

KAP AMONG DOCTORS WORKING IN HOSPITALS, REGARDING HALAL PHARMACEUTICALS; A CROSS SECTIONAL ASSESSMENT

SALEHA SADEEQA^{1*}, AZMI SARRIFF¹, IMRAN MASOOD², MUHAMMAD ATIF²
and MARYAM FAROOQUI³

¹Discipline of Clinical Pharmacy, School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia

²Faculty of Pharmacy and Alternative Medicine, The Islamia University of Bahawalpur, Bahawalpur, Punjab, Pakistan

³Faculty of Pharmacy Universiti Teknologi MARA (Bertam campus), Penang, Malaysia

Abstract: There is a growing awareness amongst Muslims to avoid all items containing non-Halal ingredients. This sentiment has now progressed into the field of various medications. It therefore, required a study to assess the knowledge, attitude and perception (KAP) relating to pharmaceuticals containing non-Halal ingredients among doctors working in various hospitals of Malaysia. This was a cross sectional study, carried out in January 2013 - February 2013 period, using a structured, self-administered questionnaires. Study settings included various government hospitals in Malaysia. Data were collected by distributing questionnaires through respective heads of the departments. Study was conducted on a sample of 243 participants. Inclusion criterion was a registered medical doctor working in a government hospital. Descriptive statistics (mean, standard deviation, frequency, percentage, median, inter quartile range) was applied to summarize the data, non-parametric tests were applied. χ^2 Test and Fisher's Exact Test were applied to assess the association between demographic characteristics and knowledge, attitude and perception scores. Results revealed that the hospital doctors had a good and positive attitude and perception about Halal pharmaceuticals. Mean knowledge score out of maximum possible 9 score was 7.67 ± 1.68 . Mean attitude score out of maximum possible 45 score was 34.10 ± 5.35 while mean perception score out of maximum possible 55 score was 45.73 ± 5.44 . Mean overall KAP score out of maximum possible 109 was 87.60 ± 10.37 . There was a significant, positive and weak correlation (0.20 - 0.29) between knowledge and attitude ($r = 0.231$, $p < 0.001$) as well as between knowledge and perception ($r = 0.209$, $p = 0.001$) while there was good correlation (0.5 - 0.75) between attitude and perception ($r = 0.588$, $p < 0.001$). It is concluded from the results that the better knowledge the respondents have on Halal pharmaceuticals the better is their perception and attitude towards Halal pharmaceuticals.

Keywords: knowledge, attitude, perception, KAP, halal, pharmaceuticals

Halal is an Arabic word which means “lawful,” “permissible” under Islamic law (1-3). Halal is a universal term that applies to all facets of life; however, this study will adapt this term to refer only to pharmaceutical products that are deemed permissible for consumption of Muslims.

It is a firm belief of all Muslims that Allah is our creator and He is the best judge of what is right for us to consume and in what shape it should be done. However, it is pertinent to mention that all old religions of the world like Hinduism, Judaism and Christianity also command certain religious restrictions and bindings on their followers in the consumption of foods and drinks (4, 5). They may use other terminologies to define these restrictions but the main

sentiment is the same. Therefore, it would be pertinent to look into various items of human consumption, including medicines, and their variants, to determine admissibility according to individual beliefs.

The globally expanding Muslim population has in turn expanded the Muslim consumer's market manifold. Moreover, awareness among Muslims is dawning regarding medicines and its sources. Muslim consumers are now increasingly mindful and in search for Halal medicines. Most countries of the world have a body or more to look upon issues related to the Halal food. These bodies govern all matters including issuance of Halal certification. Though, at present, pharmaceuticals are not mandatory for monitoring of the Halal status.

* Corresponding author: e-mail: salehasadeeqa@gmail.com

As a majority of Malaysian population is Muslim (6), there are many government organizations which play active role to ensure provision of Halal foods and pharmaceuticals. Halal Industry Development Corporation (HDC) coordinates the overall development of the Halal industry, and focuses on development of Halal standards, audit and certification (7). Department of Islamic Development Malaysia (JAKIM) has established Malaysia Halal logo and has implemented Halal Certification System (8). Ministry of International Trade and Industry (MITI) promotes Halal products and services (9). Department of Standards, Government of Malaysia has launched world's first standards, MS 2424:2010 (P): for Halal pharmaceuticals. These general guidelines will address the entire pharmaceutical manufacturing and supply chain – from processing to handling, packaging, labeling, distribution, storage and display of medicines and health supplies (10).

