HALAL PHARMACEUTICALS: KNOWLEDGE, ATTITUDE AND PERCEPTION AMONG DOCTORS, PHARMACISTS, ACADEMICIANS AND PUBLIC IN MALAYSIA

SALEHA SADEEQA

UNIVERSITI SAINS MALAYSIA

2015

HALAL PHARMACEUTICALS: KNOWLEDGE, ATTITUDE AND PERCEPTION AMONG DOCTORS, PHARMACISTS, ACADEMICIANS AND PUBLIC IN MALAYSIA

by

SALEHA SADEEQA

Thesis submitted in fulfilment of the requirements

for the degree of

Doctor of Philosophy

April 2015

DEDICATION

I dedicate this thesis to my beloved, late father (Mohammad Sadiq) who prayed, motivated and inspired me throughout my professional career to persue and accomplish my goals. I owe all my success in life to him.

ACKNOWLEDGEMENT

I would like to thank almighty Allah who have given me strength and kept me in good health throughout the study period to fulfil my duties as a student, a mother and a wife. A very special thanks to my supervisor, Associate Professor Dr. Azmi Sarrif. My deep sentiment of gratitude for your assistance and guidance that enabled me to come up with this thesis. I may avail this opportunity to let you know that you are a benevolent adviser, from whom I have learnt so much. Through these years, you guided me with serenity and patience. I thank you for your readiness to sit and talk even during your busiest moments. Your inputs on my research and your genuine concern for my work was a beacon light for me. Thank you for stimulating my thought process whenever I was stuck. May Allah always keep you in good health (Amin).

Secondly, my gratitude goes to Dr. Imran Masood, the co-supervisor for the study. Thank you very much for being such a central part of my doctoral program and for sharing your time and expertise. My special thanks to Professor Dr. Azmi Ahmed Hassali and Associate Professor Dr Asrul Akmal Shafee, who in their chairmanship provided work place for me in DSAP. I particularly thank Dr. Hadeer Ikram for being one of the first to help me settle in USM. Thank you Dr. Fahad, Dr. Maryum, Atif, Dr. Dinesh and Dr. Mohammad Bashaar for your suggestions in writing this thesis. Without your help the task would have been difficult. I am very lucky to have had such a strong group of friends to guide me through. I thank you for your support and wish all of you the best of luck in your life.

I also thank the universities and hospitals who allowed me to carry out the study at their institutions. I am grateful for the assistance and co-operation of the Directors of the hospitals, Heads of the respective departments and Deans of the Schools, for permitting data collection in their organizations. Many thanks to the research participants who made the research possible.

Last but not the least my deepest gratitude goes to my late father Mohammad Sadiq who would have been very proud of me. My mother, sisters and brothers, I appreciate your prayers and support. I would like to thank my beloved husband Mohammad Zakaria Daud, his continuous support enabled me to complete this difficult task. May Allah always keep him in good health (Amin).Thanks to my two wonderful daughters Fatima and Ayesha for their kind understanding and support who suffered a lot throughout these years by staying away in Lahore Pakistan. And my little son, Adnan Zakaria who also suffered by staying away from his loving sisters.There are no words to thank you enough. You ALL have provided me with un-daunting and relentless support. Thank you for everything! You made so many sacrifices so that I could have a marvelous future. My faith in mutual love and its limitless strength has been invigorated. A large part of my achievement is owed to your devotion and sacrifice.

I would also like to thank all staff of discipline of clinical pharmacy and DSAP, School of Pharmaceutical Sciences USM Pulau Pinang for being so supportive throughout the study period.

