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## Development and Reliability Assessment of Trilogy Scale with Practicability, Competence & Importance of Patient Oriented Services

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### ABSTRACT

**Objective:** In order to explore pharmacists' perceived practicability, importance, and their competence towards achieving and developing the pharmaceutical care practice, we aimed to develop a scale to predict the trilogy of professional skills.

**Methodology:** The process of instrument construction and development was carried out in four stages. Validity Phase: The opinions of the lecturers of the School of Pharmaceutical Sciences (USM). Phase criteria of item done by mean and standard deviations with pharmacists at national poison center and postgraduate students of Malaysia. Reliability Phase: The Reliability Test with pharmacists at National Poisoning Center and postgraduate students of Malaysia. Finally Pilot Phase: The pilot test with the pharmacists at Pulau Pinang, Malaysia. Data analysis was done by using statistical package for social sciences (SPSS 13®) for windows, both descriptive and inferential statistics used to present findings of this study.

**Results:** For section exploring the pharmacists' perception on their understanding and comprehension of pharmaceutical care, the items means were in range of 1.88 to 3.88 which indicated a midrange sense of disagreement / agreement with all statements. Items with a mean of greater than 4.00 or less than 2.00 indicated and standard deviation less than 1.00 indicated inadequate variability. Items with a mean of greater than 4.00 or less than 2.00 indicated skewness, and standard deviation of less than 1.00 indicated inadequate variability. For the importance scale, the items means were ranged from 2.84 to 3.78 which showed a midrange sense of not important / important in all statements. The data from the 32 pharmacists was used for the internal consistency. The internal consistency coefficient of importance scale was 0.868 and there were 15 items in scale. The modified questionnaire was mailed to 53 community pharmacists and 13 sets were sent to the hospital pharmacists at the General Hospital (GH) of Pulau Pinang.

**Conclusion:** The findings of study concluded the good internal consistency and reliable tool to assess the relative professional skills of pharmacists involved in either community or hospital base practice.

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**Keywords:** *Pharmaceutical care, questionnaire construction, perception, pharmacist, pharmacy services, health safety*

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## Introduction

Since the landmark description of the concept of pharmaceutical care by Hepler and Strand (1990)<sup>[1]</sup>, there have been numerous definitions of the concept<sup>[2]</sup> and suggestions and also evaluations of models for implementing pharmaceutical care practice. These include the Therapeutic Outcome Monitoring (TOM) model of Grainger-Rousseau *et al.*, (1997)<sup>[3]</sup>; and the Pharmacists Implementation of Pharmaceutical Care (PIPC) model of Odedina *et al.*, (1997)<sup>[4]</sup> among others. Pharmaceutical care involves identifying, resolving, and preventing drug-related problems<sup>[5,6]</sup>.

The experience of pharmacists seeking to incorporate this philosophy into everyday practice have led Strand and her colleagues in (1997)<sup>[7]</sup> to redefined pharmaceutical care, it is considered more pragmatic definition, as “a practice for which the practitioner takes responsibility for patient drug therapy needs and is held accountable for this commitment. This later definition has three components which comprise of: (1) a philosophy of practice, (2) a consistent and systematic patient care process, and (3) a practice management system. Most major pharmacy organizations in developed countries (e.g., the American Pharmaceutical Association [APhA] and the American Society of Health-System Pharmacists [ASHP]) have since adopted the pharmaceutical care philosophy.

World Health Organization (WHO) (1998)<sup>[8]</sup> defined pharmaceutical care as a patient care system that continually observes the short-term results of the therapy in progress and helps to make corrections to improve management outcomes. The term requires multidisciplinary approach and the term would normally consist of a patient, a pharmacist, and a general practitioner.

## Understanding, knowledge, and awareness of pharmaceutical care practice

Yet, very little is known about pharmacists' knowledge on pharmaceutical care in this country. One study in Malaysia involved 282 pharmacists practicing at the outpatient pharmacy of 13 state hospitals, 67 district hospitals, and 7-health clinic in West Malaysia revealed that, knowledge about pharmaceutical care in general is unsatisfactory. Although pharmaceutical care is regarded as, highly important, only 5% of the pharmacists were considered to have adequate knowledge on pharmaceutical care<sup>[9]</sup>.

## Competence and skills needed for pharmaceutical care

In essence pharmaceutical care is that component of pharmacy practice that can be performed by no one other than a competent pharmacist. Competence comprises adequate knowledge and skill to perform a particular function, and an attitude of commitment to the patient's valued interests<sup>[10]</sup>. In that context, the future direction of the pharmacist in hospital and community will continue to evolve towards patient-directed services that apply scientific knowledge and clinical skills to the prevention and resolution of drug-related problems.

Pharmaceutical care program called a practice enhancement program (PEP) was designed by Farris *et al.*, (1999)<sup>[11]</sup> as part of the pharmaceutical care research and education project to help pharmacists acquire the necessary competencies, including skills, knowledge, and attitude to provide a comprehensive pharmaceutical care to elderly ambulatory patients. The tools and processes

used in the project increased community pharmacists' competency for providing pharmaceutical care.