Though many government and non government organizations are playing an active role to ensure provision of Halal foods and pharmaceuticals to Muslims in Malaysia, to the best of our knowledge no study has been done, so far, to evaluate the perception of doctors working in hospitals regarding Halal pharmaceuticals. Moreover, their knowledge on the issues surrounding Halal pharmaceuticals is not well explored. Therefore, the main objective of this study is to explore Malaysian hospital doctors' perception and their opinion of Halal pharmaceuticals and to identify barriers to prescribing them.

EXPERIMENTAL

Study settings and design

A cross sectional study design was adopted by using structured, self-administered questionnaire. Survey was conducted across Malaysia from January 2013 to March 2013. Study settings included various government hospitals in Malaysia.

Questionnaire design and validation

After extensive literature review, a self administered questionnaire was designed to conduct this study. The questionnaire was validated by a panel of experts which was composed of eight (8) senior academic researchers and was updated according to their recommendations (11). A pilot study was conducted to evaluate the reliability of the updated questionnaire. Cronbach's α was applied to test validity and internal consistency of the questionnaire (12) and $\alpha = 0.6$ was set as the minimum acceptable value for validity. Final modifications were made based upon the results of pilot study.

The final questionnaire consisted of four parts. The first part of the questionnaire was on respondent's demographic information including age, gender, race, religion, nationality, current position (house officer or specialist), current area of practice, country of basic educational degree, basic medical qualification, post graduate medical qualification and finally the experience. Second part had 9 statements to evaluate the knowledge of respondents. Third part consisted of 11 statements for perception's evaluation and final part had 9 statements about the attitude of respondents regarding Halal pharmaceuticals. All questions were close ended, except one at the end for additional comments.

Scoring method for knowledge, attitude and perception (KAP)

For knowledge statements respondents were asked to choose "yes" or "no" options. Correct answer (yes) was scored one (1) while incorrect answer (no) was scored zero (0). A five point Likert scale was used for perception and attitude statements (strongly agree = 5, agree = 4, neutral = 3, disagree = 2 and strongly disagree = 1). Hence, the minimum and maximum score for knowledge, attitude and perception can be 0 to 9, 1 to 45 and 1 to 55, respectively (11). Total KAP score can be 109.

Selection criteria and recruitment of respondents

All medical doctors working in different departments (except those who were not involved in prescribing i.e., radiologists, pathologists etc.) in selected government hospitals, on duty during the study period and willing to participate in study were recruited as "study participants".

Sampling and data collection

Sampling technique was convenience sampling. All doctors, in selected hospitals, (involved in prescribing medicines) were approached. Only those doctors were included in the study who agreed to participate. Doctors were approached through respective heads of the departments (13) and were requested to return the completed questionnaires within two weeks. Reminders were sent after one week (14). No incentives were offered to any of the respondents (15, 16).

Ethical consideration

Ethical approval to conduct this study was taken from "Joint Ethics Committee of School of Pharmaceutical Sciences, USM and Hospital Lam Wah Ee on Clinical Studies". Additionally, approval of the Ministry of Health Malaysia was also taken.

Table 1. Descriptive characteristics of hospital doctors n = 243.

