

# Assessment of Knowledge, Attitude and Practice towards Halal Pharmaceuticals among Patients in Tuanku Mizan Armed Forces Hospital

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## ABSTRACT

**INTRODUCTION** Growing Muslim population derives Halal Pharmaceuticals (HP) market. Malaysia stands out from the rest of Muslims' countries by having the first world Halal Pharmaceutical Standards MS2424:2012 and recognized Chemical Company of Malaysia (CCM Pharmaceutical) for having the world's first halal prescriptive medicines certification. Purpose: The objective of the study was to assess knowledge, attitude and practice (KAP) towards HP among patients in Malaysian Armed Forces hospital and a part of military initiatives on Shariah Compliance Pharmacy Practice Program.

**METHODS** This was a cross-sectional study design. A validated, Malay language, paper-based self-administered questionnaire was distributed to 390 patients.

**RESULTS** The respondents had good level of knowledge with the mean score was  $10.73 \pm 0.13$  (total score=14) and positive attitude towards HP with mean score was  $34.31 \pm 0.22$  (total score=40). The respondents demonstrated poor practice towards HP with mean score was  $14.56 \pm 0.28$  (total score=30). Logistic regression used to quantify the relationship between socio-demographic data with the KAP level towards HP. For knowledge domain, gender (OR=3.59; 95% CI=1.719, 7.499;  $p=0.001$ ), religion status (OR=0.256; 95% CI=0.100, 0.656;  $p=0.005$ ) and education level (OR=0.474; 95% CI=0.280, 0.803;  $p=0.006$ ) significantly associated with the changes of knowledge level among respondents. While in attitude and practice domain, only religion status (OR=0.055; 95% CI=0.003, 0.943;  $p=0.045$ ) and age (OR=1.281; 95% CI=1.081, 1.517;  $p=0.004$ ) significantly associated with the changes of attitude level and practice level respectively. Pearson correlation coefficient analysis found that there was a positive, significant but poor correlation between level of knowledge with level of attitude ( $r=0.162$ ,  $p=0.001$ ) and also between level of attitude with level of practice among respondents ( $r=0.161$ ,  $p=0.001$ ). However, there was a positive, significant and fair correlation between level of knowledge with level of practice ( $r=0.357$ ,  $p<0.001$ ).

**CONCLUSION** Respondents with better knowledge had a better practice towards halal pharmaceuticals.

**KEYWORDS** Halal Pharmaceutical, Shariah Compliance Pharmacy Practice Program, Malaysian Armed Forces Hospital

## INTRODUCTION

It was reported from The Global Religious Landscape that more than eight-in-ten people identified with a religious group worldwide. 31.5% of global population, which the highest percentage of religion group were Christians, followed by 23.2% were Muslims and 16.3% 'unaffiliated' <sup>1</sup>. Malaysia itself has around 17 million Muslims, which made up 61.4% of the Malaysian population <sup>2</sup>. Most of these religions have dietary guidelines <sup>3</sup>, religion as an aspect of culture influences consumer attitude, behaviour, food purchasing decisions and eating habits in general <sup>4</sup>.

KAP assessment in halal pharmaceutical is very important for the Muslims. Knowledge means increase in awareness, understanding, and problem solving capacity needed to affect the practices or behaviors targeted previously. It also assumes that knowledge increases before changes in practices or behaviors <sup>6,7</sup>. Attitude can be defined as outlooks, perspectives, viewpoints, or opinions needed to affect the practices or behaviors targeted previously. It is assumed that attitudes influence better practices or behaviors. While attitudes tend to change slowly, opinions or viewpoints may shift prior to practice or behavior change <sup>6,7</sup>. Practice refers to the ways in which they demonstrate their knowledge and attitude through their actions <sup>5</sup>.

Halal pharmaceutical has generated a lot of debates from various stakeholders within the pharmaceutical sector in order to satisfy the Muslims' needs. The government of Malaysia put continuous efforts in promoting halal pharmaceutical by establishing the technical committee of halal pharmaceutical to revised their Drug National Policies 8, approved halal logo for OTC products<sup>9</sup>, and developing halal hub for foods, cosmetics and personal care, pharmaceutical, livestock and agriculture and also logistics<sup>10</sup>. Thus, it is important to evaluate certain issues pertaining halal pharmaceuticals.

Previous KAP studies on halal pharmaceutical which have been done before only focused within the population of general public <sup>11,12</sup>, hospital pharmacists <sup>13</sup>, hospital doctors <sup>14</sup> and academicians <sup>15</sup> in Malaysia.

There was no current data or study being done in order to assess and evaluate knowledge, attitude and practice of the halal pharmaceutical among patient's population generally, and among military populations specifically. Therefore, the main objective of this study was to explore the knowledge, attitude and practice of halal pharmaceutical among patients in Tuanku Mizan Armed Forces Hospital (TM AFH).

## METHODS

### *Study Design*

The study was a cross-sectional study design, conducted among patients in TM AFH to explore their KAP towards halal pharmaceutical.

### *Measurement Instrument*

The questionnaire was adopted from three studies which were from S. Saleha et.al, 2012; M. Hani et.al; 2010 and M. U. Safinaz, 2015. The authors had been contacted and approval was obtained to use part of their questionnaires for the purpose of this research. All questionnaires were then modified to suit with the objectives of this study. The modified questionnaire consists of twenty-eight (28) items which addressed four main areas: socio-demographic characteristics (Part 1), patient's knowledge (Part 2), attitude (Part 3), and practice (Part 4) towards halal pharmaceutical. All questions were close ended. No data was requested from the questionnaire that could hint to the identification of the participants. However, respondents were asked for written consent to participate in this study.

