calculated using the Phi–Cramer test. A value of \( P < 0.05 \) was considered statistically significant. A Cronbach’s \( \alpha \) of 0.696 was used to determine the internal reliability of the questionnaire, which, after the deletion of a question, was found to be 0.784 and was considered reliable.

Ethical approval
The ethical approval for this study was obtained from the ethics committee of the Asian Institute of Medicine, Science and Technology (AIMST) University, Bedong, Kedah, Malaysia (Protocol no. AUHAEC/FOP/2016/16).

Results
Demographics
Table 1 shows the overall demographic information for the 410 participants. Of these, 182 (44.4%) were men and 228 (55.6%) were women. Sixty-eight (16.6%) respondents had secondary education, 297 (72.4%) were undergraduates, and 35 (8.5%) were postgraduate. The ethnicity data showed that 179 (43.7%) respondents were Chinese, 108 (26.3%) were Malay, 93 (22.7%) were Indian, and 30 (7.3%) were of other races.

Knowledge toward complementary and alternative medicines
In total, 63 (27.2%) respondents were women who had good knowledge toward CAMs, whereas only 18

| Table 1: Demographic data variables |
|------------------------------------|
| Variables | n (%) |
| Gender |
| Male | 182 (44.4) |
| Female | 228 (55.6) |
| Age |
| ≤25 | 289 (70.5) |
| 26–30 | 80 (19.5) |
| 31–35 | 37 (9.0) |
| 36–40 | 3 (0.7) |
| ≥41 | 1 (0.2) |
| Ethnicity |
| Malay | 108 (26.3) |
| Chinese | 179 (43.7) |
| Indian | 93 (22.7) |
| Others | 30 (7.3) |
| Religion |
| Islam | 108 (26.3) |
| Buddhism | 136 (33.2) |
| Hinduism | 83 (20.2) |
| Christianity | 81 (19.8) |
| Others | 2 (0.5) |
| Place of living |
| Rural | 87 (21.2) |
| Urban | 323 (78.8) |
| Employment status |
| Government | 62 (15.1) |
| Private | 135 (32.9) |
| Unemployed | 213 (52.0) |
| Education level |
| No formal education | 6 (1.5) |
| Primary | 4 (1.0) |
| Secondary | 68 (16.6) |
| Undergraduate | 297 (72.4) |
| Postgraduate | 35 (8.5) |
| Family income |
| ≤RM 2000 | 120 (29.3) |
| RM 2001–4000 | 95 (23.2) |
| ≥RM 4001 | 195 (47.6) |
Table 2: Overall knowledge level with different variables