TABLE OF CONTENTS

Title **Page**

DEDICATION.....ii

ACKNOWLEDGEMENT.....iii

TABLE OF CONTENTS.....v

LIST OF TABLES.....xiii

LIST OF FIGURES.....xv

LIST OF ABBREVIATIONS.....xvi

LIST OF APPENDICES.....xviii

LIST OF PUBLICATIONS AND COMMUNICATIONS.....xix

ABSTRAK.....xxi

ABSTRACT.....xxiv

CHAPTER ONE: GENERAL INTRODUCTION.....1

1.1 Background to research.....2

1.2 Theoretical and conceptual framework for the research.....4

1.3 Study questions.....7

1.3.1 General.....7

1.3.2 Specific 7

1.4 Problem statement.....7

1.5 Rationale of the study.....9

1.6 Research objectives.....10

1.7 Significance of the study 10

1.7.1 Malaysian economic growth 11

1.7.2 Healthcare professionals 11

1.7.3 The academicians and researchers…….....12

1.7.4 Consumers…….....12

1.7.5 The producers and marketers…….....12

1.7.6 The legislators…….....13

1.8 Organization of the thesis……...13

CHAPTER TWO: LITERATURE REVIEW…….....15

2.1 Introduction…….....16

2.2 Islamic perspective …….....16

2.3 Significance of Halal for Muslims and its importance for non Muslims…….....18

2.4 Common preparations having Halal issues, used in/as pharmaceutical products ……..21

2.5 Policies and their implications ……..25

2.6 Operational definitions…….....26

2.7 Global Halal scenario……..30

2.8 Malaysian Halal scenario…….....35

2.8.1(a) Halal Industry Development Corporation (HDC)……...37

2.8.1(b) Department of Islamic Development Malaysia (JAKIM)……..37

2.8.1 (c) Ministry of International Trade and Industry (MITI)…….37

2.8.1 (d) Ministry of Domestic Trade, Co-operatives & Consumerism (MDTCC) …….38

2.8.1(e) Malaysia External Trade Development Corporation (MATRADE)……..38

2.8.1(f) Malaysia Productivity Corporation (MPC) …….....38

2.8.1(g) Standards Malaysia…….39

2. 8. 2 Malaysian Halal Standards (Latif, 2013)…….....39

2.8.3 Malaysian Standards for Halal pharmaceuticals……40

2.8.4 Halal issues and challenges in Malaysia…….....41

2.9 Drug Control Authority (DCA)…….....46

2.10 Importance of KAP study …….....46

CHAPTER THREE: GENERAL METHODOLOGY…….....49

3.1 Introduction…….....50

3.2 Operational definitions…….....50

3.2.1 Validity…….....50

3.2.1(a) Face validity…….....51

3.2.1(b) Content validity…….....51

3.2.2 Reliability…….....52

3.2.2(a) Internal consistency …….....52

3.3 Quantitative methodology…….....53.

3.3.1(a) Questionnaires…….....53

3.3.1(b) Basis of selection of questionnaire in the current research project……54

3.3.1(c) Scoring method in questionnaires…….....55

3.3.1(d) Piloting of questionnaires…… ……..... 55

3.3.2 Sampling designs in quantitative methods…….....56

3.3.2(a) Sample size calculation…….....57

3.3.3 Study site and its importance…….....57

3.3.4 Study design…….....58

3.3.5 Data collection procedure ……58

3.3.5(a) Postal survey…….....58

3.3.5(b) Others…….....60

3.3.6 Data analysis…….....60

3.3.7 Ethical considerations…….....62

CHAPTER FOUR: KNOWLEDGE, ATTITUDE AND PERCEPTION AMONG DOCTORS REGARDING HALAL PHARMACEUTICALS……...63

4.1 Introduction……64

4.2 Objectives of the study……65

4.3 Methodology…….....65

4.3.1 Type of study design……...65

4.3.2 Study location & setting…….65

4.3.3 Inclusion & exclusion criteria…….....65

4.3.4 Sampling and sample size …….....66

4.3.5 Study instrument…….....66

4.3.5(a) Study instrument Scores…….....67

4.3.6 Data collection procedure……...67

4.3.7 Data analysis…….....67

4.4 Results……....67

4.4.1 Doctors' demographics……..69

4.4.2 Doctors' knowledge regarding Halal pharmaceuticals……..71

4.4.3 Doctors' attitude regarding Halal pharmaceuticals……....74

4.4.4 Doctors' perception regarding Halal pharmaceuticals……..78

4.4.5 Comparison of doctors' knowledge, attitude, perception and total KAP scores with grouping variables……...82

4.4.6 Correlation between knowledge, attitude and perception among doctors …….84

4.4.7 Drugs creating issues of Halal/Haram mentioned by doctors……....86

4.4.8 Additional comments…….....88

4.5 Discussion …….....91

4.6 Conclusion ……..95

CHAPTER FIVE: KNOWLEDGE, ATTITUDE AND PERCEPTION AMONG PHARMACISTS REGARDING HALAL PHARMACEUTICALS……..97

5.1 Introduction ……..98

5.2 Objectives of the study……..98

5.3 Methodology……99

5.3.1 Type of study design……99

5.3.2 Study location and setting……..99

5.3.3 Inclusion & exclusion criteria……..99

5.3.4 Sampling and sample size ……..99

5.3.5 Study instrument……..100

5.3.5(a) Study instrument score……100

5.3.6 Data collection procedure……100

5.3.7 Data analysis……....101

5.4 Results……..101

5.4.1 Pharmacist's demographics……..103

5.4.2 Pharmacists' knowledge regarding Halal pharmaceuticals……..105

5.4.3 Pharmacists'attitude regarding Halal pharmaceuticals……108

5.4.4 Pharmacists' perception regarding Halal pharmaceuticals……...112

5.4.5 Comparison of pharmacists' knowledge, attitude, perception and total KAP scores with grouping variables. ……..116

5.4.6 Correlation between knowledge, attitude and perception among pharmacists.....118

5.4.7 Additional comments ……..120

5.5 Discussion……..123

5.6 Conclusion……..127

CHAPTER SIX: KNOWLEDGE, ATTITUDE AND PERCEPTION AMONG ACADEMICIANS REGARDING HALAL PHARMACEUTICALS……129

6.1 Introduction……...130

6.2 Objectives of the study……130

6.3 Methodology……131

6.3.1 Type of study design ……....131

6.3.2 Study location & settings…….....131

6.3.3 Inclusion & exclusion criteria…….....131

6.3.4 Sampling and sample size…….....131

6.3.5 Study instrument……...132

6.3.5(a) Study instrument Scores……...132

6.3.6 Data collection procedure……133

6.3.7 Data analysis……133

6.4 Results ……..133

6.4.1 Academician's demographics……...133

6.4.2 Academicians' knowledge regarding Halal pharmaceuticals …….. ...136

6.4.3 Academicians'attitude regarding Halal pharmaceuticals.....139

6.4.4 Academicians'perception regarding Halal pharmaceuticals….....142

6.4.5 Comparison of academicians' knowledge, attitude, perception and total KAP scores with grouping variables. ……147

6.4.6 Correlation between knowledge, attitude and perception among academicians……....149

6.5 Discussion……....151

6.6 Conclusion……....154

SEVEN KNOWLEDGE, ATTITUDE AND PERCEPTION AMONG PUBLIC, REGARDING HALAL PHARMACEUTICALS……..155

7.1 Introduction……..156

7.2 Objectives of the study……..156

7.3 Methodology…….....157

7.3.1 Type of study design…….....157

7.3.2 Study location & setting…….....157

7.3.3 Inclusion & exclusion criteria……..157

7.3.4 Sampling and sample size……157

7.3.5 Study instrument ……..158

7.3.5(a) Study instrument scoring……..159

7.3.6 Data collection procedure…….....159

7.3.6.(a) Subject recruitment ……....159

7.3.7 Data analysis…….....159

7.4 Results……..159

7.4.1 Public's demographics……..160

7.4.2 Public's knowledge regarding Halal pharmaceuticals……..163

7.4.3 Public's attitude regarding Halal pharmaceuticals ……..166

7.4.4 Public's perception regarding Halal pharmaceuticals……...164

7.4.5 Comparison of publics' knowledge, attitude, perception and total KAP score with grouping variable ……172

7.4.6 Correlation between knowledge, attitude and perception among public……174

7.5 Discussion……176

7.6 Conclusion…….....181

CHAPTER EIGHT: GENERAL CONCLUSION……182

8.1 Study summary……183

8.2 Implications……...183

8.3 Recommendations……184

8.3.1 Future studies……184

8.3.2. Halal pharmacopoeia ……185

8.3.3 Halal guidelines for medical practitioners……185

8.3.4 Policy makers……185

8.3.5 Drug manufacturers……185

8.3.6 Educational Institutions ……186

8.4 Strengths and limitations of study……186

REFERENCES……188

APPENDICES……204

LIST OF TABLES

Table	Title	Page
4.1	State wise distribution of general medical practitioners	68
4.2	Descriptive characteristics of doctors	70
4.3	Doctor's knowledge about Halal pharmaceuticals	73
4.4	Doctors' attitude about Halal pharmaceuticals	77
4.5	Doctors' perception about Halal pharmaceutical	81
4.6	Comparison of doctors' knowledge, attitude, perception and total KAP scores with grouping variables	83
4.7	Mean and median score of doctors' knowledge, attitude, perception and KAP about Halal pharmaceuticals	85
4.8	Correlation between knowledge, attitude and perception of doctors	85
4.9	Drugs having issues of Halal/haram, mentioned by doctors	87
4.10	Additional comments of doctors	89
5.1	State wise distribution of general medical practitioners	102
5.2	Descriptive characteristics of pharmacists	104
5.3	Pharmacists' knowledge about Halal pharmaceuticals	107
5.4	Pharmacists' attitude about Halal pharmaceuticals	112
5.5	Pharmacists' perception about Halal pharmaceuticals	116
5.6	Comparison of pharmacists' knowledge, attitude, perception and total KAP scores with grouping variables	118
5.7	Mean and median score of pharmacists' knowledge, attitude, perception and KAP about Halal pharmaceuticals	120
5.8	Correlation between knowledge, attitude and perception of pharmacists	120

5.9	Additional comments of pharmacists	122
6.1	Descriptive characteristics of academicians	136
6.2	Academicians' knowledge about Halal pharmaceuticals	139
6.3	Academicians' attitude about Halal pharmaceuticals	142
6.4	Academicians' perception about Halal pharmaceuticals	147
6.5	Comparison of academicians' knowledge, attitude, perception and total KAP scores with grouping variables	149
6.6	Mean and median score of academicians' knowledge, attitude, perception and KAP about Halal pharmaceuticals	151
6.7	Correlation between knowledge, attitude and perception of academicians	151
7.1	Descriptive characteristics of public	162
7.2	Public's knowledge about Halal pharmaceuticals	166
7.3	Public's attitude about Halal pharmaceuticals	169
7.4	Public's perception about Halal pharmaceuticals	172
7.5	Comparison of public's knowledge, attitude, perception and total KAP scores with grouping variables	174
7.6	Mean and median score of public's knowledge, attitude, perception and KAP about Halal pharmaceuticals	176
7.7	Correlation between knowledge, attitude and perception of public	176

