

# Assessment of knowledge, attitude & perception among hospital pharmacists regarding Halal pharmaceuticals

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## ABSTRACT

This study aimed to assess the knowledge, attitude and perception (KAP) relating to Halal pharmaceuticals among pharmacists working in various hospitals of Malaysia. This was a cross-sectional study, carried out in the period of January 2013 to March 2013, using a structured, self-administered questionnaire. Data was collected by distributing questionnaires through respective chief pharmacists in various government hospitals in Malaysia. Study was conducted on a total of 135 pharmacists. Descriptive statistics (mean, standard deviation, frequency, percentage, median, inter quartile range) was applied to summarize the data. Chi-square Test and Fisher's Exact Test was applied to assess the association between demographic characteristics and knowledge, attitude and perception scores. Results revealed that the hospital pharmacist had a good knowledge and positive attitude and perception about Halal pharmaceuticals. Mean knowledge, attitude and perception score was  $8.01 \pm 1.48$ ,  $33.21 \pm 5.66$  and  $51.19 \pm 6.49$  out of maximum possible 9, 45 and 60 respectively. Mean overall KAP score out of maximum possible 114 was  $92.40 \pm 11.20$ . There was a significant, positive, and weak correlation (0.1-0.3) between knowledge and perception ( $r=0.271$ ,  $p=0.001$ ), knowledge and attitude ( $r=0.252$ ,  $p=0.003$ ) & moderate correlation (0.3-0.7) between attitude and perception ( $r=0.542$ ,  $p<0.001$ ). P value of 0.05 or less was taken as statistically significant. It is concluded from the results that better knowledge the respondents have on Halal pharmaceuticals, better their perception and attitude is towards Halal pharmaceuticals.

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## INTRODUCTION

The word Halal basically originates from Arabic which means "lawful," "permissible" under Islamic law (Khattak, et al, Nasaruddin, et al, 2012). The opposite of Halal is "Haram" which means "unlawful", "prohibited", "forbidden"(Riaz and Chaudry, 2004, MS: 1500, 2004). Halal and Haram are universal terms that apply to all facets of life; however this study will adapt these terms to refer only to pharmaceutical products that are deemed permissible for consumption of Muslims.

Halal is a well known word in the entire Muslim world. However as the Muslim population is expanding in other continents, this word has come to be used so commonly in day to day life that even the non-Islamic world has become cognizant of this terminology. This has resulted in Halal signs, at shops and

food products, in America and Europe, catering for the religious beliefs and needs of the Muslim consumers. 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 (Easterbrook and Maddern, 2008, Geraldine, 2004). They may use other terminologies to define these restrictions but the main sentiment is same. Therefore, it would be pertinent, in further researches, to look into various items of human consumption, including medicines, and their variants, to determine admissibility according to individual beliefs.

In the attainment of human progression, medicines constitute a vital part as their sane and reasonable use can, not only, improve the quality of life but would also enhance the life span (Cohen-Kohler, 2007). A drug/medicine is composed of a combination of active ingredients, and excipients.

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These substances are obtained from a variety of sources; animals, plants or synthetic origin (Geraldine, 2004, Hoesli & Smith, 2011). In case of animal source, it may be porcine, dead animal or blood. All these are Haram/forbidden for Muslims as mentioned in the Quranic verses cited below:

*“He hath forbidden you dead meat and blood and the flesh of swine and that eat on which any other name hath been invoked besides that of Allah, but if one is forced by necessity, without wilful disobedience, Allah is forgiver and most merciful (Al-Quran, accessed on 2012 March 2).*

From the Quranic verse cited above it would imply that, not only, consuming Halal food but also consuming Halal medication is important because it forms a major part and behaviour of being a good practicing Muslim.