| Variables          | Poor n (%) | Moderate n (%) | Good n (%) | P value* | Effect size |
|--------------------|------------|----------------|------------|----------|-------------|
| **Gender**         |            |                |            |          |             |
| Male               | 13 (7.1)   | 151 (83.0)     | 18 (9.9)   | <0.001   | 0.310       |
| Female             | 43 (18.9)  | 122 (53.5)     | 63 (27.2)  |          |             |
| **Age**            |            |                |            |          |             |
| ≤25                | 50 (17.3)  | 179 (61.9)     | 60 (20.8)  | 0.001    | 0.182       |
| 26–30              | 1 (1.2)    | 70 (87.5)      | 9 (11.2)   |          |             |
| 31–35              | 5 (13.5)   | 22 (59.5)      | 10 (27.0)  |          |             |
| 36–40              | 0 (0.0)    | 1 (33.3)       | 0 (66.7)   |          |             |
| ≥41                | 0 (0.0)    | 1 (100.0)      | 0 (0.0)    |          |             |
| **Ethnicity**      |            |                |            |          |             |
| Malay              | 2 (1.9)    | 83 (76.9)      | 23 (21.3)  | <0.001   | 0.254       |
| Chinese            | 28 (15.6)  | 127 (70.9)     | 24 (13.4)  |          |             |
| Indian             | 21 (22.6)  | 38 (40.9)      | 34 (36.6)  |          |             |
| Others             | 5 (16.7)   | 25 (82.3)      | 0 (0.0)    |          |             |
| **Religion**       |            |                |            |          |             |
| Islam              | 2 (1.9)    | 83 (76.9)      | 23 (21.3)  | <0.001   | 0.265       |
| Buddhism           | 23 (16.9)  | 95 (69.9)      | 18 (13.2)  |          |             |
| Hinduism           | 19 (22.9)  | 34 (41.0)      | 30 (36.1)  |          |             |
| Christians         | 10 (12.3)  | 61 (75.3)      | 10 (12.3)  |          |             |
| Others             | 2 (100.0)  | 0 (0.0)        | 0 (0.0)    |          |             |
| **Place of living**|            |                |            |          |             |
| Rural              | 11 (12.6)  | 55 (63.2)      | 21 (24.1)  | 0.511    | –           |
| Urban              | 45 (13.9)  | 218 (67.5)     | 60 (18.6)  |          |             |
| **Employment status** |        |                |            |          |             |
| Government         | 9 (14.5)   | 41 (66.1)      | 12 (19.4)  | 0.312    | –           |
| Private            | 31 (14.6)  | 133 (62.4)     | 49 (23.0)  |          |             |
| Unemployed         | 16 (11.9)  | 99 (73.3)      | 20 (14.8)  |          |             |
| **Education level**|            |                |            |          |             |
| No formal education| 0 (0.0)    | 2 (33.3)       | 4 (66.7)   | <0.001   | 0.213       |
| Primary            | 4 (100.0)  | 0 (0.0)        | 0 (0.0)    |          |             |
| Secondary          | 5 (7.4)    | 41 (60.3)      | 22 (32.4)  |          |             |
| Undergraduate      | 45 (15.2)  | 205 (69.0)     | 47 (15.8)  |          |             |
| Postgraduate       | 6 (17.1)   | 5 (11.4)       | 42 (71.4)  |          |             |
| **Family income**  |            |                |            |          |             |
| ≤RM 2000           | 11 (9.2)   | 82 (68.3)      | 27 (22.5)  | 0.008    | 0.129       |
| RM 2001–4000       | 13 (13.7)  | 54 (56.8)      | 28 (29.5)  |          |             |
| ≥RM 4001           | 32 (16.4)  | 137 (70.3)     | 26 (13.3)  |          |             |

*Chi-squared test

(9.9%) were men who had good knowledge [Table 2]. A significant relationship was found among the male and female gender corresponding to knowledge. Younger age participants had good knowledge (20.8%). Malay individuals had comparatively better knowledge than other ethnic groups.

**Attitude toward complementary and alternative medicines**

As evident from Table 3, Chinese population had better attitude towards CAMs than other races, with 24 (13.4%) having good attitude and 136 (76%) having moderate attitude. In relation to ethnicity, 101 (74%) respondents practicing Buddhism were found to have moderate knowledge toward CAMs and 19 (14%) had good knowledge as compared with respondents practicing other religions. As shown in the table, on the basis of ethnicity, the effect size was 0.324 which shows moderate association between CAM use and the ethnicity.

**Practice toward complementary and alternative medicines**

Table 4 shows the overall response to practice questions. There was a significant association based on religion and place of living. The table also shows the impact of education level on use of CAMs with a significant value of $P$. 

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Knowledge toward complementary and alternative medicines

This study focuses on substantial knowledge among general population on CAMs and the difference of their knowledge in relation to health and quality of life (QoL). There were total 63 women who had good knowledge toward CAMs, whereas only 18 men had good knowledge toward CAMs. In comparison to this study, a study in the United States examined gender’s relationship to CAMs use and experience and reported similar findings. Hence, it could be said that Malaysian women had better knowledge and were more confident toward the use of CAMs.[6,7] The study showed better knowledge among working women than the working men, which had a greater effect on the outcomes of the study.[8] This difference may be due to the fact that women were more focused on gaining knowledge on health and for the appreciable use of CAMs as adjunctive therapies.[9]

Our results reported that age was a major factor affecting the knowledge among different groups. It was observed that the acceptance and use of CAMs was found to be higher in younger or newly diagnosed cancer patients rather than the older groups or the later-stage patients.[10]