Several studies have been conducted to evaluate the effectiveness of PC with regard to clinical, humanistic, and economic outcomes in patients with asthma<sup>[12-16]</sup>. Pharmaceutical care sets out to maximize the benefits and minimize the risk of medicines and improve health by working in collaboration with diabetes patient and other health care providers<sup>[17-25]</sup>. Numerous studies were conducted to evaluate the pharmacists capacity to positively influence the results of antihypertensive drug therapy through pharmaceutical care<sup>[26-36]</sup>. A study by Okamoto and Nakahiro, (2001)<sup>[37]</sup> measured clinical, economic, and humanistic outcomes associated with a pharmacists-managed hypertension clinic compared with physician-managed clinics. The results found that pharmacists can be a cost-effective alternative to physicians in management of patients, and they can improve clinical outcomes and patient satisfaction. Pharmaceutical care positively affects lipid values, quality of life, and patient satisfaction through provision of comprehensive pharmaceutical care<sup>[38-41]</sup>.

In Malaysian context, the competent pharmacist's taking a more active role in patient care is a well-recognized in the local literature. Study analyzed clinical pharmacists' interventions in the ICU of the Penang General Hospital (Penang, Malaysia) and assessed the pharmaco-economic impact of these interventions. In this study Pharmacists recommendations and interventions in the ICU of a Malaysian hospital resulted in significant cost savings in terms of drug expenses<sup>[42]</sup>. Other study conducted in Penang General Hospital to evaluate the medication compliance and the impact of pharmacist intervention in patients with congestive heart failure. More than 50% of the pharmacists' interventions and

recommendations were accepted in this study<sup>[43]</sup>. Several studies dealt with the pharmacists' ability to influence outcomes of diabetes mellitus therapy<sup>[44-46]</sup>. Other studies were conducted to evaluate the pharmacists' capacity to positively influence the results to quit smoking in Malaysia<sup>[47-50]</sup>

## **Perception, behavior, and attitude about the pharmaceutical care**

A positive pharmacist perception, behavior, and attitude are pivotal towards the implementation of pharmaceutical care. A key aspect towards improving or preventing the occurrence of drug related problems is changing the attitude, behavior, and perception of pharmacists as health care professionals to know their physical and mental limitation, and to behave in a professional and courteous manner whilst at work.

The concern about human behaviors, which spurred the formulation of the Transtheoretical Model (TTM) of Change to explain, predict, and change multiple human behaviors in the 1970s and 1980s, (Prochaska and DiClemente, 1984)<sup>[51]</sup>, incited Berger and Grimley, in the 1990s<sup>[52]</sup>, to apply the TTM to measure pharmacists' readiness for rendering pharmaceutical care. It also identified and measured factors that facilitate rendering pharmaceutical care and factors that are barriers, as well as the strength of these factors for each stage of readiness. The Transtheoretical Model, which suggests that five stages of voluntary behavior change exist from precontemplation, contemplation, preparation, action, and maintenance. Their findings support the theory behind the TTM; that is, with any behavior change, individuals

will fall into several stages of readiness for change, and the vast majority will not be ready to take action within the next six months. Also consistent with the theory, the cons of engaging in a behavior tended to be more salient for individuals in the pre-contemplation/contemplation stages than for those in the action/maintenance stages<sup>[52]</sup>

An attitude can be defined as a learned disposition to respond in a particular manner to a given object<sup>[53]</sup>. The important influence of attitudes on the practice behavior of pharmacists has been noted and discussed in the literature<sup>[54-59]</sup>.

These studies suggest that a pharmacist's choice to perform at a particular level of drug therapy decision-making (DTDM) may be influenced by her or his attitude towards the role of pharmacy in the health care process towards the perceived appropriateness of specific action, towards her or his ability to effectively perform in a particular role, and towards a number of other issues.

Several approaches to examine pharmacists' intentions and behaviors in implementing pharmaceutical care have been pursued. A Pharmacists' Implementation of Pharmaceutical Care (PIPC) model was developed by Odedina *et al.*, (1996)<sup>[60]</sup> from 617 community pharmacists in Florida (USA). These PIPC model included factors (attitude, perceived behavioral control, social norm, intention, psychological appraisal processes and past behavior recency). The PIPC model incorporates these variables or factors which proposed by Theory of Reasoned Action (Fishbein and Ajzen, 1975)<sup>[61]</sup>, Planned Behavior (Ajzen, 1985)<sup>[62]</sup>, Theory of Trying (Bagozzi and Warshaw, 1990)<sup>[63]</sup>, and Theory of Goal Directed Behavior (Bagozzi *et al.*, 1992)<sup>[64]</sup>. Although community pharmacists report low provision of pharmaceutical care at their pharmacies, they have high behavioral intention to provide pharmaceutical care.

Study results suggest that the discrepancy between behavioral intention and actual behavior may be due to (i) low perceived social norm by physician (ii) low perceived behavioral control (iii) low self-efficacies with respect to the means involved in the provision of pharmaceutical care and (iv) low effect towards the means involved in the provision of PC. The PIPC model could be used to design successful intervention procedures for implementation of PC.