The globally expanding Muslim population has in turn stretched the Muslim consumer's market manifold. Moreover, awareness among Muslims is dawning regarding pharmaceutical products and its sources. Muslim consumers are now increasingly mindful and are in search for Halal medicines. To cater for this situation, as a response, in Sydney (Australia) the first “Halal friendly retail pharmacy” has been established in the suburbs of Lakemba. It has introduced a line of Halal certified medicines. Additionally a new organization, Halal Certified Medicine (HCM), is providing a service that determines which medicines are Halal or Haram (impermissible). For the convenience of Muslim consumers, Halal medicines which are not certified Halal when manufactured, are labelled on the shelves with an “HCM” logo sticker (Kandil, accessed on 2012 Oct 18)

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 but in due time this next phase would undoubtedly come into effect.

As majority of Malaysian population is Muslim (Population and Housing Census, 2010) 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 (Accessed, 2012 Oct 18). Department of Islamic Development Malaysia (JAKIM) has established Malaysia Halal logo and has implemented Halal Certification System (Accessed, 2012 Oct 19). Ministry of International Trade and Industry (MITI) promotes Halal products and services (Accessed on 2012 Oct 10). 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, labelling, distribution, storage and display of medicines and health supplies (Accessed on 2011 Mar 2).

Though, many government and non government organizations, in Malaysia, are playing an active role to ensure

provision of Halal foods and Pharmaceuticals to Muslims population, to the best of our knowledge no study has been done, so far, to evaluate the perception of pharmacists working in hospitals regarding Halal pharmaceuticals. Their knowledge too, on the issues surrounding Halal pharmaceuticals, is not well explored. Therefore, the main objective of this study is to explore Malaysian hospital pharmacist's perception and their opinion of Halal pharmaceuticals and to identify barriers to usage of Halal pharmaceuticals. To achieve this objective, an extensive study was undertaken. A comprehensive questionnaire was prepared asking a variety of questions to assess the knowledge, attitude and perception of pharmacists working in various hospitals.

## METHODS

### Study settings and design

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

### Selection criteria and recruitment of respondents

Pharmacist registered with Malaysian Pharmacy Council, working in selected government hospitals, on duty during the study period and willing to participate in the study (Wong et al, 2013), were recruited as ‘study participants’. Whereas, those not registered with Malaysian Pharmacy Council, or those who refused to give consent were excluded from this study.

### 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. Permission was also sought from Directors of respective hospitals.

### 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 senior academic researchers and was updated according to their recommendations. A pilot study was conducted to evaluate the reliability of the updated questionnaire. The main purpose of testing questionnaire was to achieve more clarification regarding the wording of both questionnaire instructions and questions themselves (Ismail & Abidin, 2009). Cronbach's alpha was applied to test validity and internal consistency of the questionnaire (De Bourdeaudhuij, 2005) and  $\alpha = 0.6$  was set as the minimum acceptable value for validity. Final modifications were made based upon the results of the 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, country of basic educational degree, highest qualification, and

finally the experience. Second part had nine statements to evaluate the knowledge of respondents towards Halal pharmaceuticals.

Third part consisted of 12 statements for evaluating perception towards Halal pharmaceuticals and final part had nine statements about the attitude of respondents about Halal pharmaceuticals. All questions were close ended, except one at the end was open-ended question seeking the participants 'general comments', which assisted the researcher to collect data on issues that could not be answered in a structured way (Ulin *et al.*, 2005).

#### Scoring method for knowledge, attitude and perception (KAP)

For knowledge statements respondents were asked to choose "Yes" or "No" options. Positive answer (yes) was scored one (1) while negative 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 could be 0 to 9, 1 to 45 and 1 to 60 respectively. Total possible KAP score was 114.

#### Sampling and data collection

For the distribution of questionnaires, "Guidelines and Standards for Survey Research" were followed. Sampling technique was convenience sampling. All pharmacists, in selected government hospitals, were approached through chief pharmacist. Only those pharmacists were included in the study that agreed to participate and were requested to return the completed questionnaires within two weeks. Reminders were sent after one week (Desai *et al.*, 2011). In the explanatory statement, respondents were assured for confidentiality of their personal information. No incentives were offered to any of the respondents (Lie & Boker, 2006). The completion of the questionnaire by respondents was taken as their consent to participate in the study.