This study, based on ethnicity, showed that Malay population had good knowledge toward CAMs, whereas Chinese population was comparatively lower within the same category of “good knowledge” ($P = 0.001$). Previous studies carried out in different regions around the world also highlighted the effect

| Table 3: Overall attitude level with different variables |
|----------------|----------------|----------------|----------------|----------------|----------------|
| Variables               | Negative n (%) | Neutral n (%)  | Positive n (%) | $P$ value | Effect size |
|--------------------------|----------------|----------------|----------------|------------|-------------|
| **Gender**               |                |                |                |            |             |
| Male                     | 15 (8.2)       | 152 (83.5)     | 15 (8.2)       | 0.667     | –           |
| Female                   | 17 (7.5)       | 197 (86.4)     | 14 (6.1)       |            |             |
| **Age**                  |                |                |                |            |             |
| ≤25                      | 25 (8.7)       | 240 (83.0)     | 24 (8.3)       | 0.667     | –           |
| 26–30                    | 4 (5.0)        | 71 (88.8)      | 5 (6.2)        |            |             |
| 31–35                    | 3 (8.1)        | 34 (91.9)      | 0 (0.0)        |            |             |
| 36–40                    | 0 (0.0)        | 3 (100.0)      | 0 (0.0)        |            |             |
| ≥41                      | 0 (0.0)        | 1 (100.0)      | 0 (0.0)        |            |             |
| **Ethnicity**            |                |                |                |            |             |
| Malay                    | 0 (0.0)        | 108 (100.0)    | 0 (0.0)        | <0.001    | 0.324       |
| Chinese                  | 19 (10.6)      | 136 (76.0)     | 24 (13.4)      |            |             |
| Indian                   | 13 (14.0)      | 75 (80.6)      | 5 (5.4)        |            |             |
| Others                   | 0 (0.0)        | 30 (100.0)     | 0 (0.0)        |            |             |
| **Religion**             |                |                |                |            |             |
| Islam                    | 0 (0.0)        | 108 (100.0)    | 0 (0.0)        | <0.001    | 0.212       |
| Buddhism                 | 16 (11.8)      | 101 (74.3)     | 19 (14.0)      |            |             |
| Hinduism                 | 11 (13.3)      | 67 (80.7)      | 5 (6.0)        |            |             |
| Christians               | 5 (6.2)        | 71 (87.7)      | 5 (6.2)        |            |             |
| Others                   | 0 (0.0)        | 2 (100.0)      | 0 (0.0)        |            |             |
| **Place of living**      |                |                |                |            |             |
| Rural                    | 4 (4.6)        | 76 (87.4)      | 7 (8.0)        | 0.434     | –           |
| Urban                    | 28 (8.7)       | 273 (84.5)     | 22 (6.8)       |            |             |
| **Employment status**    |                |                |                |            |             |
| Government               | 2 (3.2)        | 58 (93.5)      | 2 (3.2)        | 0.159     | –           |
| Private                  | 15 (7.0)       | 183 (85.9)     | 15 (7.0)       |            |             |
| Unemployed               | 15 (11.5)      | 108 (80.0)     | 12 (8.9)       |            |             |
| **Education level**      |                |                |                |            |             |
| No formal education      | 2 (33.3)       | 4 (66.7)       | 0 (0.0)        | 0.262     | –           |
| Primary                  | 0 (0.0)        | 4 (100.0)      | 0 (0.0)        |            |             |
| Secondary                | 3 (4.4)        | 61 (89.7)      | 4 (5.9)        |            |             |
| Undergraduate            | 22 (7.4)       | 253 (85.2)     | 22 (7.4)       |            |             |
| Postgraduate             | 5 (14.3)       | 3 (8.6)        | 27 (77.1)      |            |             |
| **Family income**        |                |                |                |            |             |
| ≤RM 2000                 | 8 (6.7)        | 104 (86.7)     | 8 (6.7)        | 0.003     | 0.141       |
| RM 2001–4000             | 13 (13.7)      | 69 (72.6)      | 13 (13.7)      |            |             |
| ≥RM 4001                 | 11 (5.6)       | 176 (90.3)     | 8 (4.1)        |            |             |

*Chi-squared test*
of ethnicity on knowledge, along with the racial gap among different ethnicities.\textsuperscript{11,12} This study demarcated major ethnic differences in knowledge showing association of race on the level of knowledge.