An assessment of Canadian community pharmacists' attitude and behavior towards pharmaceutical care found that they have moderate to high intentions practice and conceptually see its benefits but believe that there was currently lack of appropriate framework in place for the adoption of pharmaceutical care.<sup>[11]</sup>

## Practicality of application the pharmaceutical care

Pharmaceutical care has universal appeal because drug-related morbidity and mortality knows no boundaries. The consistent and systemic process of providing pharmaceutical care holds true without regard to the language spoken. Pharmacists in at least 24 countries are prepared to deliver pharmaceutical care<sup>[65]</sup>.

The concept of pharmaceutical care was converted into the practice of pharmaceutical care in an action-oriented research project called Minnesota Pharmaceutical Care Project<sup>[66]</sup>. A tremendous Minnesota Pharmaceutical Care Project was a 3-year, practice-based initiative conducted from June 1992 through November 1995 by Cipolle, Strand, and Morley<sup>[67]</sup>. It included 54 pharmacists from 20 community pharmacy practice sites through the state of Minnesota. The intention of the project was to explore the

relationships between the theory and practice of pharmaceutical care. The word “practice” is important in the Minnesota model; it means pharmacists having a practice just like a doctor, a dentist, or an optician. The demonstration project was divided into four major phases: (1) the pre-study period involved selection of a representative sample site. (2) The pilot-study year to determine if a new practice of pharmaceutical care could be developed. (3) The implementation or development phase was dedicated to disseminating the practice developed in pilot-study phase. (4) The evaluation phase was developed to the evaluation of the care pharmacists provided to patients through the project. The participants have a prescribed structure (training, equipment, consultation area and reimbursement system which rewards them for identifying, preventing or responding to drug related problems), adhere to processes (planning, patient monitoring, interview, recording) to achieve patient outcomes. In this project 45,000 pharmaceutical care encounters have been documented for over 15,000 patients and over 19,000 drug therapy problems identified, prevented and resolved<sup>[68]</sup>. Part of the result shows that, the most frequent indications for drug therapy in patients receiving pharmaceutical care services were sinusitis, bronchitis, otitis media, hypertension, and pain. It is interesting that the most frequent problems were that patients needed additional drug therapy (23%) and adverse drug reactions (21%). In common with Minnesota model, it focuses on the burden of medication-related problems and aims to ensure that medicines are used appropriately, safely, effectively and conveniently.

Another study has provided evidence to support the further development of Pharmaceutical care concept in New Zealand. In 1994 the Pharmaceutical Society of New Zealand (PSNZ) adopted quality standards for

the practice of comprehensive pharmaceutical care (CPC), after the landmark paper published by Hepler and Strand<sup>[1]</sup>. 28% of community pharmacists and 16% of all the pharmacists in New Zealand working in conjunction with the (PSNZ) expressed a keen interest in pharmaceutical care application<sup>[65]</sup>. The number of pharmacists providing pharmaceutical care has been cited as a reason that the government in that country encouraged funding the process<sup>[69]</sup>. This funding was achieved by separating funding from a previously profitable dispensing remuneration into a fund for cognitive services.

There is universal interest in pharmaceutical care (PC) practice. However, its uptake as daily practice by different pharmacy settings has been hindered by a number of barriers to implementation<sup>[70,52,60]</sup>. Several pharmaceutical literatures tried to categorize the barriers to provide pharmaceutical care as: system-related, resource-related, educational, legal, professional and administrative barriers, financial, information-related, communication-related, structural, leadership-related, pharmacist-related, pharmacy management or pharmacy department-related and demand-related barriers<sup>[71-73]</sup> and there are numerous subcategories of these barriers categories.

A plethora of barriers to providing clinical pharmacy have been well-known including the gap in pharmacy training, information restrictions, divergences of interprofessional, economic structure, and uneven patient demand<sup>[74,58]</sup>. These barriers are also present when considering the implementation of pharmaceutical care<sup>[75,76,77,78]</sup>. Specifically, attitudinal factors may represent key obstacles in realizing pharmacists’ full contribution to society<sup>[79]</sup>.

Numerous studies evaluating factors that influence pharmacists’ provision of

pharmaceutical care generally cite or place greater emphasis on individual factors, such as attitude towards trying to provide pharmaceutical care due to lack of competence, confidence (self-efficacy), clinical skills, knowledge related to disease state, all are important factors which determine pharmacists provision of pharmaceutical care<sup>[80-84]</sup>. In-depth one study conducted by Odedina *et al.*, (1996)<sup>[60]</sup> explained that interview of pharmacists who did not provide pharmaceutical care revealed that they need more skill-based training rather than knowledge based continuing education program.

In Malaysia scenario, there is one study conducted in out-patient clinic by Hassan, (1990a)<sup>[85]</sup>. It found that pharmacists frequently mentioned training, communication skills, and lack of acceptance of these activities by colleagues and patients. There was another study investigated the pharmacists in public health institutions (Othman, 2004)<sup>[9]</sup> reinforces the finding of Hassan's study, that identified inadequate knowledge, lack of professional competency, and none/little training in patient counseling provided. The blame on lack of knowledge and incompetence may be two-sided, the pharmacists themselves or the leadership and authorities<sup>[9]</sup>.