| haracteristics | Demographic characteristics | Frequency (%) |
|-----------------------------|---|---------------|
| Age (years) | 24-28 | 109 (44.9) |
| | 29-33 | 71 (29.2) |
| | 34-40 | 43 (17.7) |
| | ≥41 | 20 (8.2) |
| Gender | Male | 102 (42.0) |
| | Female | 141 (58.0) |
| Race | Malay | 90 (37.2) |
| | Chinese | 96 (39.7) |
| | Indian | 8 (19.8) |
| | Others Punjabi = 4, Mamak = 1, Kadazan = 1, Bisaya = 1 | 8 (3.3) |
| Religion | Muslims | 93 (38.4) |
| | Christians | 29 (12.0) |
| | Buddhist | 72 (29.8) |
| | Hindu | 40 (16.5) |
| | Others (Sikh = 5, Tao = 2) | 8 (3.3) |
| Nationality | Malaysian | 243 (100) |
| Current Position | House Officer | 64 (26.3) |
| | Medical Officer | 130 (53.5) |
| | Specialist/consultant | 49 (20.3) |
| Current area of practice | General medicine | 103 (42.7) |
| | Obstetrics and gynecology | 38 (15.8) |
| | Surgery | 49 (20.3) |
| | Pediatrics | 28 (11.6) |
| | ENT | 22 (9.1) |
| | Others | 1 (0.4) |
| Basic medical qualification | MBBS | 108 (44.4) |
| | Doctor in medicine (MD) | 124 (51.0) |
| | Others (MBBCh, BAO = 8, Melo G = 1) | 11 (4.5) |
| Postgraduate qualification | Yes | 51 (21.2) |
| | No | 189 (77.8) |
| Country of basic degree | Malaysia | 165 (68.5) |
| | Others (Russia = 20, India = 16, Indonesia = 11, UK = 8, Australia = 5, Ireland = 4, Ukraine = 4, Czech Republic = 2, Canada = 1) | 76 (31.5) |
| Working experience (years) | 1-4 | 140 (57.6) |
| | 5-8 | 51 (21.0) |
| | 9-12 | 20 (8.2) |
| | ≥ 12 | 32 (13.2) |

Note: The frequencies and percentages are based on observed values; missing values are excluded (18).

Moreover, permission was also sought from directors of respective hospitals and the heads of the departments.

Data analysis

After data collection and screening, data were entered in SPSS version 18. After data cleaning, normality of data was checked by Kolmogorov-Smirnov test. Descriptive statistics (mean, standard deviation, frequency, percentage, median, inter quartile range) was applied to summarize the data. As data were not normally distributed, so non-parametric tests were applied. χ^2 Test and Fisher's Exact Test were applied to assess the association between demographic characteristics and knowledge, attitude and perception score. To find relationship between knowledge-attitude, knowledge-perception and attitude-perception of respondents, Spearman-correlation was applied; p value of 0.05 or less was taken as statistically significant. Responses were considered positive, if they were on positive side of the midpoint of score and negative, if they were on negative side of the midpoint of score (17).

RESULTS

Respondents' demographics

A total of 243 doctors participated in the study. Demographic characteristics of the respondents are depicted in Table 1. Mean age of the respondents was 31.25 years with SD of \pm 6.33. Age ranges from

24 to 56 years. Gender - 102 (42%) of the respondents were male and 141 (58%) were female. Ethnicity - 90 (37.2%) were Malay, 96 (39.7%) were Chinese and 48 (19.8%) Indians. According to the religion, 93 (38.4%) were Muslims, 29 (12%) Christians, 72 (29.8%) Buddhists, 40(16.5%) Hindu and 8 (3.3%) from other categories. A total of 64 (26.3%) were house officers, 130 (53.5%) medical officers and 49 (20.3%) were specialists.

Respondents' knowledge regarding Halal pharmaceuticals

Out of maximum possible score (equal to 9), mean knowledge score was 7.67, SD = 1.685. The frequency distribution of respondents' knowledge regarding Halal pharmaceuticals is depicted in Table 2. A total of 42% respondents scored 100% score, 24% respondents scored 88% score while 14% scored 77%. Hence, overall a large majority (> 94%) of the respondents scored 50% and above, which shows that study population has good knowledge regarding Halal pharmaceuticals.

Results showed that all, except one, of the respondents were aware of the term "Halal", while 225 (93%) of the respondents were aware of the term "Haram" ("unlawful", "prohibited", "forbidden") showing a significant association with respect to respondents' religion ($p = 0.008$) and race ($p = 0.003$). On the other hand, a total of 181 (74.8%) respondents were aware of the term "Halal pharmaceutical" showing a significant association with

Table 2. Hospital doctors' knowledge about Halal pharmaceuticals (frequency distribution n = 243).