#### Data analysis

Normality of data was checked by Kolmogorov-Smirnov test ((Pallant, 2011). Descriptive statistics (mean, standard deviation, frequency, percentage, median, inter quartile range) was applied to summarize the data ((Tiralongo & Wallis, 2008). As data was not normally distributed, so non-parametric tests were applied. Chi-square Test and Fisher's Exact Test was applied to determine the association between demographic characteristics and knowledge, attitude and perception score.

For the Likert responses, all responses with any degree of agreement were grouped together as positive responses, and all responses with any degree of disagreement were grouped together as negative response (Tiralongo & Wallis, 2008). To find relationship between knowledge-attitude, knowledge-perception and attitude-perception of respondents, Spearman's-correlation was applied (Pallant, 2011). P value of 0.05 or less was taken as statistically significant.

## RESULTS

A total of 135 respondents participated in the survey, and analysis was performed on all of 135 forms.

#### Respondent's demographics

Demographic characteristics of the respondents are depicted in Table-1. Mean age of the respondents was 27.51 years with Standard Deviation of  $\pm 4.13$ . Age range was 23 to 55 years. Gender wise 19(14.1%) of the respondents were male and 116 (85.9%) were female. Ethnicity wise, 50(37.0%) were Malay, 60(48.9%) were Chinese, and 19(14.1%) were Indians. Regarding the religion, 53(39.3 %) were Muslims, 15(11.1%) Christians, 53(39.3%) Buddhists, and 14(10.4%) were Hindus. A large majority 117(86.7%) had B. Pharm as their highest degree and only 18(13.3%) were M.Pharm. Working experience ranged from 1-30 years, though most of the respondents had experience up to 10 years. Only 4(3.0%) respondents had more than 10 years of experience.

**Table 1:** Descriptive characteristics of pharmacists (n=135).

Characteristics	Demographic Characteristics	Frequency (%)
Age (years) (23-55)	23-30	116(85.9)
	31-40	17(12.6)
	>40	2(1.5)
Gender	Male	19(14.1)
	Female	116(85.9)
Race	Malay	50(37.0)
	Chinese	60(48.9)
	Indians	19(14.1)
Religion	Muslims	53(39.3)
	Christians	15(11.1)
	Buddhist	53(39.3)
	Hindu	14(10.4)
Nationality	Malaysian	135(100)
	Malaysia	104(77.0)
Country of basic degree	Others (A UK=12, Australia=8, India=4, Indonesia=4, Newzealand=1)	31(23.0)
	B.Pharm	117(86.7)
	M.Pharm	18(13.3)
Working Experience (years) (1-30)	1-5	114(84.4)
	6-10	17(12.6)
	>10	4(3.0)

#### Respondents' knowledge regarding Halal pharmaceuticals

The frequency distribution of respondent's knowledge regarding Halal pharmaceuticals is depicted in Table-2. Out of maximum possible score (equal to 9) mean knowledge score was  $8.01 \pm 1.48$  (Table-5). Majority of the respondents (95.5%) scored 50% and above, which shows that study population has good knowledge regarding Halal pharmaceuticals.

Results showed that all (except two) of the respondents were aware of the term "Halal". On the other hand 108(80.0%) of the respondents were aware of the term "Haram" showing a significant association with respect to respondent's race ( $p=0.038$ ). A total of 108(80.0%) respondents were aware of the term "Halal pharmaceutical" showing a significant association with respect to respondent's race ( $p=0.014$ ).

**Table. 2:** Pharmacists' knowledge about Halal pharmaceuticals (frequency distribution n=135).

statements	Responses	
	Yes n (%)	No n (%)
Are you aware of the term/word "Halal"?	133(98.5)	2(1.5)
Are you aware of the term/word "Haram"?	108(80.0)	27(20.0)
Are you aware of the term/word "Halal pharmaceutical"?	108(80.0)	27(20.0)
Do you know that Muslim patients need Halal medicines?	130(96.3)	5(3.7)
Do you know that dead animals, blood, pork and Alcohol are Haram for Muslims to use in any form (food, medication etc)?	126(93.3)	9(6.7)
Do you know that ingredients of some drugs/medicines are derived from porcine and dead animals?	131(97.0)	4(3.0)
Do you know that resources are available to offer Halal alternatives of non-Halal drugs?	104(77.0)	31(23.0)
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?	128(94.8)	7(5.2)
Do you know that most of the Pharmacists are aware of the presence of potentially forbidden animal-derived ingredients in medicines?	114(84.4)	21(15.6)

Note: The frequencies and percentages are based on observed values; missing values are excluded (Harris et al, 2006).