Most pharmacists, as mentioned in several pharmaceutical literatures, stated the lack of sufficient time to provide pharmaceutical care<sup>[86-88]</sup>. The pharmacist's preoccupation with dispensing drug products may constitute one barrier to the acceptance of this new philosophy among product-oriented practitioners; drug distribution continues to be their major responsibility. Patient-care activities are second focus, and perform only when there is spare time or extra staff available<sup>[89]</sup>. Other studies reported that the percentage of time spent for patient care activities are preceded by percentage of time

spent for dispensing and management activities<sup>[90-92]</sup>. This situation made it very difficult to establish the continuity of care necessary for a good pharmacist-physician and pharmacist-patient relationship<sup>[93,5,1,84]</sup>

In order to explore pharmacists' perceived practicality, importance, and their competence towards achieving and developing the pharmaceutical care practice, we aimed to develop a scale to predict the trilogy of professional skills.

## Construction and Reliability testing

A questionnaire was designed to explore the pharmacist's understanding, knowledge, and their perceptions on the philosophy of pharmaceutical care and barriers to its provision, and also the current pharmacy practice. The initial questionnaire consists of ninety items. The main points in constructing the thirty items related to "the understanding of pharmaceutical care, as well as perceived important, competent, and practicality on pharmaceutical care process" were generated from the nine-steps pharmaceutical care process proposed by Strand, Cipolle, and Morley (1993)<sup>[5]</sup>, and also was drawn from concepts that inherent and representative of pharmaceutical care<sup>[1,2]</sup>; five items of these thirty items were adapted from one New Zealand study<sup>[94]</sup>. Another twenty-two items related to current pharmacy practice was developed from numerous studies<sup>[74,90]</sup>. The main points used in constructing the seventeen items related to "barriers to implement pharmaceutical care" scale was drawn from several national and international articles<sup>[81,95,82,96,60,97,72,73,89,85]</sup>. The other twenty-one items related to pharmacists characteristics and practice background were not direct adaptation but were made up

through review and designed based on the experiences of the researcher's supervisor, and feedback from our pretests as mentioned earlier.

The questionnaire consists of five sections as follows:

Section one: this section contains questions related to the samples of demographic characteristics and their practice profiles in the hospital and community pharmacy settings, respectively.

Section two: the questionnaire was on pharmacists' understanding and comprehension on pharmaceutical care. In this section, the instrument was designed according to the traditional Likert format in which it was structured as statement of opinion and the response choice ranged from strongly disagree to strongly agree. The scores in each statement ranging from 1 to 5.

Section three: this section was further divided into two parts, part one was constructed to explore the pharmacists perception on the various activities related to their current pharmacy practice. The activities that were considered essential to both the hospital and community pharmacists include the management, dispensing, patient care, and public health activities. For each of the statements constructed in part 1; the respondents had to provide responses to the different scales, which is namely, the practice scale, the importance scale, and the competent scale. The practice scale measures whether the respondents are currently performing the activity or not. Then the respondents need to state the importance of such activity based on 5-point Likert scale. Lastly, the respondents were asked to rate their competency on the 5-point Likert scale same as importance scale. In the second part of section 3 of the instrument, the respondent was asked to state the percentage (%) of time spent in their current

pharmacy practice. The respondent was also asked to state the percentage (%) of time that they would like to spend on the various activities of pharmacy practice.

Section four: this section comprises 15 items. It was constructed to explore the pharmacists' perception towards achieving and developing pharmaceutical care practice. For each of the statement constructed in this section, the respondents had to provide responses to three different scales; namely the importance, competence, and the practicality scales. Firstly, by rating a 5- point Likert scale, the respondents had to determine the importance of the stated activity, followed by stating their level of competence to perform the activity. Lastly, the respondents had to determine the practicality of such activity with respect to the local scenario of the pharmacy practice in Malaysia.

Section five: this section explores the respondent's perception with regards to the barriers on the provision of pharmaceutical care practice. To ease the respondents' lists of perceived barriers to the provision of pharmaceutical care practice was tabulated along with a 5-point Likert scale. The respondents were asked to also specify any other perceived barriers, which were not in the list. Lastly, the respondents were requested to provide suggestion and recommendation to overcome such barriers.

## **Stages of construction and development of questionnaire**

The process of instrument construction and development was carried out in four stages.

1. Validity Phase: The opinions of the lecturers of the School of Pharmaceutical Sciences (USM).



2. Phase of Criteria of item Mean and Standard Deviation with pharmacists at National Poisoning Center and postgraduate students of Malaysia.

3. Reliability Phase: The Reliability Test with pharmacists at National Poisoning Center and postgraduate students of Malaysia

4. Pilot Phase: The Pilot Test with the pharmacists at Pulau Pinang, Malaysia.

### **Validity Phase: The opinions of the lecturers of the School of Pharmaceutical Sciences, (USM)**

Content validity is a subjective measure of how appropriate the items seem to a set of reviewers who have some knowledge of the subject matter<sup>[98,99]</sup> (Wilkin *et al.*, 1992; McDowell and Newell, 1987).