### *Validation of the Questionnaire*

Validation is a process to ensure the questionnaire is valid and appropriate to test knowledge, attitude and practice of halal pharmaceutical among the patients. There were three phases of validation process which involved a) validation of the content, b) pilot study and c) reliability test.

First phase involved face and content validity. The questionnaire was reviewed by four expert panels which comprises of an academican from Faculty of Pharmacy, UITM Puncak Alam Campus; a physician who is a TM AFH head of medical department; a pharmacist who is a representative from Malaysian Pharmaceutical Society and one officer from JAKIM. All of them have at least 10 years of experience in their subject matters. They gave score of relevancy, clarity, simplicity and ambiguity for each item in the questionnaire based on the four-point scale of Content Validity Index (CVI). Major changes were made based on experts comment and recommendation with a number of statements in the questionnaire reduced from 30 to 28 statements. The CVI value of the reviewed questionnaire was 92.42% (0.92) which was more than 0.75.

Thus it can be concluded that the questionnaire was adequately measured the knowledge, attitude and practice towards halal pharmaceuticals among patients in TM AFH.

On the second phase, a pilot study was conducted among 10% from the total study sample to evaluate reliability of the updated questionnaire. In this study, minimum sample size for pilot study was 39 patients. Those patients who had involved in this pilot study were not included in the real study.

The third phase involved reliability test to measure internal consistency of the answered questionnaire from the pilot study. The result were analyzed using Cronbach Alpha. The results of Cronbach's alpha coefficient was 0.826 for all 14 items under knowledge domain, 0.705 for all eight items under attitude domain and 0.741 for all six items under practice domain.

### *Sample Size and Subject Selection*

This study involved 390 patients with the inclusion criteria were the patients age were more than 18 years old, the patients received treatment and medication in TM AFH and able to read and understand in Malay language. Patients who were excluded from this study who failed to understand the aim of the study and refuse to give consent

### *Ethical Approval*

An approval from Research Ethics Committee (REC) UITM with the Reference No. 600-IRMI (5/1/6) and TM AFH Ethical Committee with Certificate No. 001/16 were obtained for this study to be performed.

### *Data Collection*

The data from this study was collected via paper-based self-administrated survey. The questionnaire was distributed to patients at the waiting area in Specialist Clinics and Outpatients Pharmacy compartment from April to May 2016. All patients were asked about their willingness to participate in this study. Explanation was given to the patients who agree to participate. All patients subsequently read the patient's information sheet and signed the patient's consent form. A convenience sampling method was used due to its practicality and responds were on their voluntary basis.

### *Scoring method for knowledge, attitude and practice (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 attitude (strongly agree=5, agree=4, neutral=3, disagree=2 and strongly disagree=1), and practice statements (always=5, often=4, sometimes=3, rarely=2 and never=1).

Hence the minimum and maximum score for knowledge, attitude and perception could be 0 to 14, 1 to 40 and 1 to 30 respectively. Total possible KAP score was 84.

The total score from knowledge, attitude and practice domains were then categorized into two levels by using mean score respectively. Mean scores of eight and above from the total knowledge score were considered good, and below eight were considered poor level of knowledge.

Mean scores of 24 and above from the total attitude score were considered positive attitude, and below 24 were considered negative attitude towards halal pharmaceuticals. Mean scores above 18 of the total practice score will be considered good practice, and below 18 will be considered poor practice (Table 1).

**Table 1. Shows the Scoring Method For Assessment Level of Knowledge, Attitude And Practice (KAP) Towards Halal Pharmaceuticals**

Domain	Level of K/A/P towards halal pharmaceutical	Mean of total score
Knowledge	Poor	< 8
	Good	> 8
Attitude	Negative	< 24
	Positive	> 24
Practice	Poor	< 18
	Good	> 18

#### Data Analysis

Descriptive statistics of the data collected were analyzed using SPSS software for Windows version 20.0. Only completed questionnaires with written consent by respondent were included in the analysis. Preliminary data examination was assessed to detect data entry errors.

Descriptive statistics were used to summarize the data. Frequencies and percentages of responses were produced for each answer in the questionnaire. Logistic regressions were applied to quantify the association between the socio-demographic characteristics and the outcome variables (level of knowledge, attitudes and practice toward halal pharmaceuticals). Pearson correlation coefficient analysis were used to determine the correlation between level of knowledge with level of attitude, level of knowledge with level of practice and level of attitude with level of practice. A p-value of 0.05 or less was taken as statistically significant.

## RESULTS

### Socio Demographic Characteristics

Socio demographic characteristics of the patients were depicted in Table 2.