Educational background is one of the parameters to estimate knowledge among the respondents, which could inculcate better understanding of information on CAM.\textsuperscript{13} In this study, knowledge regarding CAMs was directly proportional to level of education. The postgraduates had good knowledge toward CAMs as compared with undergraduates who had poor knowledge. Respondents with secondary education had good knowledge representing slightly higher than undergraduates as most respondents with secondary education belonged to rural areas. They appeared more knowledgeable and this translated to an increased acceptance of CAMs in rural areas.

### Attitude toward complementary and alternative medicines

This study shows a proper image of disparities in attitudes among different races and ethnicities based on places of residence in Sungai Petani, Malaysia. Various studies and systemic reviews conducted in the United States, Israel, and Thailand identified that positive attitude was linked with a high prevalence of CAM’s use.\textsuperscript{7-10} A strong and significant association was observed ($P < 0.001$) among ethnicity and attitude. Previous studies have expressed minor inconsistencies between three major ethnicities in Malaysia.\textsuperscript{11-13}

### Table 4: Overall responses to practice questions

| Variables        | Poor n (%) | Fair n (%) | Good n (%) | $P$ value | Effect size |
|------------------|------------|------------|------------|-----------|-------------|
| **Gender**       |            |            |            |           |             |
| Male             | 150 (82.4) | 24 (13.2)  | 8 (4.4)    | 0.763\textsuperscript{b} | –           |
| Female           | 182 (79.8) | 33 (14.5)  | 13 (5.7)   | –         | –           |
| **Age**          |            |            |            |           |             |
| ≤25              | 228 (78.9) | 46 (15.9)  | 15 (5.2)   | 0.457     | –           |
| 26–30            | 71 (88.8)  | 7 (8.8)    | 2 (2.5)    | –         | –           |
| 31–35            | 29 (78.4)  | 4 (10.8)   | 4 (10.8)   | –         | –           |
| 36–40            | 3 (100.0)  | 0 (0.0)    | 0 (0.0)    | –         | –           |
| ≥41              | 1 (100.0)  | 0 (0.0)    | 0 (0.0)    | –         | –           |
| **Ethnicity**    |            |            |            |           |             |
| Malay            | 103 (95.4) | 3 (2.8)    | 2 (1.9)    | <0.001    | 0.275       |
| Chinese          | 136 (76.0) | 29 (16.2)  | 29 (16.2)  | –         | –           |
| Indian           | 65 (69.9)  | 23 (24.7)  | 23 (24.7)  | –         | –           |
| Others           | 28 (93.3)  | 2 (6.7)    | 2 (6.7)    | –         | –           |
| **Religion**     |            |            |            |           |             |
| Islam            | 103 (95.4) | 3 (2.8)    | 2 (1.9)    | <0.001    | 0.289       |
| Buddhism         | 102 (75.0) | 23 (16.9)  | 11 (8.1)   | –         | –           |
| Hinduism         | 55 (63.3)  | 23 (27.7)  | 5 (6.0)    | –         | –           |
| Christians       | 70 (86.4)  | 8 (9.9)    | 3 (7.5)    | –         | –           |
| Others           | 2 (100.0)  | 0 (0.0)    | 0 (0.0)    | –         | –           |
| **Place of living** |          |            |            |           |             |
| Rural            | 60 (69.0)  | 20 (23.0)  | 7 (8.0)    | 0.006\textsuperscript{b} | 0.159       |
| Urban            | 272 (84.2) | 37 (11.5)  | 14 (4.3)   | –         | –           |
| **Employment status** |        |            |            |           |             |
| Government       | 50 (80.6)  | 6 (9.7)    | 6 (9.7)    | 0.099     | –           |
| Private          | 17 (84.0)  | 28 (13.1)  | 6 (2.8)    | –         | –           |
| Unemployed       | 103 (76.3) | 23 (17.0)  | 9 (6.7)    | –         | –           |
| **Education level** |         |            |            |           |             |
| No formal education | 4 (66.7)  | 2 (33.3)   | 0 (0.0)    | 0.002     | 0.112       |
| Primary          | 4 (100.0)  | 0 (0.00)   | 0 (0.0)    | –         | –           |
| Secondary        | 60 (88.2)  | 3 (4.4)    | 5 (7.4)    | –         | –           |
| Undergraduate    | 239 (80.5) | 42 (14.2)  | 16 (5.4)   | –         | –           |
| Postgraduate     | 2 (5.7)    | 8 (22.9)   | 25 (71.4)  | –         | –           |
| **Family income** |          |            |            |           |             |
| ≤RM 2000         | 95 (79.2)  | 8 (6.7)    | 17 (14.2)  | 0.327     | –           |
| RM 2001–4000     | 73 (76.8)  | 20 (20.1)  | 2 (2.1)    | –         | –           |
| ≥RM 4001         | 164 (84.1) | 20 (10.3)  | 11 (5.6)   | –         | –           |