After minor revisions of the English version of the questionnaire by the center of languages, the first draft of survey tool was reviewed by five faculty lecturers to establish content validity of the questionnaire. The purpose was to assess general acceptance of the survey instrument, comprehension, question organization and sequencing. It is also done to detect any flaws in the questionnaire and generate comments and suggestion. The researcher also hopes to seek their general opinions on the meaningfulness of the issue to the pharmacists as respondents.

All the five reviewers responded and returned the questionnaire with some reviewers giving positive comments through the direct discussion. The most common comments from two of the five lectures were on length of the questionnaire, which were considered as too long.

The questionnaire was then given to the researcher's supervisor for further comments and suggestions. The questionnaire was found to require some minor amendments particularly in section one where more of the variables were re-written as to be more specific such as question number (4), and number (5). In addition, two questions on the barriers to implement pharmaceutical care, which is about "lack of information technology" and "insufficient physical space" were added, and reworded the questionnaire's instructions and formatted to improve its clarity. The researcher then looked out for misunderstandings in terms of wordings, sentence constructions and ambiguity. The final draft of the questionnaire used in this stage is shown in (Appendix A-1).

### **Phase of criteria of item mean and standard deviation with pharmacists at National Poisoning Center and the postgraduate students**

#### ***(a) Pre-test of the first draft of the questionnaire***

The revised questionnaire was administered to thirty-two pharmacists practicing at the National Poisoning Center, University Sains Malaysia, and postgraduate students who were registered pharmacists. The demographic characteristics of participating pharmacists were shown in (Appendix A-2)

#### ***(b) Criteria of item mean and standard deviation***

Item analysis was used to select items to be used for further tests using the criteria of item means with central tendency.

For section exploring the pharmacists' perception on their understanding and comprehension of pharmaceutical care, the items means were in range of 1.88 to 3.88 which indicated a midrange sense of disagreement / agreement with all statements (Appendix A-3).

Items with a mean of greater than 4.00 or less than 2.00 indicated skewness and standard deviation less than 1.00 indicated inadequate variability. There were two items, which were skewed, and these items number (2) and (8) were examined for suitability of wording and appropriateness. (e.g., "pharmaceutical care can be viewed as sophisticated medication counseling service") was reworded to "pharmaceutical care is the same as medication counseling service", and "clinical pharmacy is the same as pharmaceutical care" was reworded as "pharmaceutical care is merely a new name for clinical pharmacy". Five items out of fifteen items were worded as incorrect statement, (i.e., items number 2, 5, 8, 11, and 14) (Appendix A-1).

This section is on the perception of current pharmacy practice; which is the importance scale, and competence scale with 20 items, which was divided into 4 main categories: management activities, dispensing activities, patient care activities, and public health activities as mentioned earlier. All four categories were combined into one index based on the scale to select items to be used for further tests using the criteria of item means with central tendency.

Items with a mean of greater than 4.00 or less than 2.00 indicated skewness, and standard deviation of less than 1.00 indicated inadequate variability. For the importance scale, the items means were ranged from 2.84

to 3.78 which showed a midrange sense of not important / important in all statements. There were no items, which were skewed or lacked of variability. On the other hand, competence scale items means provided ranged of 3.31 to 4.09 which showed a midrange sense of not competent / competent in all statements. There was only one item (mean= 4.09), which was skewed (i.e., consulting with doctors concerning dosage regimen). This item was retained for the reason that the mean only exceeded by 0.09 (Appendix A-4).

In section four, which explore the pharmacists' perception on "toward achieving and developing pharmaceutical care". For the importance scale, the items means were ranged from 2.84 to 3.78 which showed a midrange sense of not important / important in all statements. There were no items, which were skewed or lacked of variability. On the other end, competence scale items means were ranged from 2.56 to 3.97 which showed a midrange sense of not competent / competent in all statements. There were no items, which were skewed or lacked of variability (Appendix A-5).

For section on the "Barriers to implement pharmaceutical care practice", the open-ended question about the pharmacist opinions related to the concept and philosophy of pharmaceutical care was omitted, as the response to it was less than 50%. The inclusion of it reduces the number of respondents for statistical analysis. However the other open-ended question related to the pharmacists' opinion on how to overcome barriers to the provision of PC in the Malaysian pharmacy settings, was added (Appendix A-1).

The items means ranged from 1.88 to 3.88 which showed a midrange sense of disagreement / agreement with the statements in this section. There were no items, which

were skewed or lacked variability (Appendix A-6).