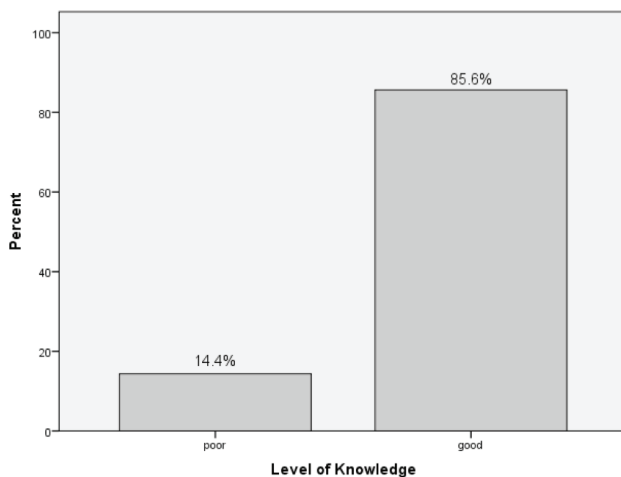
**Table 2. Socio-Demographic Characteristics (N=390)**

Characteristics	Frequency (%)
<b>Age (years)</b>	
18 – 30	80 (20.5%)
31 – 40	99 (25.4%)
41 – 50	71 (18.2%)
51 – 60	79 (20.3%)
≥ 61	61 (15.6%)
<b>Gender</b>	
Male	236 (60.5%)
Female	154 (39.5%)
<b>Race</b>	
Malay	356 (91.3%)
Chinese	7 (1.8%)
Indian	8 (2.1%)
Others	19 (4.9%)
<b>Religious status</b>	
Muslim	365 (93.6%)
Non-Muslim	25 (6.4%)
<b>Education level</b>	
University / College	212 (54.4%)
Secondary school	171 (43.8%)
Primary school	6 (1.5%)
No formal education	1 (0.3%)
<b>Occupation</b>	
Government employee	207 (53.1%)
Private employee	19 (4.9%)
Self-employed	24 (6.2%)
Veteran / retired	79 (20.3%)
Unemployed	32 (8.2%)
Student	29 (7.4%)
<b>Frequency of collecting medicines in TM AFH Pharmacy</b>	
Weekly	2 (0.5%)
Monthly	130 (33.3%)
Every 2 – 4 months	258 (66.2%)

## KNOWLEDGE TOWARDS HALAL PHARMACEUTICAL

### *Assessment for the Level of Knowledge among Patients in TM AFH*

The frequency distribution of patients' knowledge regarding halal pharmaceuticals is depicted in Table 3. From the total score of 14, mean knowledge score was  $10.73 \pm 0.13$  showed that study population had good knowledge regarding halal pharmaceuticals. The total score of knowledge level was then categorized into two categories. More than half of the patients with total knowledge score was eight and above (85.6%,  $n=334$ ) were reported to have good knowledge, while remaining patients with total knowledge score was below eight. (14.4%,  $n=56$ ) reported to have poor knowledge towards halal pharmaceutical (Figure 1).



**Figure 1. Level Of Patients' Knowledge Towards Halal Pharmaceuticals**

### *Relationship between Patients' Socio-Demographic Factors with the Level of Knowledge*

A logistic regression was performed to ascertain the effects of age, gender, religion status, education level and occupation on the likelihood that TM AFH patients had good knowledge towards halal pharmaceuticals. The contribution of race was omitted from this model due to highly correlated variable. For this analysis, occupation had been categorized into two categories which were 'employed' and 'unemployed'. 'Employed' used for the patients who work in government, private, or self-employed. 'Unemployed' for the patients who veteran or retired, unemployed or students.

The logistic regression model was statistically significant,  $\chi^2 (5) = 30.437$ ,  $p < 0.001$ . The model explained 13.4% (Nigelkerke  $R^2 = 0.134$ ) of the variance in level of knowledge and correctly classified 85.9% of an event.

The result for logistic regression analysis showed there were three factors that significantly associated with the changes of knowledge level among patients in TM AFH which were the gender, religion status and education level. Males were 3.59 times more likely to have higher level of knowledge compared to females (OR = 3.59; 95% CI = 1.719, 7.499;  $p = 0.001$ ). The Muslim patients were decreased the odds of having lower level of knowledge by 74.4% than the non-Muslim patients (OR = 0.256; 95% CI = 0.100, 0.656;  $p = 0.005$ ). Patients who had higher level of education were decreased the odds of having lower level of knowledge by 52.6%.

## ATTITUDES TOWARDS HALAL PHARMACEUTICAL

### *Assessment for the Level of Attitudes among Patients in TM AFH*

The frequency distribution of patients' attitude regarding halal pharmaceuticals is depicted in Table 4.

From the total score of 40, mean attitude score was  $34.31 \pm 0.22$  showed that study population had positive attitude towards halal pharmaceuticals.

The level of attitude was then categorized into two categories. More than half of the patients with total attitude score was 24 and above ( $n=388$ , 99.5%) were reported to have positive attitudes, while remaining patients with total knowledge score was 24 ( $n=2$ , 0.5%) reported to have negative attitudes towards halal pharmaceutical (Figure 2).