A large majority 130(96.3%) knew that Muslim patients need Halal medicines. While 126(93.3%) 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 respondent's race ( $p=0.006$ ) and religion ( $p=0.023$ ). A large majority 131(97.0%) of respondents knew that ingredients of some medicines are derived from porcine and dead animals. On the other hand, a total of 104(77.0%) respondents had knowledge that resources are available to offer Halal alternatives of non-Halal drugs showing a significant association with respect to respondent's gender (Fisher's  $p$  value =0.036), race ( $p<.001$ ) and religion ( $p<.001$ ). Study further found that a total of 128(94.8%) respondents opined that it is ethical obligation for a practitioner to take consent from the patient before dispensing any medicine which has any non-Halal content. A total of 114(84.4%) respondents were aware about the presence of potentially forbidden animal-derived ingredients in medicines showing a significant association with respect to respondent's gender (Fisher's  $p$  value =0.031) and race ( $p=0.001$ ).

### Respondents' attitude regarding Halal pharmaceuticals

The attitude of respondents regarding Halal pharmaceuticals was evaluated by using attitude questionnaire. The frequency distribution of respondent's attitude regarding Halal

pharmaceuticals is depicted in Table-3. There were 9 statements to evaluate the attitude of respondents. Out of maximum possible score (45), the mean attitude score was  $33.21 \pm 5.66$  (Table-5). More than 96% of respondents scored 50% or above, denoting a positive attitude towards Halal pharmaceuticals.

Results showed that a total of 19(14.1%) respondents strongly agreed while 33(24.4%) gave their opinion as 'agree' that they discuss with patients about forbidden/Haram ingredients of drugs. This showed a significant association with respect to respondent's race ( $p<.001$ ), religion ( $p<.001$ ), qualification ( $p<.001$ ) and years of experience ( $p=0.011$ ). A total of 30(22.2%) respondents showed their response as 'strongly agree' while 54(40.0%) as 'agree' that they feel moral obligation to disclose the derivation of non-Halal ingredients to the patient (e.g. alcohol in syrups/elixirs and gelatin in capsules). This showed a significant association with respect to respondent's gender ( $p<.001$ ) and race ( $p=0.025$ ). A total of 35(25.9%) respondents showed their response as 'strongly agree' while 50(37.0%) as 'agree' that they take consent from patients, if they know the drug is non-Halal, showing a significant association with respect to respondent's gender ( $p=0.020$ ), race ( $p=0.015$ ) and religion ( $p=0.006$ ).

In addition, the study found that a total of 38 (28.1%) respondents gave their opinion as 'strongly agree' while 62(45.9%) as 'agree' that they consider patient's religious beliefs when designing a treatment regimen.

This showed a significant association with respect to respondent's gender ( $p=0.014$ ), religion ( $p=0.009$ ) and qualification ( $p=0.009$ ). A total of 25(18.5%) respondents "strongly agreed" whereas 57(42.2%) 'agreed' that they make an effort to search for any available Halal alternatives. This showed a significant association with respect to respondent's gender ( $p=0.04$ ) and race ( $p=0.008$ ). A total of 21(15.6%) respondents showed their response as 'strongly agree' while 57(42.2%) as 'agree' that they educate the patients regarding Halal ingredients of medicines showing a significant association with respect to respondent's gender ( $p=0.007$ ), race ( $p=0.010$ ), and qualification ( $p<0.001$ ).

Study further found that a total of 28(20.7%) respondents showed their response as 'strongly agree' while 50(37.0%) as 'agree' that they prefer Halal medicines in their practice. This showed a significant association with respect to respondent's race ( $p<.001$ ) and religion ( $p<.001$ ). A total of 30(22.2%) respondents showed their response as 'strongly agree' while 43(31.9%) as 'agree' that they recommend the purchase of Halal alternatives, which may be more expensive.