| Statements | Responses | |
|---|--------------|-------------|
| | Yes n (%) | No n (%) |
| Are you aware of the term/ word "Halal"? | 241 (99.6) | 1 (0.4) |
| Are you aware of the term/word "Haram"? | 225 (93.0) | 17 (7.0) |
| Are you aware of the term/word "Halal pharmaceuticals"? | 181 (74.8) | 61 (25.2) |
| Do you know that Muslim patients need Halal medicines? | 228 (95.0) | 12 (5.0) |
| Do you know that dead animals, blood, pork and Alcohol are Haram for Muslims to use in any form (food, medication etc)? | 227 (94.2) | 14 (5.8) |
| Do you know that ingredients of some drugs/medicines are derived from porcine and dead animals? | 231 (95.5) | 11 (4.5) |
| Do you know that resources are available to offer Halal alternatives of non-Halal drugs? | 173 (72.1) | 67 (27.9) |
| Do you know that it is ethical obligation for a practitioner to take consent from the patient before dispensing any medicine which has any non-Halal content? | 200 (82.6) | 42 (17.4) |
| Do you know that most of the doctors are aware of the presence of potentially forbidden animal-derived ingredients in medicines? | 183 (75.9) | 58 (24.1) |

Note: The frequencies and percentages are based on observed values; missing values are excluded (18). The cut off level of ≥ 5 was considered as good knowledge while < 5 as poor.

respect to respondents' gender (Fisher's p value = 0.035), religion ($p = 0.005$) and years of experience ($p = 0.045$). A large majority (95%) of the respondents were aware that Muslim patients need Halal medicines showing a significant association with respect to respondents' religion ($p < 0.001$), race ($p = 0.002$) and years of experience ($p = 0.021$).

It was also found that a total of 227 (94.2%) respondents were aware that dead animals, blood, pork and alcohol are Haram for Muslims to use in any form (food, medication etc.), showing a significant association with respect to respondents' religion ($p = 0.031$) and race ($p = 0.016$). A majority of respondents (95.5%) were aware that ingredients of some drugs/medicines are derived from porcine and dead animals. This showed a significant association with respect to respondents' race ($p = 0.002$). A total of 173 respondents (72.1%) had knowledge that resources are available to offer Halal alternatives of non-Halal drugs, showing a significant association with respect to respondents' religion ($p = 0.015$). Results found that 200 (82.6%) of the respondents

had knowledge that it is ethical obligation for a practitioner to take consent from the patient before dispensing any medicine which has any non-Halal content, showing a significant association with respect to respondents' religion ($p = 0.003$) and race ($p = 0.047$). Study further found that 183 (75.9%) of the respondents were aware that most of the doctors know of the presence of potentially forbidden animal-derived ingredients in medicines. This showed a significant association with respect to respondents' religion ($p = 0.033$) and race ($p = 0.010$).

Respondents' perception regarding Halal pharmaceuticals

The perception of respondents regarding Halal pharmaceuticals was evaluated by using perception questionnaire. The frequency distribution of respondents' perception regarding Halal pharmaceuticals is presented in Table 3. There were total 11 statements to evaluate the perception of respondents. Out of maximum possible score (55), the mean perception score was 45.73 ± 5.44 . About 90% of the respon-

Table 3. Hospital doctors' perception about Halal pharmaceuticals (frequency distribution $n = 243$).

| Statements | Responses* | | | | |
|--|-------------|------------|------------|-------------|--------------|
| | SA n (%) | A n (%) | N n (%) | DA n (%) | SDA n (%) |
| Patient has a right to ask information about sources & ingredients of medicines. | 131 (53.9) | 107(44) | 5 (2.1) | | |
| It is important for prescriber to explain about the sources & ingredients of medicine as much as possible and encourage the patients to ask questions. | 78 (32.2) | 132 (54.5) | 27 (11.2) | 4 (1.7) | 1 (0.4) |
| It is not a common practice to inform the patients about sources of the medicines. | 21 (8.6) | 106 (43.6) | 59 (24.3) | 45 (18.5) | 12 (4.9) |
| Drug manufacturers should provide prescribers with a list of their products containing animal-derived ingredients. | 106 (43.8) | 118 (48.8) | 16 (6.6) | 1 (0.4) | 1 (0.4) |
| Doctor should be educated about the sources of medicines. | 96 (39.5) | 132 (54.3) | 11 (4.5) | 2 (0.8) | 2 (0.8) |
| Patient's religious beliefs are considered while prescribing medicines. | 99 (41.1) | 115 (47.7) | 21 (8.7) | 5 (2.1) | 1 (0.4) |
| Patient's religious beliefs impact their adherence to drug therapy. | 88 (36.2) | 122 (50.2) | 28 (11.5) | 4 (1.6) | 1 (0.4) |
| Pharmaceutical manufacturers should be sensitive towards the requirements of patients and wherever possible should produce Halal medicines. | 91 (37.4) | 110 (45.3) | 37 (15.2) | 4 (1.6) | 1 (0.4) |
| Drug companies should clearly mark medication packaging with easy-to-spot Halal/non Halal labels. | 102 (42) | 109 (44.9) | 24 (9.9) | 6 (2.5) | 2 (0.8) |
| Clear and well explained guidelines are need of healthcare professionals to navigate religious conflicts. | 83 (34.2) | 132 (54.3) | 26 (10.7) | 1(0.4) | 1 (0.4) |
| Healthcare professionals need to define medical necessity and explore existence of Halal alternatives. | 70 (28.8) | 133 (54.7) | 32 (13.2) | 8 (3.3) | |