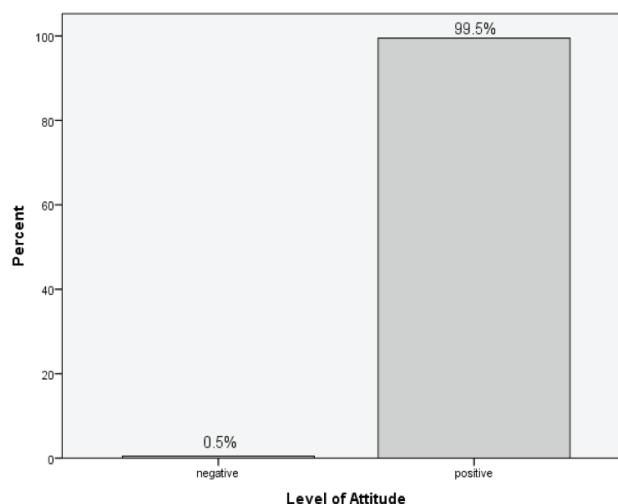
### *Relationship between Patients' Socio-Demographic Factors with the Level of Attitudes*

A logistic regression was performed to ascertain the effects of age, gender, religious status, education level and occupation on the likelihood that TM AFH patients have positive attitude towards halal pharmaceuticals. The contribution of race, education and gender were omitted from this model due to highly correlated variables. For this analysis, occupation had been categorized into two categories which were 'employed' and 'unemployed'. 'Employed' used for the patients who work in government, private, or self-employed. 'Unemployed' for the patients who veteran or retired, unemployed or students.

The logistic regression model was not statistically significant,  $\chi^2 (3) = 30.437$ ,  $p = 0.200$ . The model explained 19.0% (Nigelkerke  $R^2 = 0.190$ ) of the variance in level of attitudes and correctly classified 99.5% of an event.

**Table 3. Patients' Knowledge Towards Halal Pharmaceuticals (Frequency Distribution) (N=390)**

No.	Statements	Knowledge	
		Yes n (%)	No n (%)
1	Adakah anda faham maksud "Halal?"	390 (100%)	0 (0%)
2	Adakah anda faham maksud "Haram"?	373 (95.6%)	17 (4.4%)
3	Adakah anda faham maksud "Ubat - ubatan Halal"	354 (90.8%)	36 (9.2%)
4	Adakah anda tahu bahawa pesakit yang beragama Islam memerlukan ubat yang Halal?	379 (97.2%)	11 (2.8%)
5	Adakah anda tahu bahawa pembuatan ubat – ubatan bersumber daripada bangkai binatang, darah, babi dan alkohol adalah Haram untuk digunakan umat Islam?	357 (91.5%)	33 (8.5%)
6	Adakah anda tahu bahawa pesakit beragama Islam dilarang mengambil ubat – ubatan yang tidak Halal kecuali demi menyelamatkan nyawa dan tiada rawatan alternatif yang lain?	355 (91.0%)	35(9%)
7	Adakah anda tahu Majlis Fatwa Kebangsaan telah menetapkan bahawa ubat – ubatan yang menggunakan alkohol sebagai pelarut adalah dibenarkan dengan syarat alkohol yang digunakan tersebut bukan daripada ekstrak pembuatan arak?	297 (76.2%)	93 (23.8%)
8	Adakah anda tahu bahawa Malaysia merupakan negara pertama di dunia yang mempunyai Garis Panduan Am – Farmaseutikal Halal (MS 2424:2012) yang dikeluarkan oleh Jabatan Standard Malaysia?	200 (51.3%)	190 (48.7%)
9	Kapsul ubat – ubatan adalah terhasil daripada gelatin yang mungkin bersumberkan babi.	227 (58.2%)	163 (41.8%)
10	Sediaan cecair atau sirap ubat – ubatan mungkin mengandungi alkohol.	258 (66.2%)	132 (33.8%)
11	Penghasilan ubat – ubatan mungkin diperolehi daripada sumber binatang yang tidak disembelih mengikut cara Islam (hukum syarak).	186 (47.7%)	204 (52.3%)
12	Kolagen dan gliserin boleh terhasil daripada tumbuh – tumbuhan dan juga haiwan. Ia berstatus syubhah untuk digunakan dalam makanan dan pembuatan ubat – ubatan.	253 (64.9%)	137 (35.1%)
13	Vitamin C dan menthol boleh terhasil daripada tumbuh – tumbuhan dan juga sintetik. Ia berstatus halal untuk digunakan dalam makanan dan pembuatan ubat – ubatan.	286 (73.3%)	104 (26.7%)
14	Ethanol boleh terhasil daripada pembuatan arak dan sintetik. Ia berstatus haram untuk digunakan dalam makanan dan pembuatan ubat – ubatan.	268 (68.7%)	122 (31.3%)

**Figure 2. Level of Patients' Attitude Towards Halal Pharmaceuticals**

From the result, it was found only religion status was statistically significant to determine the changes in level of attitude among patients towards halal pharmaceuticals ( $p < 0.05$ ). The Muslim patients were decreased the odds of having negative attitude by 94.5% than the non-Muslim patients (OR = 0.055; 95% CI = 0.003, 0.943;  $p = 0.045$ ).

### PRACTICES TOWARDS HALAL PHARMACEUTICAL

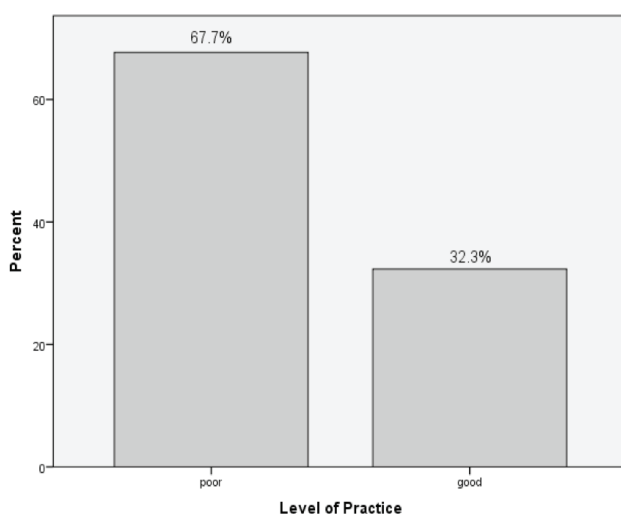
#### *Assessment for the Level of Practice among Patients in TM AFH*

The frequency distribution of patients' practice towards halal pharmaceuticals is depicted in Table 5. From the total score of 30, mean practice score was  $14.56 \pm 0.28$  which shows that study population has poor practice towards halal pharmaceuticals.