LIST OF FIGURE

Figure	Title	Page
1.1	Theoretical and conceptual framework for the research	6

LIST OF ABBREVIATIONS

Terms	Abbreviations
AIFDC	Assessment Institute for Foods, Drugs, and Cosmetics
AIDS	Acquired Immune Deficiency Syndrome
CAM	Complimentary and Alternative Medicine
CME	Continuous Medical Education
DSAP	Discipline of Social and Administrative Science
DNA	Deoxyribonucleic Acid
ENT	Ear Nose Throat
FSIS	Food Safety and Inspection Service
Fomca	Federation of Malaysian Consumers Association
HIV	Human Immune deficiency Virus
HPRI	Halal Products Research Institute
HDC	Halal Industry Development Corporation
HMA	Halal Monitoring Authority
HCM	Halal Certified Medicine
ISO	International Standards Organization
ISNA	Islamic Society of North America
IFANCA	Islamic Food and Nutrition Council of America
KAP	Knowledge Attitude Perception
MPC	Malaysia Productivity Corporation
MDTCC	Ministry of Domestic Trade, Co-operatives and Consumerism
MOH	Malaysian Ministry of Health
MITI	Ministry of International Trade and Industry

MUIS	Majlis Ulama Islam Singapura
MUI	Majlis Ulama Indonesia
NEAC	National Economic Advisory Council
NMRR	National Medical Research Register
NPCB	National Pharmaceutical Control Bureau
NGOs	Non Government Organizations
Pbuh	Peace be upon him
SD	Standard Deviation
SIRIM	Integration of Standards and Research Institute of Malaysia
SWT	Subhan Wa Taala
SRIs	Strategic Reform Initiatives
USM	Universiti Sains Malaysia
UK	United Kingdom
WHO	World Health Orgnization
WHF	World Halal Forum
WHR	World Halal Research

LIST OF APPENDICES

Number	Title
APPENDIX-A:	Ethical approval from "Joint Ethics Committee of School of Pharmaceutical Sciences, USM and Hospital Lam Wah Ee on Clinical Studies"
APPENDIX-B:	Ethical approval from Ministry of Health Government of Malaysia
APPENDIX-C:	Explanatory statement for doctors
APPENDIX-D:	Data collection tool for doctors
APPENDIX-E:	Explanatory statement for pharmacists
APPENDIX-F:	Data collection tool for pharmacists
APPENDIX-G:	Explanatory statement for academicians
APPENDIX-H:	Data collection tool for academicians
APPENDIX-I:	Explanatory statement for public
APPENDIX-J:	Data collection tool for public
APPENDIX-K:	Explanatory statement for public, Malay translation
APPENDIX-L:	Data collection tool for general public, Malay translation
APPENDIX-M:	Knowledge, attitude, perception statements for doctors
APPENDIX-N:	Knowledge, attitude, perception statements for pharmacists
APPENDIX-O:	Knowledge, attitude, perception statements for academicians
APPENDIX-P:	Knowledge, attitude, perception statements for public

LIST OF PUBLICATIONS AND COMMUNICATIONS

Publications and communications arising from this thesis:

A.**PUBLICATIONS**

1. Sadeeqa, S, Sarriff, A, Masood, I, & Farooqui, M (2013). Knowledge, attitude and perception regarding Halal pharmaceuticals, among academicians in various universities of Malaysia. *International Journal of Educational Research and Development* 2(8), 191-202.

2. Sadeeqa, S, Sarriff, A , Masood, I, Saleem, F, & Atif, M (2013). Knowledge, attitude and perception regrading Halal pharmaceuticals among general public in Malaysia. *International Journal of Public Health Science* (IJPHS) 2(4), 143-150.

3. Sadeeqa, S, Sarriff, A, Masood, I, Farooqui, M & Atif, M (2013). Evaluation of knowledge, attitude, and perception regarding Halal pharmaceuticals, among general medical practitioners in Malaysia. *Archives of Pharmacy Practice* 4(4), 139-146.

4. Sadeeqa, S & Sarriff, A (2014). Assessment of knowledge, attitude & perception among hospital pharmacists regarding Halal pharmaceuticals. *Journal of Applied Pharmaceutical Science* ,4(5), 80-86.

5. Sadeeqa, S & Sarriff, A (2014). Do males and females differ in terms of their knowledge, attitude, perception (KAP) regarding Halal pharmaceuticals?. *International Journal of Public Health Science* (IJPHS), 3(3), 163-168.

6. Sadeeqa, S & Sarriff, A (2014). Comparing KAP regarding Halal pharmaceuticals among general practitioners and hospital doctors. *Journal of Applied Pharmaceutical Science*, 4(10), 92-96.

7. Sadeeqa, S & Sarriff, A (2015). KAP among hospital doctors regarding Halal pharmaceuticals, a cross sectional assessment. *Acta Poloniae Pharmaceutica* (Accepted).

8. Sadeeqa, S, Sarriff, A ,& Masood, I (2015). KAP among community pharmacists regarding Halal pharmaceuticals: A crossectional assessment. *International Journal of Innovative Healthcare Research*, 3 (1):1-11.

9. Sadeeqa, S & Sarriff, A (2015).Comparing KAP among community pharmacists and hospital pharmacists regarding Halal pharmaceuticals. *International Journal of Innovative Healthcare Research,* 3 (1):18-25.

B. COMMUNICATIONS

1. Sadeeqa, S, Sarriff, A & Masood, I (2012). Knowledge, attitude & perception regarding Halal pharmaceuticals, among community pharmacists in Malaysia. *Malaysian Journal of Pharmacy*, 1(10), PPP15 (000109).

2. Sadeeqa, S (2014). Assessment of KAP among hospital pharmacists. ISPOR 6th Asia-Pacific Conference, 6-9 September 2014 Beijing International convention Center Beijing, China, P1H30.

FARMASEUTIKAL HALAL: PENGETAHUAN, ATITUD DAN PERSEPSI KALANGAN DOKTOR, AHLI FARMASI, AHLI AKADEMIK DAN ORANG AWAM DI MALAYSIA

ABSTRAK

Penduduk Muslim serata dunia menggunakan berbagai-bagai jenis ubat-ubatan yang mungkin mengandungi bahan-bahan yang bercanggah dengan kepercayaan mereka. Dengan meningkatnya kesedaran ini, keperluan untuk meninjau pengetahuan, atitud dan persepsi di kalangan pihak tertentu menjadi sangat penting.