## Reliability phase of the pharmaceutical care instrument

### (a) Internal consistency

Internal consistencies for the instrument and its domains were calculated with Cronbach's  $\alpha$  statistic (Cronbach, 1963; Cronbach, 1951)<sup>[100,101]</sup>, in which the questions in the index were compared to determine if they seem to be measured on the same concept. An index that is internally consistent indicates that the items perform well enough together to be a composite score. Internal consistency of a scale is determined by the correlations of items within a scale of an ( $\alpha$ ) value range between 0 and 1, and a value of 0.7 or more is taken to indicate good internal consistencies<sup>[102,103]</sup>. The data from the 32 pharmacists was used for the internal consistency. The mean score, SD, range, and number of items of the five sections of the questionnaire were tabulated in Appendix A-7. For analysis of internal consistency, the last two items of section five was omitted, as response to these items were less than 50%.

The reliability coefficient of the five sections of the survived instrument was tabulated in Appendix A-8 through Appendix A-15 respectively. The reliability coefficient of section two of the questionnaire instrument was 0.655, as shown in Appendix A-8. It was noted that there were four items (8, 9, 11, and 14) had a very low corrected item-total correlation. However, they were retained because the omission of these items did not increase the "alpha" significantly as shown in the last column. The reliability coefficient of section (III) of the questionnaire instrument (importance scale) was 0.874, as shown in

Appendix A-9. It was noted that there was only one item (19) which had slightly low corrected item-total correlation. However, it was retained because omission of this item did not increase the "alpha" significantly as shown in the last column.

For section (III) "current pharmacy practice", the global scale with internal consistency coefficient of competence scale of 0.933 and there were 20 items in the scale. The public health subscale with three items "answering poison control and drug information calls", "sponsoring and participating in health fairs", and "delivering a public talk related to rational drug use" has slightly lower correlation than others. Even though this item had slightly low correlations with the total scale, it was retained because omission of this item did not increase the 'alpha' significantly as shown in the column of 'coefficient alpha if item is deleted' in (Appendix A-10). For section (III) current pharmacy practice, the internal consistency coefficient of practice scale was 0.946 and there were 20 items in scale. As shown in the columns of 'Corrected Item-total Correlation' in (Appendix A-11); all the instrument items had not low correlations with the total scale

For the items 'towards achieving and developing PC' there were three scales (importance, competence, and practice scale). The internal consistency coefficient of importance scale was 0.868 and there were 15 items in scale. There were only two items with slightly low corrected item-total correlation; item (5) "mandatory of patient's medication history", and "referrals to other health care teams". Although these items had slightly low correlations with the total scale, it was retained because omission of these items did not increase the 'alpha' significantly as shown in the column of 'coefficient alpha if item is deleted' in (Appendix A-12). The internal consistency coefficient of competence scale 'towards achieving and developing PC' was

0.964 and there were 15 items in scale. There were only two items with minor low corrected item-total correlation; item (7) “help patients create a realistic expectation of their drug therapy”, and item (9) “your plan should be based on the patient’s wishes and priorities”. Though these items had minor low correlations with the total scale, it was retained because omission of these items did not increase the ‘alpha’ significantly as shown in the column of ‘coefficient alpha if item is deleted’ in (Appendix A-13).

The internal consistency coefficient of practicality scale ‘towards achieving and developing PC’ was 0.7304 and there were 15 items in scale. There was only one item (12) with low corrected item-total correlation “a follow-up programme to improve patient/customer satisfaction and loyalty”. Though this item had low correlations with the total scale, it was retained because omission of this item did not increase the ‘alpha’ significantly as shown in the column of ‘coefficient alpha if item is deleted’ in (Appendix A-15). The reliability coefficient of barriers to implement pharmaceutical care instrument is 0.866. In general, there was only one item with very low corrected item-total correlation; item (17) “insufficient physical space”. Although this item had very low correlations with the total scale, it was retained because omission of this item did not increase the ‘alpha’ significantly as shown in the before last column ‘coefficient alpha if item is deleted’ in (Appendix A-16). In the final phase, all items were retained except the last open-ended question related to the pharmacist opinions about the concept and philosophy of pharmaceutical care was omitted. This is due to the response to it was less than 50%. If included it would reduce the number of respondents for statistical analysis as mentioned earlier. Revisions and rewording of the questionnaire items were found necessary to give a concise or clear in

meaning. The resulting 92-item index was used in the pilot phase (see Appendix A-1).

## Pilot test of the questionnaire

The modified questionnaire was mailed to 53 community pharmacists and 13 sets were sent to the hospital pharmacists at the General Hospital (GH) of Pulau Pinang. An additional cover letter was added to those sets that were sent to the hospital pharmacists. This was addressed to the chief pharmacist at the General Hospital of Pulau Pinang. The purpose of it was to ease the delivery of the survey materials to the randomly selected other hospital pharmacists. After five days, 11 out of 13 questionnaires were received from the General Hospital of Pulau Pinang and five out of 53 were received from community pharmacists. However, a total of 27 (41%) questionnaires were returned from the respondents after a verbal reminder through telephone.

### (b) Result of the pilot study

The general comments were drowning from this phase were as follows:

- *The questionnaire was moderate in length compared to the time needed to answer it. The format of the questionnaire and its instructions were suitable for self-administration. The mode of delivery of the questionnaire was considered appropriate as all the pharmacists received it. The maximum time they took to complete the questionnaire and return it back was 10 days.*

Based on the above comments, there was no more modification made on the questionnaire. However, to improve its attractiveness; the

color of the questionnaire was changed from white to soothing light blue and green for community and hospital pharmacies, respectively<sup>[104,105]</sup>.