This showed a significant association with respect to respondent's age ( $p=0.006$ ), race ( $p<.001$ ), religion ( $p=.012$ ), and years of experience ( $p=0.002$ ). Results further found that a total of 40(29.6%) respondents indicated their opinion as 'strongly agree' while 56(41.5%) as 'agree' that medical representatives are a good source of information about sources and ingredients of drugs for them, showing a significant association with respect to respondent's race ( $p<.001$ ), and religion ( $p<.001$ ).

**Table. 3:** Pharmacists' attitude about Halal pharmaceuticals (frequency distribution n=135).

Statements	Responses*				
	SA n (%)	A n (%)	N n (%)	DA n (%)	SDA n (%)
I discuss with patients about forbidden/Haram ingredients of drugs.	19(14.1)	33(24.4)	55(40.7)	23(17.0)	5(3.7)
I feel moral obligation to disclose the derivation of non-Halal ingredients to the patient (e.g. alcohol in syrups/elixirs and gelatin in capsules).	30(22.2)	54(40.0)	34(25.2)	15(11.1)	2(1.5)
I take consent from patients, if I know the drug is non-Halal.	35(25.9)	50(37.0)	39(28.9)	9(6.7)	2(1.5)
I consider patient's religious beliefs when designing a treatment regimen.	38 (28.1)	62(45.9)	32(23.7)	2(1.5)	1(0.7)
I make an effort to search for any available Halal alternatives.	25(18.5)	57(42.2)	45(33.3)	5(3.7)	3(2.2)
I educate the patient regarding Halal ingredients of Medicines.	21(15.6)	57(42.2)	42(31.1)	12(8.9)	3(2.2)
I prefer Halal medicines in my practice.	28(20.7)	50(37.0)	44(32.6)	11(8.1)	2(1.5)
I recommend the purchase of Halal alternatives, which may be more expensive.	30(22.2)	43(31.9)	42(31.1)	16(11.9)	4(3.0)
I feel that medical representatives are a good source of information about sources & ingredients of drugs for me.	40(29.6)	56(41.5)	29(21.5)	5(3.7)	5(3.7)

Note: The frequencies and percentages are based on observed values; missing values are excluded (Harris et al, 2006).

\* SA= strongly agree, A= agree, N= neutral, DA= disagree, SDA= strongly disagree

**Table. 4:** Pharmacists' perception about Halal pharmaceuticals (frequency distribution n=135).

Statements	Responses*				
	SA n (%)	A n (%)	N n (%)	DA n (%)	SDA n (%)
Patient has a right to ask information about sources & ingredients of medicines.	94(69.9)	40(29.6)	--	--	1(0.7)
It is important for prescriber to explain about the sources & ingredients of medicine as much as possible and encourage the patients to ask questions.	57(42.2)	54(40.0)	20(14.8)	3(2.2)	1(0.7)
Drug manufacturers should provide prescribers with a list of their products containing animal-derived ingredients.	87(64.6)	44(32.6)	3(2.2)	--	1(0.7)
It is not a common practice to inform the patients about sources of the medicines.	22(16.3)	63(46.7)	21(15.6)	22(16.3)	7(5.2)
Pharmacists should be educated about the sources of medicines.	72(53.3)	49(36.3)	13(9.6)	--	1(0.7)
Patient's religious beliefs are considered while dispensing of medicines.	60(44.4)	47(34.8)	23(17.0)	5(3.7)	--
Patient's religious beliefs impact their adherence to drug therapy.	54(40.0)	57(42.2)	20(14.8)	2(1.5)	2(1.5)
A list of the most commonly used, animal-derived drugs and their alternatives should be developed.	59(43.7)	62(45.9)	13(9.6)	--	1(0.7)
Pharmaceutical manufacturers should be sensitive towards the requirements of patients and where ever possible should produce Halal medicines.	67(49.6)	44(32.6)	22(16.3)	1(0.7)	1(0.7)
Drug companies should clearly mark medication packaging with easy-to-spot Halal/non Halal labels.	80(59.3)	37(27.4)	11(8.1)	6(4.4)	1(0.7)
Healthcare professionals need to define medical necessity and explore existence of Halal alternatives.	48(35.6)	62(45.9)	22(16.3)	2(1.5)	1(0.7)
Clear and well explained guidelines are need of healthcare professionals to navigate religious conflicts.	59(43.7)	52(38.5)	22(16.3)	1(0.7)	1(0.7)