Kajian ini bertujuan untuk menilai pengetahuan, attitud dan persepsi (KAP) berkaitan dengan farmaseutikal halal di kalangan doktor, ahli farmasi, ahli akademik, dan orang awam di Malaysia. Suatu kajian keratan rentas telah dilakukan dengan menggunakan soal-selidik pengisian-kendiri yang telah disahkan dan berstruktur. Data di kutip melalui soal-selidik yang di poskan kepada ahli akademik, ahli farmasi komuniti dan pengamal perubatan umum manakala data yang di kutip daripada orang awam adalah dengan menggunakan pengumpul data terlatih. Penyelidik menghubungi ketua-ketua Jabatan di hospital-hospital yang berkaitan untuk mendapatkan data dikalangan doktor dan ahli farmasi hospital. Pernyataan-pernyataan berkaitan dengan pengetahuan, respondens perlu memilih 'Ya' atau 'Tidak', manakala bagi pernyataan-pernyataan berkaitan dengan persepsi dan atitud, skala Likert digunakan bermula dengan " sangat setuju" kepada " sangat tidak setuju ". Sejumlah 407 doktor, 310 ahli farmasi, 170 ahli akademik dan 458 respondens daripada khalayak ramai menyertai dalam kajian ini.

Statistik deskriptif dan ujian bukan-parametrik telah digunakan untuk merumuskan data. Ujian khi kuasa dua dan ujian tepat Fischer digunakan untuk menilai perkaitan

antara ciri-ciri demografi dengan skor pengetahuan, atitud, dan persepsi. Korelasi Spearman digunakan bagi meninjau perkaitan antara pengetahuan-atitud, pengetahuan-persepsi dan atitud-persepsi. Bagi menilai kekuatan dan arah perkaitan, koefisien Phi dan nilai Cramer ditentukan dengan menggunakan kriteria Cohen bagi menentukan kesan saiz. Bagi menentukan perbezaan antara skor pengetahuan,atitud, dan persepsi kalangan variabel, Ujian-ujian Mann-Whitney dan Kruskal-Wallis dilakukan. Korelasi Spearman digunakan bagi menentukan perhubungan antara pengetahuan-atitude, pengetahuan-persepsi dan atitud-persepsi.

Di kalangan doktor-doktor, skor-skor bagi min pengetahuan, atitud dan persepsi adalah 7.69 ± 1.67, 34.16 ± 5.96, dan 46.23 ± 5.63 daripada 9,45 dan 55, bagi setiap satunya. Bagi ahli-ahli farmasi, skor-skor min pengetahuan, atitud dan persepsi adalah 7.96 ±1.45, 35.15± 6.64 dan 51.59 ±6.26 daripada 9, 45 dan 60, bagi setiap satunya. Bagi orang awam, skor-skor min pengetahuan, atitud dan persepsi adalah 6.41 ± 1.35, 25.86 ± 4.03 dan 30.71 ± 4.47 daripada 9, 35 dan 35, bagi setiap satunya. Akhirnya, bagi ahli-ahli akademik, skor-skor min pengetahuan, atitud dan persepsi adalah 6.85 ± 1.00, 33.43 ± 8.17 dan 62.59 ± 6.11 daripada 8, 50 dan 75, bagi setiap satunya.

Penemuan kajian menunjukkan bahawa respondens mempunyai pengetahuan baik serta atitud dan persepsi yang positif tentang farmaseutikal halal. Perhubungan signifikan (lemah,sederhana,kuat) ternyata antara ciri-ciri demografi dengan pernyataan-pernyataan tertentu bagi pengetahuan, atitud, dan persepsi dalam setiap domain tersebut. Perbezaan signifikan dalam skor-skor variabel yang dikaji telah ditemui kalangan variabel-variabel dalam kumpulan yang berlainan. Korelasi positif yang signifikan telah ditemui antara pengetahuan-atitude, pengetahuan-persepsi dan atitud-persepsi dalam setiap domain.Rumusannya, kajian ini memberikan

pemahaman tentang KAP respondens terhadap farmaseutikal halal. Penyelidikan lanjutan perlu dilakukan bagi menghuraikan perhubungan dan perkaitan antara setiap domain KAP dan respons daripada subjek-subjek kajian.

HALAL PHARMACEUTICALS: KNOWLEDGE, ATTITUDE AND PERCEPTION AMONG DOCTORS, PHARMACISTS, ACADEMICIANS AND PUBLIC IN MALAYSIA

ABSTRACT

The Muslim population all over the globe is using countless number of drugs which may contain ingredients contradictory to their faith. As this awareness grows, the necessity for exploring into the knowledge, attitude and perception of various players of this field becomes imperative.

This study aimed to evaluate the knowledge, attitude and perception (KAP) relating to Halal pharmaceuticals among doctors, pharmacists, academicians and public in Malaysia. A cross sectional study was carried out using structured, validated, self-administered questionnaires. Data was collected through questionnaires sent by post for academicians, community pharmacists and general medical practitioners while data from general public was collected through trained data collectors. Hospital doctors were approached through head of respective departments and hospital pharmacists were approached through chief pharmacists, by the researcher. For knowledge statements respondents were asked to choose "Yes" or "No" options, while for perception and attitude statements, a five point Likert scale was used starting from "strongly agree" to "strongly disagree". A total of 407 doctors, 310 pharmacists, 170 academicians and 458 respondents from public participated in this study.

Descriptive statistics was applied to summarize the data, non-parametric tests were applied. Chi-square Test and Fisher's Exact Test was utilized to assess the association between demographic characteristics and knowledge, attitude &

perception scores. To determine the strength and direction of association, Phi coefficient and Cramer's V values were applied using Cohen's criteria for effect size. To find the differences between knowledge, attitude & perception scores among different grouping variables, Mann-Whitney test and Kruskal-Wallis test were applied. To find relationship between knowledge-attitude, knowledge-perception and attitude-perception, Spearman's-correlation was applied.

For doctors, mean score for knowledge, attitude, and perception was 7.69 ± 1.67, 34.16 ± 5.96 and 46.23 ± 5.63 out of 9, 45 and 55, respectively. For pharmacists, mean score for knowledge, attitude, and perception was 7.96 ±1.45, 35.15± 6.64 and 51.59 ±6.26 out of 9, 45 and 60 respectively. For public, mean score for knowledge, attitude, and perception was 6.41 ± 1.35, 25.86 ± 4.03 and 30.71 ± 4.47 out of 9, 35 and 35, respectively. For academicians, mean score for knowledge, attitude, and perception was 6.85 ± 1.00, 33.43 ± 8.17 and 62.59 ± 6.11out of 8, 50 and 75, respectively.

Study findings indicate that respondents have good knowledge and positive attitude & perception about Halal pharmaceuticals. Significant associations (weak, moderate, strong) were found between demographic characteristics and different statements of knowledge, attitude & perception in each domain. Significant differences were found in test variable scores among different grouping variables. Significant, positive correlation was found between knowledge-attitude, knowledge-perception and attitude- perception in each domain.

In summary, the study provides insight into the KAP of respondents regarding Halal pharmaceuticals. Additional research should be performed to explain the

relationship and connection between each domain of the KAP and the responses given by study subjects.

CHAPTER ONE

GENERAL INTRODUCTION

1.1 Background to research

In the attainment of human progression, medicines constitute a vital part as their rational 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 prepared by a well balanced combination of active ingredients, and excipients. These ingredients are obtained from a diversity of sources — animals, plants, minerals or synthetic (Hoesli and Smith, 2011; Geraldine Mynors et al., 2004)

Various cultures and civilizations have been using numerous botanical ingredients for more than two millenniums, such as black seed in Islamic tradition (Al-Akili, 1994) and asphoetida in India (Raghavan Uhl, 2000). In pharmaceutical production it is the animal-derived ingredients that have to be circumvented and evaded with caution. Because of the reason that animal source may be porcine, dead animal or blood. All these are forbidden /Haram for Muslims (Khattak et al., 2011), as mentioned in the translated Quranic verses cited below:-

> "*He hath only 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, 2,173*).
>
> "*Forbidden to you (for food) are: dead meat, blood, the flesh of swine, and that on which hath been invoked a name other than that of Allah" (Al-Quran, 5, 3)*
>
> Bible has also forbidden swine-flesh (Shamsi, 1999).