## Conclusion

The findings of our scale concluded the good internal consistency and reliable tool to assess the relative professional skills of pharmacists involved in either community or hospital base practice. This scale is proven to be useful for evaluation of barriers hindering pharmacist to practice pharmaceutical care at practice setting.

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## Appendices

### **Appendix A-1: (The final questionnaire)**



#### **The Practice of Pharmaceutical Care in Malaysia – a Quantitative Approach**

Dear Pharmacist,

It has been documented that medicine related-problems have caused harm and discomfort to patients and have been costly for the public. Different attempts have been made by professionals to avoid medicine-related problems. Pharmaceutical Care (PC) is one professional strategy which deals with the detection and assessment of medicine-related problems in a systematic way. However, since the PC has been practiced in the United States for more than a decade, there has been much debate about how this philosophy translates into practice. Until recently, there is no conclusive evidence about how PC is being practised in Malaysia.

The purpose of this study is to develop an understanding of the perceptions and attitudes among Malaysian pharmacists regarding the concept of pharmaceutical care practice. Your responses will be anonymous and remain strictly confidential. Finally, it would be truly appreciated if you can provide your answers and send the questionnaires in 2 weeks time in the postage-paid return envelope. Your responses will become an important part of our research.

**THANK YOU FOR YOUR TIME AND YOUR THOUGHTS****QUESTIONNAIRE****SECTION 1**

Please indicate your responses either by **ticking the relevant boxes** (  ), or **writing** the required information.

**A. YOUR PERSONAL PARTICULARS**

1. Gender:             Male             Female
2. How old are you?    \_\_\_\_\_ Years old
3. Race:             Malay     Chinese     Indian             Others, please  
Specify \_\_\_\_\_
4. Where were you awarded your Bachelor degree?  
 USM    UKM  
 UM    Other, please specify \_\_\_\_\_
5. When were you awarded your Bachelor degree?  
Please state the year: \_\_\_\_\_
6. Which of the following indicates your highest achievement in the  
Pharmaceutical field?  
 Bpharm             B.Sc (Pharmacy)             MSc  
 Mpharm             PharmD                             PhD  
 Other, please specify: \_\_\_\_\_
7. Which of the following indicates your current practice setting?  
 Hospital ( proceed to Question 8 )

- Community ( Skip to Question 10 )
- Other, please specify \_\_\_\_\_  
(Go to section 2)

**B. YOUR PRACTICE PROFILE**

8. What is your current position in the pharmacy ?

- Chief pharmacist
- Staff pharmacist
- Other, please specify : \_\_\_\_\_

9. Where have you been practising in this hospital? ( tick all that apply )

- Outpatient / Public health pharmacy
- Ward supply
- Satellite pharmacy
- Oncology pharmacy
- Total parenteral nutrition ( TPN ) service
- Therapeutic Drug Monitoring ( TDM ) service
- Drug information service
- Drug counselling service
- Enforcement officer
- Other, please specify \_\_\_\_\_

( Skip to question 15 )

10. What type of pharmacy is yours ?

- Independent ( privately-owned )
- Chain
- Franchise
- Other, please specify \_\_\_\_\_

11. What type of business operation is yours ?

- Retail only
- Retail & wholesale
- Wholesale only
- Other, please specify \_\_\_\_\_

12. What is your current position in the pharmacy ?

- Manager
- Staff pharmacist
- Owner
- Other, please specify : \_\_\_\_\_

13. What is the size of your pharmacy ?

- Large (>800 square feet)
- Medium (400-800 square feet)
- Small ( 200-400 square feet )

**14. Please state the average number of prescriptions that your pharmacy received on a monthly basis.**

No. of prescriptions/month : \_\_\_\_\_

15. How long have you been working in the pharmacy ?

No. of years : \_\_\_\_\_

16. How many hours per day do you operate your pharmacy ?

Please state : \_\_\_\_\_ hours / day

17. How many days per week do you operate your pharmacy ?

Please state : \_\_\_\_\_ days / week

18. Currently, how many pharmacists are serving in your pharmacy ?

No. of pharmacist : \_\_\_\_\_

19. Currently, how many supporting staff members (i.e. pharmacy assistants, technical/clerical staffs ) are serving in your pharmacy ?

No. of support staffs : \_\_\_\_\_

20. How would you describe the geographical location of your pharmacy?

- rural
- urban
- suburban

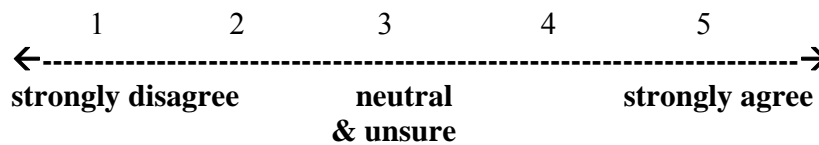
21. Do you have a specific counseling /consultation room at your pharmacy ?