The level of practice was then categorized into two categories. More than half of the patients ( $n=264$ , 67.7%) were reported to have poor practice towards halal pharmaceutical with total practice score was less than 18, while remaining patients ( $n=126$ , 32.3%) reported to have good practice towards halal pharmaceutical with total practice score was 18 and above (Figure 3).

#### *Relationship between Patients' Socio-Demographic Factors with the Level of Practice*

A logistic regression was performed to ascertain the effects of age, gender, religious status, education level and occupation on the likelihood that TM AFH patients have good practice towards halal pharmaceuticals. The contribution of race was omitted from this model due to highly correlated variables.



**Figure 3. Level of Patients' Practice Towards Halal Pharmaceuticals**

For this analysis, occupation had been categorized into two categories which were 'employed' for the patients who work in government, private, or self-employed, while 'unemployed' for the patients who veteran or retired, unemployed or students. The logistic regression model was statistically significant,  $\chi^2 (5) = 19.866$ ,  $p=0.001$ . The model explained 6.9% (Nigelkerke  $R^2 = 0.069$ ) of the variance in level of practice and correctly classified 68.7% of an event.

The result for logistic regression analysis showed there was only the age factor that significantly associated with the changes of practice level among patients in HATTM ( $p < 0.05$ ). At one point increment of age will increased 1.28 times of good practice compared to the patients at younger age (OR = 1.281; 95% CI = 1.081, 1.517;  $p = 0.004$ ).

### CORRELATION BETWEEN KNOWLEDGE, ATTITUDE AND PRACTICE LEVEL OF PATIENTS

Pearson correlation coefficient analysis found that there was a positive, significant but poor correlation between level of knowledge with level of attitude ( $r=0.162$ ,  $p=0.001$ ) and also between level of attitude with level of practice among patients ( $r=0.161$ ,  $p=0.001$ ). However, there was a positive, significant and fair correlation between level of knowledge with level of practice ( $r=0.357$ ,  $p < 0.001$ ). From the results, it can be concluded that patients with better knowledge on halal pharmaceuticals having better practice towards halal pharmaceuticals.

### DISCUSSION

The Malaysian Armed Forces Health Services (MAFHS) is one of the leading organizations that supports and purchases halal pharmaceutical products for its patients. In 2012, The MAFHS had introduced selective procurement strategy by giving special merit to halal medicines using a declaration of product's specification. This Declaration Form spells out twenty-nine most important procurement criteria for the MAFHS to choose the purest, highest quality, safest and most efficacious medicines (Table 6). The criteria are based on holistic Syariah compliant procurement guideline that incorporates the concept of *toyyiban* and *halalan*. The concept is broken down to four sub-groups of Good Practices. The criteria were then adopted by the Malaysian Standards Department in 2014 as the national benchmark reference for other agencies.

As the MAFHS had created new standard in empowering halal pharmaceuticals, thus, this study was very important to evaluate the knowledge, attitude and practice towards halal pharmaceutical among patients in TM AFH. Intensive literature review found that no such study had ever been conducted on the issues surrounding halal pharmaceutical on patient's perspective. Medicines had become necessity now to maintain the health and patients nowadays are more educated in making decision to choose which medications they are going to use<sup>17</sup>.

Table 4. Patients' Attitude Towards Halal Pharmaceuticals (Frequency Distribution) (N=390)

No	Statement	Attitude				
		Strongly Agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly Disagree n (%)
1	Saya berbincang dengan doktor dan ahli farmasi berkenaan kehalalan kandungan ubat sebelum menerimanya	124 (31.8%)	161 (41.3%)	83 (21.3%)	16 (4.1%)	6 (1.5%)
2	Saya berasa senang jika ahli farmasi berbincang bersama doktor untuk menukar kepada ubat yang halal	220 (56.4%)	134 (34.4%)	31 (7.9%)	3 (0.8%)	2 (0.5%)
3	Saya mengambil langkah inisiatif untuk mendapatkan maklumat mengenai kandungan atau sumber – sumber ubatan saya.	123 (31.5%)	208 (53.3%)	53 (13.6%)	6 (1.5%)	0 (0%)
4	Saya hanya mengambil sediaan ubat yang Halal.	147 (37.7%)	163 (41.8%)	73 (18.7%)	6 (1.5%)	1 (0.3%)
5	Saya sanggup mengambil ubatan Halal tanpa mengambilkira isu kos harga ubat.	140 (35.9%)	172 (44.1%)	69 (17.7%)	6 (1.5%)	3 (0.8%)
6	Saya mahu melihat logo Halal pada ubatan saya.	193 (49.5%)	146 (37.4%)	48 (12.3%)	2 (0.5%)	1 (0.3%)
7	Saya mahu syarikat pengeluar ubat – ubatan mengisytiharkan status halal kandungan produk mereka yang menggunakan sumber daripada binatang.	226 (57.9%)	140 (35.9%)	21 (5.4%)	2 (0.5%)	1 (0.3%)
8	Orang awam perlu didedahkan berkaitan dengan status halal ubat-ubatan.	252 (64.6%)	119 (30.5%)	17 (4.4%)	0 (0%)	2 (0.5%)