From the translation of Quranic verses cited above it would imply that, not only consuming Halal food but also consuming Halal medication is important because it

forms a major part of practicing Muslim. Consuming Halal medication is fundamental right of Muslims in terms of using healthcare facilities and services to maintain their health according to their faith and belief. Muslims are obliged to observe the divine laws in every aspect of their life. There is a complete code of dietary laws present in the Holy Quran for the followers of Islam. Some basic principles are described as all foods are permitted except those forbidden clearly in the Holy Quran (Khattak et al., 2011). Much has been written on the subject of Halal and Haram in food, but references to Halal/Haram issue in pharmaceuticals especially as to the origin of compounds, are undocumented, scanty and few (Halal Index, 2011). In fact the subject of Halal/Haram in pharmaceuticals has not been given appropriate attention so far.

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. It is pertinent to mention that other religions of the world like Hinduism, Judaism and Christianity also command certain religious prohibitions on their followers in the consumption of foods and drinks (Geraldine Mynors et al., 2004; Easterbrook and Maddern, 2008; Hoesli and Smith, 2011). Moreover, some religious groups such as the Orthodox Christians, Jews and Seventh Day Adventists have dietary restrictions that prevent them from taking some medications due to various ingredients in them (Hashmi, 2010). Several cases have been reported in which patients from these religious groups even discontinued their medication due to inert medication ingredients such as gelatin and/or stearic acid (Sattar et al., 2004). They may use other terminologies to define these restrictions but the main sentiment is the same. Therefore it would be

essential to look into various items of human consumption, including medicines, and their variants, to determine admissibility according to individual beliefs.

1.2 Theoretical and conceptual framework for the research

Basically, pharmaceutical preparation is a product containing active and inactive pharmaceutical ingredients formulated into the particular dosage form. The active pharmaceutical ingredient can be defined as any chemical substance intended for use in the medical diagnosis, treatment, or prevention of disease (WHO, 2011). While the inactive pharmaceutical ingredients or excipients are substances used in the formulation of a particular dosage form (WHO, 2011). These excipients include diluents, fillers, binders, lubricants, coatings, preservants, stabilizers, colorants and flavourings.

The prophet Muhammad (pbuh) had been reported to have said: as mentioned in the translated version of hadith cited below:-

"*Halal is clear and Haram is clear; in between these two is certain things that is suspected*." (Sahih Bukhari & Sahih Muslim)

Therefore, we are obliged to look and search for *Halal* and not just only concern avoiding the *Haram*. With regard to pharmaceuticals, its *Halal status* is not just negating but it covers all aspects of preparation, processing, packaging, distribution and all related processes. Moreover the product must not be prepared, processed, or manufactured using equipment contaminated by non Halal items as defined in Islamic religious law (Rina et al., 2013). Halal pharmaceutical standards govern the whole Halal pharmaceutical supply chain (MS 2424:2010). According to Tieman (2011), Halal products or services do not only matter during the point of

consumption or purchase but involve every aspect and activities along the supply chain, from farm-to-fork.

Referring to MS1500:2009 Halal Food - Production, Preparation, Handling and Storage General Guidelines (Second Revision), Halal product and services:

-Not prepared, processed or manufactured using tools or equipment that are contaminated or used together with non-Halal or najs.

-During the process of manufacturing, preparation, packaging, storage or distribution, product must be physically separated between Halal and Haram products.

As such, the theoretical and conceptual framework of this research is built from these perspectives as shown in Figure 1.1.

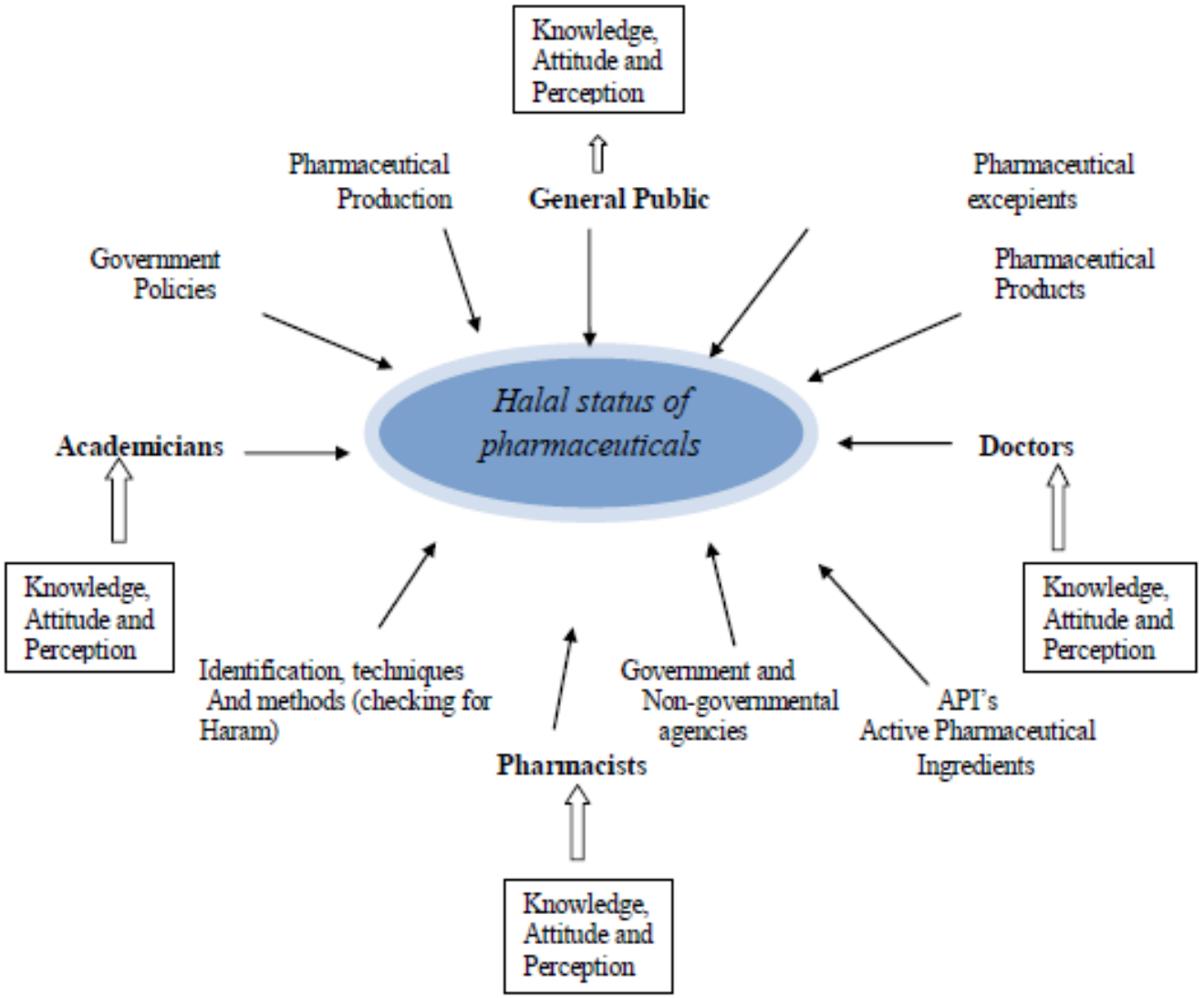

Figure 1.1 Conceptual Framework for the research

1.3 Study questions

1.3.1 General

What is the awareness level of Halal pharmaceuticals among Healthcare professionals, academicians and public?