Note: The frequencies and percentages are based on observed values; missing values are excluded [18]. The cut off level of ≥ 28 was considered as positive perception while < 28 as negative. * SA = strongly agree, A = agree, N = neutral, DA = disagree, SDA = strongly disagree.

Table 4. Hospital doctor's attitude about Halal pharmaceuticals (frequency distribution n = 243).

| Statements | Responses* | | | | |
|--|-------------|------------|------------|-------------|--------------|
| | SA n (%) | A n (%) | N n (%) | DA n (%) | SDA n (%) |
| I discuss with patients about forbidden/Haram ingredients of drugs. | 41 (16.9) | 134 (55.1) | 56 (23.0) | 11 (4.5) | 1 (0.4) |
| I feel moral obligation to disclose the exact source of non-Halal ingredients to the patient (e.g. alcohol in syrups/elixirs and gelatin in capsules). | 55 (22.6) | 129 (53.1) | 50 (20.6) | 7 (2.9) | 2 (0.8) |
| I take consent from patients, if I know the drug is non-Halal. | 63 (25.9) | 112 (46.1) | 53 (21.8) | 13 (5.3) | 2 (0.8) |
| I consider patient's religious beliefs when designing a treatment regimen. | 71 (29.2) | 124 (51.0) | 42 (17.3) | 6 (2.5) | |
| I make an effort to search for any available Halal alternatives. | 39 (16.1) | 103 (42.6) | 76 (31.4) | 23 (9.5) | 1 (0.4) |
| I educate the patient regarding Halal ingredients. | 35 (14.4) | 108 (44.4) | 80 (32.9) | 20 (8.2) | |
| I prefer Halal medicines in my practice. | 59 (24.3) | 77 (31.7) | 89 (36.6) | 15 (6.2) | 3(1.2) |
| I recommend the purchase of Halal alternatives, which may be more expensive. | 45 (18.5) | 87 (35.8) | 88 (36.2) | 16 (6.6) | 7 (2.9) |
| I feel that medical representatives are a good source of information about sources and ingredients of drugs for me. | 48 (19.8) | 114 (47.1) | 63 (26.0) | 14 (5.8) | 3 (1.2) |

Note: The frequencies and percentages are based on observed values; missing values are excluded (180). The cut off level of ≥ 23 was considered as positive attitude while < 23 as negative. * SA = strongly agree, A = agree, N = neutral, DA = disagree, SDA = strongly disagree.

dents scored more than 70% of the perception score and all respondents (except one) scored more than 50% of the perception score denoting a positive perception towards Halal pharmaceuticals.

Results showed that a total of 131 (53.9%) respondents strongly agreed and 107 (44%) agreed, that the patient has a right to ask the information about sources of ingredients in medicines, showing a significant association with respect to respondents' religion ($p < 0.001$), race ($p < 0.001$) and current position ($p < 0.001$). A total of 78 (32.2%) of the respondents strongly agreed and 132 (54.5%) agreed, that it is important for prescriber to explain about the sources and ingredients of medicine as much as possible and encourage the patients to ask questions. This showed a significant association with respect to respondents' age ($p = 0.021$), gender ($p = 0.042$), race ($p = 0.031$) and years of experience ($p = 0.025$). On the other hand, 21 (8.6%) respondents strongly agreed and 106 (43.6%) agreed that it is not a common practice to inform the patients about sources of the medicines showing a significant association with respect to respondents' race ($p = 0.014$) and respondents' current area of practice ($p = 0.005$).