Table 5. Patients' Practice Towards Halal Pharmaceutical (Frequency Distribution) (N=390)

No	Statement	Practice				
		Strongly Agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly Disagree n (%)
1	Berapa kerapkah doktor atau ahli farmasi memaklumkan kepada anda mengenai bahan-bahan Haram yang terkandung dalam sediaan ubat yang akan digunakan oleh anda?	17 (4.4%)	33 (8.5%)	83 (21.3%)	79 (20.3%)	178 (45.6%)
2	Berapa kerapkah anda bertanya kepada doktor atau ahli farmasi anda berkenaan status Halal ubat – ubatan anda?	10 (2.6%)	47 (12.1%)	129 (33.1%)	75 (19.2%)	129 (33.1%)
3	Berapa kerapkah anda meneliti kandungan ubat – ubatan yang terdapat pada sisipan bungkusan atau risalah ubat yang digunakan oleh anda?	31 (7.9%)	137 (35.1%)	115 (29.5%)	65 (16.7%)	42 (10.8%)
4	Berapa kerapkah anda melakukan pencarian maklumat melalui buku – buku atau laman sesawang internet berkenaan ubat – ubatan yang diterima/diberli oleh anda?	20 (5.1%)	118 (30.2%)	132 (33.8%)	47 (12.2%)	73 (18.7%)
5	Berapa kerapkah anda memaklumkan semula kepada doktor dan ahli farmasi sekiranya anda mendapati ubat – ubatan yang diterima oleh saya terhasl dari sumber yang tidak Halal?	14 (3.6%)	37 (9.5%)	78 (20.0%)	81 (20.8%)	180 (46.2%)
6	Berapa kerapkah anda meminta nasihat daripada ahli agama / ulama sekiranya dikehendaki mengambil ubat yang tidak Halal kerana tiada alternatif lain bagi merawat penyakit anda?	16 (4.1%)	53 (13.6%)	98 (25.1%)	69 (17.7%)	154 (39.5%)

## PATIENTS' KNOWLEDGE TOWARDS HALAL PHARMACEUTICAL

From this study, majority of the patients knew the meaning of halal; haram; halal medicines; and the used of animal carcasses, blood, pork, alcohol were haram for Muslim consumptions. The results were supported with the findings from other studies<sup>11,13,15</sup>. The knowledge of patients in this study about Muslims are forbidden from taking non-halal medicines except in life-saving situations and when there was no other alternative treatment available were slightly higher from the halal vaccine study done by M. U. Safinaz, 2015 by 91% and 88% respectively. Patients had a good knowledge regarding the use of alcohol as a solvent as long as the alcohol does not obtain from brewery process, while moderate knowledge regarding Malaysia as the first country in the world that developed the national standards for halal pharmaceuticals.

It is very important to identify the source of pharmaceutical ingredients before it can be categorized into halal, haram or mushbooh. About half of the patients from this study knew that there were capsules made from gelatin which may be derived from pig source, and this was almost the same result obtained by S. Sadeeqa et.al, 2013 from the general public perspective. These patients compared to general public<sup>11</sup> had better knowledge in terms of liquid preparations or syrups might contain alcohol. Less than 50% of the patients knew that medicines can be produced from animal sources that not slaughtered according to Shariah law and no previous study had reported for this finding. This study showed that the patients had good knowledge to identify products derived from animal sources such as collagen and glycerin were doubtful (mushbooh), products from plants and synthetics such as vitamin C and menthol were permissible (halal) and products obtained from brewing process such as ethanol was forbidden (haram). J. M. Hani, 2010 reported that 30% of the respondents who were pharmacy students correctly answered that gelatin was doubtful (mushbooh), while 27.6% answered that ethanol was forbidden (haram). Other ingredients such as collagen, vitamin C and menthol were never been asked from previous study.

Zhari et al., 2014 had identified out of 3200 monographs in British Pharmacopoeia 2012, 27 monographs were classified as red lists (haram) where the ingredients were prepared specifically from porcine or pig, 68 monographs were grey lists (mushbooh) as 13 monographs of it sources from bovine only and 55 monographs from animal sources include porcine and bovine and lastly, 55 monographs were green lists (halal) which 44 monographs of it derived from chemical synthesis and analogues, and 11 monographs from recombinant DNA technology<sup>18</sup>.

### *Level of Patients' Knowledge towards Halal Pharmaceuticals*

Majority of the patients in this study had good level of knowledge towards halal pharmaceuticals (85.6%, n=334), while the rest at the poor level of knowledge (14.4%, n=56). This high percentage of knowledge level consistent with results reported from studies within the population of general public<sup>11</sup>, hospital pharmacists<sup>13</sup>, hospital doctors<sup>14</sup> and academicians<sup>15</sup>.

However, less than 60% of the patients aware the availability of Halal Pharmaceutical guidelines by Malaysian Standard Department, porcine based gelatine and special requirements for slaughtered animal showed poor level of knowledge. Thus it is a responsibility of many parties including government bodies and manufacturers to educate the patients.