1.3.2 Specific

1.3.2.1 Do doctors/pharmacists have knowledge about the sources and ingredients (active ingredients and excepients) of the medicines they prescribe /dispense?

1.3.2.2 Do doctors/pharmacists take consent from their patients before prescribing?

1.3.2.3 Do doctors /pharmacists offer their patients a choice in their medicine taking?

1.3.2.4 Do doctors/pharmacists provide synthetic Halal alternatives?

1.3.2.5 Do doctors have understanding of their patient's faith regarding medicines?

1.3.2.6 Do Academicians think compulsory to teach their students about Halal pharmaceuticals?

1.3.2.7 Does public has awareness about the ingredients of medicines they are taking?

1.4 Problem statement:

In the last five to six decades, a sizeable number of, Muslim population has been steadily migrating for various reasons, to the Western and Christian dominated part of the world. The culture in these countries is in sharp contrast to the doctrine of life obligatory for Muslims. As a result of the difficulties faced by these families and with

the fear of losing their coming generations to the Western culture, these families started looking for ways to safeguard fundamentals of their faith. This gave a big start to a Halal pursuant culture which has now gained considerable momentum. In the meanwhile, to help ease the situation and to meet the rising demand, some of the Muslims, established their own businesses. As the demand for Halal food and drinks increased more and more, non-Muslim corporate businesses also jumped into the arena to boost their sales. Now in the Muslim minority world as well as in the multi faith cultures getting Halal food items does not pose much problem.

Despite of the fact that the Halal food culture in all the above mentioned societies is almost reaching the desired level, the attention to the pharmaceutical field has been ignored so far. Whereas, the focus on this important matter is below desired level in the Muslim majority regions, the focus on this issue is almost absent in the Non-Muslim world. The awareness amongst the Muslims is also very scanty as the guidance to, or consciousness of this important issue is inadequate.

To deal with the Halal issue of food is relatively a simple matter whereas pharmaceutical story is totally different. Thousands of active and inactive ingredients are used in the pharmaceutical industry and origin of most of these remains a grey area. Also the knowledge level for determining the wholesomeness of any of the ingredients requires a certain degree of excellence. Without revolutionary motivation, sufficient know how and adequate research and development facilities, it would remain difficult to determine the Halal status and wholesomeness (Free from Najs) of such a large number of components.

The Muslim population all over the globe is using countless number of drugs, nutrients, creams, gels and what not for various ailments without knowing that these are contradictory to their faith and their use amounts to being resentful to the explicit order of Allah SWT. Very little effort has so far been made to create a Halal culture in the field of medicine. The magnitude of work required to be done in this field is so large that only consistent and concerted effort at all levels would be able to remedy this situation. The public is also required to be educated and informed so that the inadvertent folly, in which they are falling repeatedly, should be eradicated from their lives.

1.5 Rationale of the study

Keeping in view the importance of the subject there is a pressing need to undertake numerous research works to provide material for enlightenment of the Muslim public, healthcare professionals and academicians about the dilemma that is facing the Muslims all over the world. Never before has ever been a time when Muslims were more cognizant about the Halal factor in their daily use of intakes. It is the need of the hour to bring into focus the medicinal intakes as well because this factor has been neglected and has very little awareness, if any, is existing amongst the different players of this field. No such study has ever been done to explore the knowledge, attitude and perception of such a large and important segment of our society. The current study hopefully will open new venue in the field of research and act as a source of inspiration for the future researchers.

During the process of this study a few hundred doctors, pharmacists and academicians have been approached to obtain their opinion and a fair amount of imploratory work

have been done to ascertain the knowledge, attitude and perception of these important pillars of our society. In addition the thought process in a few hundred individuals of various cross sections of the public would also have been initiated to think on this significant matter.

By conducting this study it is felt that the individuals who are approached for exploring them on this subject, as a result, would be more mindful while handling the matters regarding pharmaceuticals. Doctors and pharmacists will be more focused when dealing with a Muslim patient, academicians will look into the possibilities of including this subject in the curriculum and research studies. This will also work to stir the thought process of consumers who would become more conscious of the Halal status of medicines they use. All these factors would also set in motion a process which would gather speed. In due time, this would influence the government to form effective legislations which would accelerate the creation of a Halal culture in Malaysia in particular and the world in general.

1.6 Research objective

The main objective of the study was to evaluate and explore knowledge, attitude and perception among doctors, pharmacists, academicians and public.

1.7 Significance of the study

This research will provide a new measure to gauge the level of mental inclination, existing and developing, amongst various players and users of the field of medicine. It will also have far reaching effects on global-Islamic pharmaceutical industry that would

be able to use this research as a guideline to plan their future course of production and marketing. Malaysia's current campaign to incorporate Halal considerations towards achieving an integrated Halal lifestyle, which is incomplete without including Halal pharmaceuticals, would also benefit from this study. Following fields might stand to gain positively due to effects of this study:

1.7.1 Malaysian economic growth

The National Economic Advisory Council (NEAC) is making concerted effort for detailed implementation for each of the Strategic Reform Initiatives (SRIs) one of which is "Enhancing the sources of growth". Taking a step in the direction of Halal pharmaceuticals production and export, for which there is an ever increasing demand in the Muslim population of the world, would positively enhance the national economic growth. Exports will continue to grow for local companies resulting in increased company revenues. Malaysia will be able to gain advantage from its capability and infrastructure of producing Halal-certified products to fulfill the needs of local and foreign Islamic communities. In this scenario the Malaysian Standards for Halal Pharmaceuticals would also help to propel economic activities and transform the Malaysian economy.

1.7.2 Healthcare professionals

Study will explore the knowledge of Healthcare professionals about Halal pharmaceuticals and their alternatives. It is felt that by communicating the subject of medicine ingredients consideration while prescribing or dispensing, the healthcare professionals' attention would effectively be drawn to the right of the patient who may

want to be careful in the choice of permissible or non-permissible issue. It is also expected that attention of the industry and healthcare professionals will be drawn to the Halal issue in medications. This trend will catch momentum with this study.

1.7.3 The academicians and researchers

Although research work has been done on Halal foods and drinks but very scanty study is available on Halal pharmaceuticals. This field offers vast exploratory potential for academicians and researchers. The completion of this study will escort in and pioneer a new era in the field of research. This would benefit the academic institutions in Malaysia as well as other countries of the world.