It was further found that 106 (43.8%) respondents strongly agreed while 118 (48.8%) agreed that drug manufacturers should provide prescribers with a list of their products containing animal-derived

ingredients. This showed a significant association with respect to respondents' race ($p < 0.001$) and religion ($p < 0.001$). A total of 96 (39.5%) respondents strongly agreed while 132 (54.3%) agreed that doctors should be educated about the sources of medicines. This showed a significant association with respect to respondents' race ($p < 0.001$) and religion ($p < 0.001$). A total of 99 (41.1%) respondents strongly agreed and 115 (47.7%) agreed, that patient's religious beliefs are considered while prescribing medicines showing a significant association with respect to respondents' race ($p < 0.001$) and religion ($p < 0.001$). On the other hand, 88 (36.2%) of the respondents strongly agreed while 122 (50.2%) agreed that patient's religious beliefs impact their adherence to drug therapy showing a significant association with respect to respondents' race ($p < 0.001$) and religion ($p = 0.005$).

The study further found that 91 (37.4%) respondents showed their response as 'strongly agree' while 110 (45.3%) as 'agree' that pharmaceutical manufacturers should be sensitive towards the requirements of patients and wherever possible should produce Halal medicines. This showed a significant association with respect to respondents' race ($p < 0.001$), religion ($p < 0.001$) and current position ($p < 0.001$). A total of 102 (42%) respondents showed their response as 'strongly agree' while 109 (44.9%) as 'agree' that drug companies

should clearly mark medication packaging with easy-to-spot Halal/non Halal labels. This showed a significant association with respect to respondents' race ($p < 0.001$), religion ($p < 0.001$) and current position ($p = 0.047$). A total of 83 (34.2%) respondents strongly agreed while 132 (54.3%) agreed that clear and well explained guidelines are a need of healthcare professionals to navigate religious conflicts. This showed a significant association with respect to respondents' gender ($p = 0.042$), race ($p < 0.001$) and religion ($p < 0.001$). Furthermore, 70 (28.8%) of the respondents strongly agreed while 133 (54.7%) agreed that healthcare professionals need to define medical necessity and explore existence of Halal alternatives. This showed a significant association with respect to respondents' gender ($p = 0.005$), race ($p < 0.001$), and religion ($p < 0.001$).

Respondents' attitude regarding Halal pharmaceuticals

The attitude of respondents regarding Halal pharmaceuticals was evaluated by using attitude questionnaire. The frequency distribution of respondents' attitude regarding Halal pharmaceuticals is shown in Table 4. There were total 9 statements to evaluate the attitude of respondents. Out of maximum possible score (45), the mean attitude score was 34.10 ± 5.35 . More than 77% of the respondents scored 66% of the attitude score while 98% of the respondents scored more than 50% of the attitude score denoting a positive attitude towards Halal pharmaceuticals.

The results showed that 41 (16.9%) respondents strongly agreed while 134 (55.1%) agreed that they discuss with their patients about forbidden/Haram ingredients of drugs, showing a significant association with respect to respondents' current position ($p = 0.002$) and current area of practice ($p = 0.045$). A total of 55 (22.6%) respondents strongly agreed while 129 (53.1%) agreed that they feel moral obligation to disclose the derivation of non-Halal ingredients to the patients (e.g., alcohol in syrups/elixirs and gelatin in capsules). This showed

a significant association with respect to respondents' race ($p < 0.001$ and religion ($p = 0.003$). It was further found that 63 (25.9%) of the respondents showed their response as 'strongly agree' while 112 (46.1%) as 'agree' that they take consent from patients, if they know the drug is non-Halal. This showed a significant association with respect to respondents' race ($p = 0.046$) and current position ($p = 0.024$). The study further found that 71 (29.2%) of the respondents showed their response as 'strongly agree' while 124 (51%) as 'agree' that they consider patient's religious beliefs when designing a treatment regimen. This showed a significant association with respect to respondents' race ($p < 0.001$), religion ($p = 0.015$) and current position ($p = 0.013$). A total of 39 (16.1%) respondents showed their response as 'strongly agree' while 103 (42.6%) as 'agree' that they make an effort to search for any available Halal alternatives. This showed a significant association with respect to respondents' race ($p = 0.011$), religion ($p = 0.013$) and current position ($p = 0.005$). A total of 35 (14.4%) respondents showed their response as 'strongly agree' while 108 (44.4%) as 'agree' that they educate the patients regarding Halal ingredients of medicines, showing a significant association with respect to respondents' age ($p = 0.045$), race ($p = 0.002$), religion ($p = 0.011$), years of experience ($p = 0.018$), current position ($p = 0.003$) and current area of practice ($p = 0.001$).