Note: The frequencies and percentages are based on observed values; missing values are excluded (Harris et al, 2006).

\* SA= strongly agree, A= agree, N= neutral, DA= disagree, SDA= strongly disagree

### Respondents' perception regarding Halal pharmaceuticals

The perception of respondents regarding Halal pharmaceuticals was evaluated by using perception questionnaire. The frequency distribution of respondent's perception regarding Halal pharmaceuticals is depicted in Table-4. There were a total of 12 statements to evaluate the perceptions of respondents. Out of maximum possible score (60), the mean perception score was 51.19 ±6.49 (Table-5). More than 99% of respondents scored 50% or above, denoting a positive attitude towards Halal pharmaceuticals.

Results established that almost all respondents either strongly agreed 94(69.9%) or agreed 40(29.6%) that patient has a right to ask the information about sources of ingredients in medicines showing a significant association with respect to respondent's gender (p=.044), race (p<.001), and religion (p<.001). On the other hand, a total of 57(42.2%) respondents strongly agreed and 54(40.0%) 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 respondent's gender (p=.035), race (p<.001) and religion (p<.001). A total of 87(64.6%) respondents "strongly agreed" while 44(32.6 %) "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 respondent's race (p<.001) and religion (p<.001).

Study further established that a total of 22(16.3%) respondents strongly agree and 63(46.7%) agree that it is not a common practice to inform the patients about sources of the medicines. This indicated a significant association with respect to respondent's gender (p=.034). On the other hand a total of 72(53.3%) respondents "strongly agreed" while 49(36.3%) "agreed" that pharmacists should be educated about the sources of medicines. This showed a significant association with respect to respondent's gender (p=.016), race (p<.001) and religion (p<.001). A total of 60(44.4%) respondents "strongly agreed" while 47(34.8%) "agreed" that patient's religious beliefs are considered while dispensing of medicines showing a significant association with respect to respondent's race (p<.001), religion (p=.001), and qualification (p<.001).

Results discovered that a total of 54(40.0%) respondents elected their response as 'strongly agree' while 57(42.2 %) as 'agree' that patient's religious beliefs impact their adherence to drug therapy. This showed a significant association with respect to respondent's race (p=.003) and religion (p=.031). A total of 59(43.7 %) respondents showed their response as 'strongly agree' while 62(45.9 %) as 'agree' that a list of the most commonly used, animal-derived drugs and their alternatives should be developed. This showed a significant association with respect to respondent's gender (p=.016), race (p<.001) and religion (p<.001). However, a total of 67(49.6%) respondents showed their response as 'strongly agree' while 44(32.6 %) as 'agree' that pharmaceutical manufacturers should be sensitive towards the requirements of

patients and, where ever possible, should produce Halal medicines. This showed a significant association with respect to respondent's race ( $p < .001$ ) and religion ( $p < .001$ ).

Study further found that a total of 80(59.3%) respondents chose to respond as 'strongly agree' while 37(27.4%) as 'agree' that drug companies should clearly mark medication packaging with easy-to-spot Halal/non Halal labels indicating a significant association with respect to respondent's race ( $p < .001$ ), and religion ( $p < .001$ ). A total of 48(35.6%) respondents showed their response as 'strongly agree' while 62(45.9%) as 'agree' that healthcare professionals need to define medical necessity and explore existence of Halal alternatives showing a significant association with respect to respondent's race ( $p < .001$ ) and religion ( $p < .001$ ). A total of 59(43.7%) respondents showed their response as 'strongly agree' while 52(38.5%) as 'agree' that clear and well explained guidelines are need of healthcare professionals to navigate religious conflicts. This showed a significant association with respect to respondent's race ( $p < .001$ ) and religion ( $p < .001$ ).