1.7.4 Consumers

When the government policy will be influenced to make legislation for Halal pharmaceutical production there will be an undoubted blessing for the consumers, especially the Muslims, who stand to benefit. Muslim consumers who are mindful of the advantages of Halal medicines ethically will have the facility of making a wise decision while selecting medicines for their personal use. Moreover, the study will identify the barriers affecting public's attitude towards Halal pharmaceuticals.

1.7.5 The producers and marketers

In the final place it is the responsibility of the pharmaceutical industry to manufacture and provide Halal medicines for the consumer market. When other players get effectively motivated, there is a good possibility that the industry would get encouraged to creatively think for conceiving new ideas in this direction. As it is deduced that the demand for Halal medication is expanding at a remarkable pace, this new initiative will

hugely add to the production, sales and profits of various segments of the field. This study will provide and help them to device production policies with the changing scenario.

1.7.6 The legislators

The legislators have to provide and formulate guiding laws for the needs of society. There is a dire need for legislation to be made for Halal pharmaceuticals. Present Malaysian National Drug Policy has no component regarding Halal pharmaceuticals, though efficacy, safety and quality of medicine is ensured. It is a proven fact, and is beyond doubt that only Halal products are of good quality and safe for health, so this study will institute the idea of Halal pharmaceuticals among legislators which will result in the requisite formation of rules and regulations.

1.8 Organization of the thesis

This section will deal with how the thesis is organized. This study consists of eight chapters covering different areas of the study. The introduction in chapter one, contains the introduction, study questions, rationale, objectives, problem statement and the significance of the study. Chapter two provides a literature review of the most recent and relevant studies in this field. It gives wider knowledge of the Halal pharmaceuticals and Halal agencies and a clear picture of the issues involved in conducting the study. Chapter three of the thesis gives a comprehensive account of research methodology adopted in this study and the statistical analysis techniques employed in the analysis of the data. Chapter four presents a descriptive analysis of the survey data for the level of knowledge, attitude and perception of doctors along with objectives, results, discussion and summarized view of the findings in the form of conclusion.

Chapter five presents a descriptive analysis of the survey data for the level of knowledge, attitude and perception of pharmacists along with objectives, results, discussion and conclusion. Chapter six presents a descriptive analysis of the survey data for the level of knowledge, attitude and perception of academicians along with objectives, results, discussion and conclusion. Whereas chapter seven presents a descriptive analysis of the survey data for the level of knowledge, attitude and perception of public along with objectives, data collection procedure, results, discussion and conclusion. Chapter eight summarizes major findings, contribution of the study, strengths & limitations of the study and suggestions for the future direction of research in this area.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The intention of this chapter is the appraisal of previous studies as well as realistic and practical findings of studies that are relevant to the objectives of this research, to get some insight on the Halal issue and KAP methodology. This chapter examines the various facets that relate to Halal foods and pharmaceuticals as well as the efforts made by the authorities to make and implement policies about Halal pharmaceuticals. The impediments and obstacles in implementing these policies and the global efforts on Halal issue will also be analyzed.

2.2 Islamic perspective

For Muslims it is necessary to ingest the permissible (Halal) and wholesome (Tayyab) products (including medicines) as it is one great way to avoid displeasure of Allah Almighty. In addition it gives sustenance to the body as well as to the soul. However, the dearth of realistic and reliable information and statistics on the subject is a major hurdle. Access to dependable and consistent data is considered a necessity because the ever improving trend in the awareness level of the Muslims regarding Halal status of foods and pharmaceuticals is exerting a pressure on all performers of this field (Nasaruddin et al., 2012). Consuming Halal and Tayyab products is an order from Allah and it is an essential part of the Islamic faith. There is no doubt for this obligation as Allah has emphasized the consumption of Halal materials and commands all Muslims and all of the mankind to eat of the Halal and Tayyab things. Al Qur'an says: as mentioned in the translated Quranic verses cited below:-

"*O mankind eat of that which is lawful and wholesome and follow not the footsteps of the devil. Lo he is an avowed enemy of you*" *(Al-Quran, 2, 168).*

Prohibition of intoxicants including alcohol is cited in the Quranic verses given below:

"They ask you concerning wine and gambling. Say: "In them there is great sin, and some profit, for men, but sin is greater than the profit "(Al-Quran, 2: 219).

"O you who believe! Intoxicants and gambling, (dedication of) stones, and (divination by) arrows, are an abomination of Satan's handiwork. Avoid such (abomination) that you may prosper" (Al-Quran 5: 90).

"Satan's plan is to sow enmity and hatred among you with intoxicants and gambling, and to hinder you from the remembrance of Allah and from prayer. Will you not then give up"(Al-Quran 5: 91).

Prophet Mohammed (pbuh) on the subject of lawful and prohibited has explained very clear path to follow. He says: as mentioned in the translated version of hadith cited below:-

"*That which is lawful is plain and that which is unlawful is plain and between the two of them are doubtful matters about which many people do not know. Thus he who avoids doubtful matters clears himself in regard to his religion and his honour, but he who falls into doubtful matters falls into that which is unlawful."* (Narrated by Abu Abdullah An Numan Bin Bashar-R.A. Reported in Bukhari and Muslim.)

"*Allah the Almighty has laid down religious duties, so do not neglect them; He has set boundaries, so do not cross them; He has prohibited some things, so do not violate*

them; about some things. He was silent out of compassion for you, not due to forgetfulness-, so do not seek after them." (Narrated by Abu Tbalaba Al Khushani Jurtum Bin Nashir-R.A.reported in Ad-Daraqutni.)

These fundamental principles apply to all facets of a Muslim including ingested items which enter his metabolism and become a part of his body and soul. It includes medicines as well. Halal practices apply to all aspects and activities of a Muslim, but it is more than just a religious obligation (Syazwan et al., 2013).

2.3 Significance of Halal for Muslims and its importance for non Muslims

As some critics in the West misunderstand, Halal is not merely restricted to Muslims as a religious taboo but is actually becoming a dominant factor in the food commerce. It is now recognized as a global symbol for quality assurance and gives confidence to the buyers. Although Halal food products are showing a rising tendency and references are available on its various aspects but academic research and detailed studies, on Halal pharmaceuticals is exceedingly scarce (Lada et al., 2009).

Halal and Tayyab items for intake must be viewed as universally healthy because it is suited for everyone‘s betterment and not only for Muslims. Halal food is healthy because the food is clean, sustaining and wholesome. It does not have dangerous and toxic ingredients (Quadri et al., 2009). Conversely, eating Haram food such as pig meat is not only forbidden by the religion but it is also damaging for human health (Kazim, 1981) harmful germs take abode in the pork (Shamsi, 1999).

Pork also serves as a carrier of several diseases to humans (Hussaini and Sakr, 1983). It is on this ground that this meat is not considered good for human consumption (Shamsi, 1999).

Another reason is the incompatibility of fatty acids of swine flesh, with the human fat and the biochemical systems (Sakr, 1993; Awan, 1988; Hussaini and Sakr, 1983).This fat does not get hydrolyzed and is not converted to human fat. It, therefore, is retained in humans as pig fat residing in the adipose tissues (Shahid, 1986). Pork meat contains high levels of cholesterol and lipids (Omojola et al., 2009) and this information has been established scientifically. This can cause considerable damage to human health (Nasaruddin et al., 2012).