It was further found that 59 (24.3%) of the respondents showed their response as 'strongly agree' while 77 (31.7%) as 'agree' that they prefer Halal medicines in their practice, showing a significant association with respect to respondents' gender ($p = 0.003$), race ($p < 0.001$) and religion ($p < 0.001$). A total of 45 (18.5%) respondents showed their response as 'strongly agree' while 87 (35.8%) as 'agree' that they recommend the purchase of Halal alternatives, which may be more expensive, showing a significant association with respect to respondents' race ($p < 0.001$) and religion ($p < 0.001$). It was also found that 48 (19.8%) of the respondents showed their response as 'strongly agree' while 114 (47.1%) as 'agree' that they feel

Table 5. Mean and median score of respondents' knowledge, attitude, perception and KAP about Halal pharmaceuticals.

| Variables | Mean \pm SD | Median (IQR) (25-75) |
|------------|-------------------|----------------------|
| Knowledge | 7.67 \pm 1.68 | 8 (7-9) |
| Attitude | 34.10 \pm 5.35 | 34 (31-36) |
| Perception | 45.73 \pm 5.44 | 45 (43-50) |
| KAP | 87.60 \pm 10.37 | 88 (81-95) |

Table 6. Correlations between knowledge, attitude and perception*.

| Variables | Number. of respondents (n) | p value | Correlation (r) |
|----------------------|----------------------------|---------|-----------------|
| Knowledge-Perception | 243 | 0.001 | 0.209 |
| Knowledge-Attitude | 243 | < 0.001 | 0.231 |
| Attitude-Perception | 243 | < 0.001 | 0.588 |

*Correlation significant at 0.01 levels (2 tailed).

that medical representatives are a good source of information about sources and ingredients of drugs for them showing a significant association with respect to respondents' race ($p < 0.001$) and religion ($p < 0.001$).

Correlation between knowledge, attitude and perception

Correlations between knowledge, attitude and perception are depicted in Table 6. There was a significant, positive, and weak correlation (0.20 - 0.29) between knowledge and attitude ($r = 0.231$, $p < 0.001$) as well as knowledge and perception ($r = 0.209$, $p = 0.001$), whereas good correlation (0.5 - 0.75) between attitude and perception ($r = 0.588$, $p < 0.001$). This means that the better knowledge the respondents have on Halal pharmaceuticals, the better is their perception towards them.

DISCUSSION AND CONCLUSION

This study was conducted to evaluate the knowledge, attitude and perception of doctors working in various government hospitals of Malaysia. A total of 243 doctors participated in the survey. Extensive literature review found only one study which is conducted regarding Halal pharmaceuticals among doctors working in various hospitals (11). Medicines has become a necessity now to maintain health. Usually there are three players in this context: physicians, pharmacists and consumers (19). Consumers usually cannot judge which medicine is suitable for them. This is then the role of physician to choose the most suitable medication for his/her patient keeping in mind the religious beliefs of the patient as well. Consumers who are the end users of the medicines are a key success factor for the treatment process. Therefore, any lack of knowledge, misconception or mal practice regarding medicines would negatively affect on drugs utilization, patients' quality of life and country resources. This is an accepted and undeniable finding that physicians are perceived as one of the most knowledgeable healthcare practitioners on drugs and medica-

tions being used. In fact, closer patient-physician relationship has resulted in consumer to perceive that the advice of physician is reliable. Hence, physician's opinion becomes an important factor when it comes to the drug decision making process. An important aspect of consideration when prescribing a medication regimen is the patient him/herself. Individuals have different views on treatment, including the use of certain inactive ingredients in medications. However, most patients are unaware of these ingredients in their medications. The clinicians and pharmacists should be proactive and not leave it to the patient to broach the subject. Since patients have the right to make informed decisions about their medical treatment, it is important that healthcare providers involve the patient when making treatment decisions (20).