### *Relationship between Patients' Socio-Demographic Factors with the Level of Knowledge*

In this study showed that patients' gender, religion status and level of education were significantly associated with level of knowledge. Being males are almost 4 times more to have good knowledge than females (OR = 3.59; 95% CI = 1.719, 7.499; p = 0.001). However, this result was contradicted with the result reported by M.U. Safinaz, 2015 where females were 4 times to have good knowledge regarding vaccine and halal concept. S. Sadeeqa et al., 2013 reported that there was significant association between gender and their knowledge about the term of halal medicines and forbidden ingredients to be avoided by the Muslims. However, there was no quantification of association reported from her study.

Being Muslims were decreased the odds of having lower level of knowledge by 74.4% than the non-Muslim. (OR = 0.256; 95% CI = 0.100, 0.656; p = 0.005). No result from other study can be compared with this finding. M.U. Safinaz, 2015 stated that there was no significant association of knowledge level and race of publics. Thus, regardless of the race, being a Muslim will give significant impact on patients' knowledge.

Patients who had higher level of education were decreased the odds of having lower level of knowledge by 52.6%. (OR = 0.474; 95% CI = 0.280, 0.803; p = 0.006).

This result was consistent with the finding from M. U. Safinaz, 2015 where the public who had no formal or primary school education level had decreased odd of good knowledge by 86%.

The age and occupation of patients were not significantly contributed to the level of knowledge, as consistent with the result reported by M. U. Safinaz, 2015. This study indicates that age and occupation did not have relationship towards the level of knowledge. Meanwhile, S. Sadeeqa et al., 2013 reported that there was a significant association between age and occupation within items in knowledge domain in her study.

**Table 6. The 29-point specification for medicines tender by the MAFHS that has been adopted by Malaysian Standards Department as benchmark for Good Government Procurement Practice in the Halal Pharmaceutical Economic Sector in Malaysia - Specific contents to be declared by potential suppliers 16.**

<b>Toyyiban aspects – Good Evaluation Practice</b>	
1.	Sample of medicines
2.	Sample of packaging
3.	Brochures of pharmaceutical product
4.	Pharmaceutical dosage form
5.	Palatability and physical form of pharmaceutical product
6.	Innovator / Reference product
7.	National Pharmaceutical Bureau approval
8.	US Food and Drug Administration approval
9.	Drug control authorities from other countries
<b>Toyyiban aspects – Good Manufacturing Practice</b>	
10.	Good Manufacturing Practice compliance product manufacturer
11.	Pharmaceutical Inspection Convention and Pharmaceutical Inspection Co-operation Scheme approval
12.	Active pharmaceutical ingredients with drug master profile status
13.	Bioequivalence study, therapeutic equivalence study, post-marketing surveillance, stability study and certificate of analysis
<b>Halalan aspects - Good Consumption Practice</b>	
14.	Declaration of animal content in medicine
15.	Declaration of alcohol content
16.	Halal recognition/certification
17.	Initiatives towards MS2424: 2012 General Guidelines on Halal Pharmaceuticals
<b>Toyyiban aspects – Good Supply Chain Practice</b>	
18.	Declaration of previous bad history
19.	Letter of Acceptance/ Letter of Undertaking between manufacturer/ licence holder / supplier
20.	Ex-stock
21.	Delivery period within 21 days
22.	Alternative plan(s) if the supplier failed to deliver pertaining manufacturer issue(s)
23.	Minimum one year of shelf life
24.	Cold/ cool chain management
25.	Security and sustainability of supply chain
26.	Corporate Social Responsibility through bonus scheme after expiration of patented drug
27.	Declaration of pedigree for all intermediary
28.	Initiatives towards Malaysian Standard under Shariah Compliant criteria
29.	Green technology and/or renewable energy application

## **PATIENTS' ATTITUDE TOWARDS HALAL PHARMACEUTICAL**

From the attitude domain, most of the patients answered strongly agreed and agreed with the percentage ranged from 31.5% up to 64.6% of all eight items in attitude domain.

This is in line with the results reported by S. Sadeeqa et.al, 2013 where 14.2% - 15.1% strongly agreed and 21.9% - 26.0% agreed that the public communicate with the doctors and pharmacist upon receiving their prescriptions, felt comfortable with pharmacist intervention to dispense halal medicines to them and admit their own initiatives to get information about the sources of their medicines.

This study demonstrated majority of the patients were agreed to take only halal medicines, used to take halal medicines regardless of the cost issues, and want to see halal logo on their medicines which is consistent with study done by S. Sadeeqa et al., 2013 for general public. In this study, as verbally told by the patients, they were undecided or disagreed with the statements because they willing to accept non-halal medicines as long as it will cure their illnesses, they want the halal medicines to be competitive or even lower price with the equivalent drugs available in the market and they bother to see halal logo at packaging of the medicines.

Almost 94% (57.9% strongly agreed, 35.9% agreed) of the patients agreed that they want pharmaceutical manufacturers to declare halal status of their products which obtained from animal sources. According to Drug Registration Guidance Document (Malaysia), revised 2011, there was a labeling requirement to the manufacturer to declare source of ingredients derived from animal origin 19. The result from this study is a good force to the policy maker to extend such declaration up to halalness status of ingredients derived from animal origin. Meanwhile, 95.1% (64.6% strongly agreed, 30.5% agreed) of the patients agreed that patients should be educated about halalness of medicines and this result supported with finding from S. Sadeeqa et al., 2013.