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

Variables	Mean± SD	Median (IQR)(25-75)
Knowledge	8.01 ±1.48	9(7-9)
Attitude	33.21± 5.66	34(29-37)
Perception	51.19 ±6.49	53(47-56)
KAP	92.40 ± 11.20	93(86-101)

### Correlation between knowledge, attitude and perception

Correlation between knowledge, attitude and perception is depicted in Table-6. There was a significant, positive, and weak correlation (0.1-0.3) between knowledge and perception ( $r = .271$ ,  $p = .001$ ), knowledge and attitude ( $r = .252$ ,  $p = .003$ ) and moderate correlation (0.3-0.7) between attitude and perception ( $r = .542$ ,  $p < .001$ ). This means that better knowledge the respondents have on Halal pharmaceuticals, better their perception and attitude is towards Halal pharmaceuticals.

**Table. 6:** Correlation between knowledge, attitude and perception.

Variables	Number of respondents(n)	P value	Correlation(r)
Knowledge- perception	135	0.001	.271
Knowledge-attitude	135	0.003	.252
Attitude- perception	135	<.001	.542

\*Correlation significant at 0.01 levels (2 tailed).

## DISCUSSION

This study was conducted to evaluate the knowledge, attitude and perception of pharmacists working in various government hospitals of Malaysia. A total of 135 pharmacists participated in the survey. Intensive literature review found that no such study has ever been conducted on the issues surrounding Halal pharmaceuticals among hospital pharmacists. Medicines have become a necessity to maintain our health. An important aspect of consideration when dispensing a medication 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 the presence 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 health care providers involve the patient when making treatment decisions (Hoesli & Smith, 2011).

The study tried to explore the knowledge of hospital pharmacists about Halal pharmaceuticals. Study findings showed that hospital pharmacists had a good knowledge towards issues surrounding Halal pharmaceuticals. Significant association was found between age, gender, race, religion, qualification and different statements of knowledge.

Study discovered positive perception about Halal pharmaceuticals. A large majority of the respondents perceived that patients have the right to ask information about sources of ingredients in medicines which are prescribed to them. A large majority of the respondents either "agreed" or "strongly 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 (Khokhar et al, 2008). This is a novel and convenient approach. If drug manufacturers get into the practice of clearly marking the medicines as Halal or non-Halal, then it will be easy for a pharmacist to choose better for the patient. Majority of respondents perceived that pharmacists should be educated more about Halalness of medicines. 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 who reported four different cases of patient's nonadherence due to religious beliefs (Sattar et al, 2004). Majority of respondents either "strongly agreed" or "agreed" that pharmaceutical manufacturers should be sensitive towards the requirements of Muslim patients and where ever possible should produce Halal medicines. This is in accordance with what is reported by Bashir et al while discussing 'Concordance in Muslim patients in primary care' (Bashir et al, 2001). 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 & Smith while discussing effects of religious and personal beliefs on medication regimen design (Hoesli & Smith, 2011). Significant association was found between age, gender, race, religion, qualification, and different statements of perception. Study respondents have positive attitude towards Halal pharmaceuticals. A large majority recommended to purchase Halal medicines, take consent from their patients, educate the patients about Halal ingredients of medicine and discuss with their patients about Haram ingredients of medicines. Significant association was found between age, gender, race, religion, years of experience, and different statements of attitude. A significant and positive correlation was found between knowledge and attitude, attitude and perception and knowledge and perception. This means that better knowledge the respondents have on Halal pharmaceuticals, better their perception will be towards Halal pharmaceuticals.

## CONCLUSION

To summarize this discussion, it can be said that this study is an indicator that, the knowledge, attitude and perception regarding Halal/ Haram status of medicines, among pharmacists, were good where 95.5%, 96%, and 99% of the respondents scored 50% and above respectively. Significant correlations were found between knowledge and attitude, attitude and perception and 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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