In this study we tried to explore the knowledge of doctors working in hospitals about Halal pharmaceuticals. Study findings showed that doctors had a good knowledge towards issues surrounding Halal pharmaceuticals. More than 94% of the respondents scored more than 50% of the knowledge score. Significant association was found between gender, race, religion, years of experience and different statements of knowledge.

This study found positive perception about Halal pharmaceuticals. Almost all of the respondents scored more than 50% of the perception score. A majority of the respondents perceived that "patients have a right to ask information about sources of ingredients in medicines which are prescribed to them". A large majority of the respondents agreed that 'drug companies should clearly mark medication packaging with 'Halal' or 'non Halal' logo. This approach is also described by Khokhar et al. while discussing faith issues in psychopharmacological prescribing (21). This would be a novel and convenient approach, if drug manufacturers practice to mark drugs clearly about Halal or non-Halal, then it will be easy for a medical practitioner to make a better choice for the patients. A majority of respondents perceived that doctors should be educated more about Halalness of medi-

cines; moreover, doctors should inform their patients about Haram ingredients. This is in accordance with Newson's "Clinical Ethics Committee Case Report" in which this issue is highlighted (22). A large majority of respondents perceived that patient's religious beliefs impact their adherence to drug therapy. This is in line with Sattar et al. (23), who reported four different cases of patient's non-adherence due to religious beliefs. A majority of respondents either strongly agreed or agreed that pharmaceutical manufacturers should be sensitive towards the requirements of Muslim patients and wherever possible should produce Halal medicines. This is in accordance with what is reported by Bashir et al. (24) while discussing "Concordance in Muslim patients in primary care". A large majority of respondents perceived that drug manufacturers should provide prescribers with a list of their products containing animal-derived ingredients to assist the prescriber. This approach is in line with what is reported by Hoesli and Smith while discussing effects of religious and personal beliefs on medication regimen design (20). Significant association was found between age, gender, race, religion, years of experience, current position (medical officer, house officer or specialist), current area of practice and different statements of perception.

Study respondents have positive attitude towards Halal pharmaceuticals. A large majority of the respondents scored 50% or more of the attitude score. A large majority recommended purchasing Halal medicines, taking consent from their patients, educating the patients about Halal ingredients of medicine and discussing with their patients about Haram ingredients of medicines. Significant association was found between age, gender, race, religion, years of experience, current position (medical officer, house officer or specialist), current area of practice and different statements of attitude.

A significant, positive correlation was found between knowledge and attitude, attitude and perception as well as knowledge and perception. This means that the better knowledge the respondents have on Halal pharmaceuticals, the better their perception will be towards them. A majority of respondents perceived that patient's religious beliefs should be considered while doctors decide medication for them.

Within this context, this research shows that religion and spirituality are linked to positive physical and mental health. A study from the University of Missouri, Columbia shows that if religious issues are addressed during treatment, even individuals with disabilities can adjust to their impairments and

it can give a new meaning to their lives (25). Therefore, it is advisable to disseminate adequate information about Halal medicines in the Malaysian population. This dissemination of information will result in building positive perception towards medications and an increased treatment outcome, which is the aim of any therapy.

Summarizing the issue related to Halal pharmaceuticals, it can be said that healthcare continues to mature. Previously, patient care was largely thought to involve simply the correct application of medical science to disease. Today, however, the slogan is that "an ounce of prevention" is often better than a "pound of intervention." Religious issues do carry their weight and importance to health outcomes. However, a significant question in providing the best quality of health care is "how can we offer our patients, with their rich diversity of religious backgrounds, care that is spiritually nurturing and culturally competent?" Addressing concern associated with Halal and Haram in medication use can be the first step in providing competent and rational healthcare.

To summarize this discussion, we can say that this study is an indicator that the knowledge, attitude and perception regarding Halal/Haram status of medicines, among doctors working in hospitals, were good where 94%, 98%, and all (except one) of the respondents scored 50% and above, respectively. Significant correlations were found between knowledge and attitude, attitude and perception as well as knowledge and perception.

Suggestions for further study

This issue is of paramount importance for Muslims as it affects their religious beliefs directly and should be researched and explored in various parts of, not only Malaysia but, the entire Muslim world so that more pertinent results come to the focus of the various players in the field of pharmaceuticals.

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