#### *Level of Patients' Attitude towards Halal Pharmaceuticals*

This study demonstrated that 99.5% of patients had positive attitude towards halal pharmaceuticals, while 0.50% of them were negative attitude. In this domain attitude, patients frequently answered with strongly agreed and agreed compared to other scores. This high percentage of positive attitude consistent with results reported from studies within the population of general public <sup>11</sup>, hospital pharmacists <sup>13</sup>, hospital doctors <sup>14</sup> and academicians <sup>15</sup>.

#### *Relationship between Patients' Socio-Demographic Factors with the Level of Attitude*

This study found that only religion status was statistically significant to determine the changes in level of practice among patients towards halal pharmaceuticals. Muslim patients were decreased the odds of having negative attitude by 94.5% than non-Muslim patients (OR = 0.055; 95% CI = 0.003, 0.943; p = 0.045). On the other hands, M. U. Safinaz, 2015 reported there was a significant association between attitude and level of education among general public regarding halal vaccine products.

### **PATIENTS' PRACTICE TOWARDS HALAL PHARMACEUTICAL**

In practice domain, the patients were asked on the frequency of they perform certain issues regarding halal pharmaceutical.

About 66% (45.6% never, 20.3% rarely) of the patients less frequent to experience the doctors or pharmacists explained to them regarding forbidden ingredients that they going to be used. At the same times, about 52% (33.1% never, 19.2% rarely) of patients were less frequent to ask doctors or pharmacist regarding halal status of the medicines. The results were consistent with the study done by M.U. Safinaz, 2015 where majority of the public less frequent to ask health care professionals about non-halal ingredients that might presence in the vaccines, and less frequent of them to ask healthcare professionals about halal status of vaccine products before accepting it.

This study demonstrated that 43.0% (7.9% always, 35.1% often) of the patients more frequently read the ingredients at package inserts or product leaflets about the medicines they consumed, and 35.3% (5.1% always, 30.2% often) of patients more frequently searched for information through the books or websites regarding the medicines they received or bought. The results were contradicted with study done by M.U. Safinaz, 2015 where she reported the publics were less frequently request to read package inserts or product information leaflets before taking a vaccine, and less frequently to search information via the internet or smartphone applications regarding halal status of vaccines.

Majority of the patients never inform doctors or pharmacists if they noticed the medications they received were originated from non-halal sources and this result is supported by the study from M.U. Safinaz, 2015. Lastly, more than half of the patients (39.5% never, 17.7% rarely) less frequently practice to seek guidance from religious leaders if they need to take non-halal medicines due to no other alternative treatment available, even though S. Sadeeqa et al., 2013 reported that 92.2% (68.1% strongly agreed, 24.1% agreed) of the respondents agreed that the publics should seek guidance from religious leaders, as to the correct interpretation of laws with regard to the use of medicines considered haram.

#### *Level of Patients' Practice towards Halal Pharmaceuticals*

This study established more than half of the patients (67.7%) experienced poor practice towards halal pharmaceuticals. The result was opposite compared to the result reported by M.U. Safinaz, 2015 where the publics possessed good practice on usage and status of halal vaccines. The differences of the result might be due to the patients mainly rely on the healthcare professionals to apply the best decision for them, they had limited resources to reach certain extend of information and never experienced the situation as described in the statements at practice domain.

#### *Relationship between Patients' Socio-Demographic Factors with the Level of Practice*

Age was the only factor that significantly associated with the change of practice level among patients.

At one-point increment of age will increased 1.3 times of good practice compared to the patients at younger age (OR = 1.281; 95% CI = 1.081, 1.517; p = 0.004). However, there were no socio-demographic factors that significantly associated with practice level in the study done by M.U. Safinaz 2015.

### CORRELATION BETWEEN KNOWLEDGE, ATTITUDE AND PRACTICE LEVEL OF PATIENTS

The correlation between knowledge – attitude, and attitude – practice were poor and positive, while knowledge – practice was fair and positive. These results supported with the findings from S. Sadeeqa et al., 2013 and M. U. Safinaz., 2015. Therefore, increasing patients' level of knowledge will increase patients' level of practice towards halal pharmaceuticals.

### CONCLUSION

This study can be concluded that majority of the patients had good knowledge towards halal pharmaceuticals. Gender, religion status and level of the education play significant roles for the changes of knowledge level among patients. Patients also showed positive attitudes towards halal pharmaceuticals. Religion status was the only factor that significantly contributed to the changes level of attitude among patients towards halal pharmaceuticals. In terms of practice, the patients showed poor level of practice. Age, gender and occupation were significantly associated with the level of practice, however in terms of relationship, age was statistically significant with one-point increment of age will increased 1.28 times of good practice.

In terms of limitation, the results of this study might differ according to the literacy, economic standards, level of education and other patients' characteristics because it only done in single centre and did not present entire Malaysian military population. Thus, this study may not be generalizable to entire armed forces population.

Thus, it is recommended for the future to compare the KAP before and after application of awareness or intervention programs regarding halal pharmaceuticals. It is very important to spread the knowledge of halal and haram substances/ingredients and their alternatives as reference for those needed. As mentioned in the limitation, all studies regarding halal pharmaceuticals should be published to promote and facilitate future studies. Compilation of results from various studies in halal pharmaceuticals is paramount to support the demands or issues regarding halal pharmaceuticals economically and scientifically.

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