Meat of dead animals is also Haram and forbidden. It is the meat of the animal which dies before slaughtering and its blood is withheld inside the meat. Dead animals are not suitable for human health because degeneration process results in the composition and building up of some noxious and damaging chemicals (Awan, 1988). All infective organisms including virus germinate and thrive in the blood media. Therefore consuming such meat will be injurious to human health (Shahid, 1986). Blood in any shape is also Haram for consumption because when it flows out from the body it bears harmful bacteria, toxins and products of metabolism (Awan, 1988; Hussaini & Sukr, 1983). Consequently it is detrimental to health.

Alcohol is another pharmaceutical ingredient that constantly causes mental discomfort to humans. Consumption of alcohol is prohibited clearly in the Holy Quran. The Arabic term for alcohol is ‘khamr’ and it means that which is fermented, including anything

which affects the consciousness of the humans. This may include all wines, whiskey, beer, brandy, drugs, narcotics and other intoxicating liquors and powders. Some Muslim groups are of the opinion that if alcohol content in a pharmaceutical product is less than 0.1% then ethically there is no harm in its consumption (Khattak et al., 2011). It may be pertinent to mention here that, at present, for Halal certification in Malaysia, the permissible amount of alcohol is 0.01 % in the final product (Maizirwan and Salleh, 2009).

Habit forming drugs and drinks such as alcohol, are damaging as they affect the health in many adverse ways. They cause nervous disorders which affect the mind and can lead to evil behavior resulting in social embarrassment. Consistent use may lead to certain complicated ailments which may cause loss of life and ruination to one's family. Deterioration in efficiency of such people has resulted in many cases losing their jobs (Al-Qaradawi, 1984; Awan, 1988). Alcoholism affects hormonal system which results in various syndromes in the human body as well as serious behavioral disorders (Shahid, 1986; Sattar et al., 2007; Razzaq and Sarriff, 2013). In addition to severe hormonal and anatomical damages alcohol is a central nervous system depressant. Recession of inhibitory passageways obliterates the shame and removes self-control. Therefore, what a normal person will be embarrassed of doing in public will not prevent him under the influence of alcohol. Alcohol has been the root cause of crimes like family violence, sexual viciousness, rape, physical attack, and child exploitation. Statistically one third of all road accidents are attributable to alcohol (Shahid, 1986).

2.4 Common preparations having Halal issues, used in/as pharmaceutical products

Following are some examples of the materials which are used in/ as pharmaceutical products. These have animal origin and may be bovine or porcine;

Gelatin

Gelatin is obtained from collagen, a protein found in the bones and skin of certain animals. Pigs and cows are the most common sources of collagen. (Easterbrook, 2008; Maizirwan and Salleh, 2009).

Collagen is extracted by pre-treating these animal tissues with either alkali or acid, then boiling it (Sattar et al., 2002).Type A gelatin is exclusively made from pork skins, and is hence Haram for Muslims to use (Riaz and Chaudry, 2004).

Gelatin is used predominantly in the manufacturing of capsules (capsule shells). Other pharmaceutical applications of gelatin include microencapsulation, tabletting, suppositories and medicinal emulsions (Ismail, 2011; Bernama, 2011). Due to its excellent compatibility with human tissues, gelatin is also used in sponge form for treating wounds. Its usage also includes a substitute of blood plasma. Similarly gelatin is used as one of the stabilizers added to vaccines (Offit and Jew, 2003). The gelatin content information is usually made available from medication reference texts and pharmaceutical manufacturers (Pinals and Sattar, 2002).

A Physician's Desk Reference has listed 336 medications which contain gelatin as an inactive ingredient (Montvale, 2002).

As a general practice a product label does not indicate the source of the gelatin (Chaudry, 1994).This creates doubt and, unless these items are certified Halal, the Halal minded consumer tends to avoid products containing gelatin. With the ever increasing trade from the Western nations to the Muslim countries, there has been rising alertness of the dilemma posed by gelatin presence in certain eatables. Several Muslim countries including Malaysia have made it mandatory that, imported as well as domestic food products, be made with Halal gelatin. As the demand is rising, several gelatin manufacturers in Europe, India, and Pakistan now produce Halal gelatin (Riaz and Chaudry, 2004).

Stearic Acid

Major source of stearic acid is the fat of cows and pigs (Ismail, 2011), and its salt form is commonly used in various medication processes. For example the binding and lubricating properties of magnesium stearate make its usage a common practice as it helps in ejection of tablets from the tablet press (Hamad et al., 2008; Gupta et al., 2009). Stearic acid is used as a passive base chemical in the manufacturing of several pharmaceutical preparations. Physician's Desk Reference lists 756 medications which have stearic acid in some form as an inert base chemical (Montvale, 2002).

Vaccines

In the preparation of vaccines, animal sera are frequently added to culture media to provide nutrients for microbial growth. Bovine serum is primarily used, although serum from pigs, horses, rabbits or humans may also be utilized (Karger, 1999). In Diphtheria/

tetanus, Diphtheria Toxoid, Tetanus and Plaque vaccine, sera of cow, pig or horse is used as biological media for growth (Eldred et al., 2006).

Pancreatin

It chiefly consists of lypase, amylase and proteases and is usually obtained from the pancreas of pigs or cows (Ismail, 2011). Pancreatin supplements are used for patients who are unable to digest properly because of inadequacy of natural pancreatic excretions, or when pancreas has been removed (WebMed, 2005).

Heparin

It is an anticoagulant and one of the most commonly prescribed drugs that is derived from pigs (Geraldine Mynors et al., 2004; Ismail, 2011). Since the late 1930s, heparins are prepared by chemical removal from porcine intestine and bovine lung. From a pharmaceutical perspective, steady activity and purity of the drug is a vital part of the manufacturing process and it is simpler to accomplish with synthetic material (Hirsh et al., 1988).

Insulin

Insulin was initially obtained from bovine and porcine pancreata (Ismail, 2011).This practice continued for many years following the discovery of insulin. Today most individuals are treated with human insulin produced by genetic engineering or insulin analogues (93% prescriptions). Animal insulin is used in about 7% cases (Owens et al., 2001).

Lard

It is produced by melting the fat of pigs or hogs (Kazim, 1981). This oil is low in cost and is commonly available for usage in pharmaceuticals. Lard is mainly fat, which, in the chemical terminology is known as triglyceride. It is used in various ointments as a vehicle (Ismail, 2011) , as non aqueous medium in I/M injections and for suspending water-soluble substances when it is essential to decrease the rate of absorption and hence lengthen the duration of action of the drug. It is also used as a diluting element for oil-soluble substances. Customarily it is used in cooking too (Ismail, 2011). A few years back this fat was widely used in various cuisines but many restaurants in the Western nations have reduced the use of lard in their kitchens because of the religious and health-related dietary restrictions of many of their customers.

Oxytocin

It is obtained from pig posterior pituitary gland, but bovine and synthetic preparations are also available. It is used to induce labour, manage post partum haemorrhage and to promote lactation (Ismail, 2011).

Alcohol

It is one of the largely used liquids that serves as a 'stabilizer' for runny forms of medicine and also as a solvent in extraction process for pharmaceutical products (Maizirwan and Salleh, 2009). However, the major use of alcohol today remains for alcoholic drinks. In the pharmaceutical field it is utilized as a solvent in the cosmetics, and medicines (Riaz and Chaudry, 2004).