\textsuperscript{a}Chi-squared test
Overall, in this study Chinese respondents had good positive attitude toward CAMs. The study also reported that the majority of Malay along with Indians had neutral attitude toward CAMs. The findings of this study were in accordance with an earlier study conducted in Selangor and Kuala Lumpur, in which Chinese population was found to have better attitude and understanding toward CAMs. This could be mainly due to the fact that most of the Chinese have strong faith on traditional Chinese medicine.

In all the questions asked with associations, it was observed that education level has a significant effect on attitude. Increasing level of education promotes a more positive attitude as seen in postgraduate population having diverse results with SD ± 6.23. The highest level of education in this study was postgraduate, which showed a remarkably good attitude toward CAMs. A similar study performed on medical students regarding CAMs also supported our study observations that with an increase in level of education, the attitude was comparatively better. The postgraduate students were good in overall understanding as compared with the undergraduate students.

**Practice toward complementary and alternative medicines**

A number of studies have been performed on knowledge, attitude and practice towards CAM, but mostly the focus was healthcare practitioners or students. This study explains the practice of general population of Sungai Petani, Malaysia toward the use of CAM. The study was divided into four major age groups to explain the effect on practice. No significant association was found in age and individual question on practice of respondents. Despite gender differences, age was reported in many studies accordingly to measure the difference in practice, which is widely used worldwide as a major independent factor.

This study explains the racial differences and their effect on practice. A statistically high significant association was observed in ethnic groups on the practice with \( P < 0.001 \). This study identified that Indian population had good practice, which was better among all ethnicities. Therefore, Chinese and Malay population were found to have comparatively moderate practice and weaker association between ethnic groups.

**Limitation**

There are certain limitations associated with this study. This study was conducted in a single city, which is not densely populated and considered as under developing city. The respondents selected were mostly belonging to younger age of less than 30 years. Current study has fewer number of participants in the age group above 60 years, and hence need further elucidation. An unequal number of respondents was included based on educational, religious, ethnic, and financial levels. Therefore, the study was unable to conclude on the exact difference in association, which is also important limitation of this study.

**Conclusion**

A significant association was observed among different religious and ethnic groups. The study highlights a higher knowledge, positive attitude, and moderate practice in a particular group among Malaysian population. To increase the practice and better attitude of whole population, there is a need to make and implement certain strategies regarding the educational interventions. This study explains the overall knowledge and attitude of the general population regarding CAM therapies highlighting race and socioeconomic as determinants for CAM selection in the major and minor illnesses. Certain studies prove that better knowledge resulted in better attitude and practice. The promotional and informative campaigns on CAMs should be encouraged by the health authority of Malaysia to improve the overall acceptance, use, and health-related QoL.

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**Conflicts of interest**

There are no conflicts of interest.

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