Yes     No     under consideration

## SECTION 2

### Your understanding about the concept of pharmaceutical care.

Given below are statements reflecting the understanding about the concept of pharmaceutical care. Please read each of them carefully and indicate to what extent you agree / disagree with the statements using the following scheme for your responses :



Using the Likert scale above, circle the appropriate number

1. Pharmaceutical care is a philosophy in which the pharmacist accepts responsibility for patient outcomes.

Your response :            1            2            3            4            5

2. \*Pharmaceutical care is the same as medication counseling service.

Your response :            1            2            3            4            5

3. In Pharmaceutical care, the pharmacist guides patient to use drugs safely, effectively, and appropriately.

Your response :            1            2            3            4            5

4. Pharmaceutical care is a process in which pharmacist identifies the patient's drug-related needs and attempts to prevent problems associated with medications.

Your response :            1            2            3            4            5



5. \*Pharmaceutical care can be considered an extension of current pharmacy services.

Your response :      1      2      3      4      5

6. In pharmaceutical care, the pharmacist assesses the patient's actual and potential drug-related problems.

Your response :      1      2      3      4      5

7. In pharmaceutical care, the pharmacist initiates a monitoring plan to check patient progress. ( e.g. follow up phone calls, and home visits)

Your response :      1      2      3      4      5

8. \*Clinical pharmacy is the same as pharmaceutical care.

Your response :      1      2      3      4      5

9. In pharmaceutical care , the pharmacist empowers patient compliance, checks patient understanding, and provides patient counselling.

Your response : 1      2      3      4      5

10. In pharmaceutical care, the pharmacist documents his/her intervention to update the patient's record

Your response :      1      2      3      4      5

11. \*All patients taking medication require pharmaceutical care.

Your response :      1      2      3      4      5

12. The primary aim of pharmaceutical care is to improve the patient's quality of life.

Your response :      1      2      3      4      5

13. The pharmacist prepares a pharmaceutical care plan in collaboration with the patient and other health care professionals.

Your response :      1      2      3      4      5

14. \*A pharmacists require a post- graduate qualification to practise

pharmaceutical care in Malaysia.

Your response :      1      2      3      4      5

15. In pharmaceutical care, the pharmacist establishes therapeutic objectives for each drug prescribed based on the patient's desired outcomes.

Your response :      1      2      3      4      5

### SECTION 3

#### Your Perceptions of Pharmacy Practice

##### Part 1 - Instructions

<b>There are three (3) responses for each statement.</b>					
(i)	Practice scale				
	Circle (1), if you are currently performing the activity and (2) if you are not performing the activity.				
(ii)	Importance scale				
	Using the Likert scale below, circle the number that best reflects your opinion about the importance of the activity in pharmacy practice.				
	1	2	3	4	5
	not important				very important
(iii)	Competency scale				
	Using the Likert scale below, circle the number that best represent your level of competence to perform the activity.				
	1	2	3	4	5
	not competent				very competen

#### 1. Management Activities

- A. General management such as planning and organizing to establish a patient counselling service.

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

- B. Personnel management such as training and supervising pharmacy staff for prescription screening and drug dispensing.

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

- C. Purchasing and controlling inventory, including selecting suppliers.

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

- D. Financial management including budgeting, monitoring cash flow and accounts receivable, developing price strategy and structure.

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

- E. Sales and promotions including developing advertising, making displays and related activities.

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

## 2. Dispensing Activities

- A. Dispensing functions including verifying the legality and validity of the prescriptions, evaluating the patient profile, selecting the appropriate drug, and processing the prescription.

Practice scale :	1 ( Yes )	2 ( No )			
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Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

B. Developing and maintaining patient records and profile.

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

C. Compounding prescriptions extemporaneously ( e.g. captopril syrup )

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

D. Preparing parenteral therapy including IV additives, TPN, and reconstitution of injectable medications.

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

E. Implementing and utilizing a unit-dose distribution system.

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

### 3. Patient Care Activities

A. Counselling patients on how and when to take medications, duration of therapy, precautions and side-effects.

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

B. Counseling patrons/ patients on OTC drugs.

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

- C. Counseling patients on the proper use of self-monitoring and self-diagnostic products ( e.g. blood glucose monitors )

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

- D. Consulting with doctors concerning dosage regimen related to a particular patient's drug therapy.

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

- E. Providing services such as screening for diabetes and/or monitoring blood pressure.

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

- F. Providing pharmacy services including medication and chart review and consulting with the physician.

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

- G. Discussing patient cases related to drug therapy problems with the physician.

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

#### **4. Public Health Activities**

- A. Answering poison control and drug information calls.

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

## B. Sponsoring and/or participating in health fairs ( e.g. smoking cessation program )

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

## C. Delivering a public talk related to rational drug use.

Practice scale :	1 ( Yes )	2 ( No )			
Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5

**Part 2 – Time Spent in Major Categories of Activities**

## A. Please indicate the percentage spent in each of the following major categories of pharmacy activities in a typical day.

Category of Activity	% of Time
i. Management	_____
ii. Dispensing	_____
iii. Patient Care	_____
iv. Public Health	_____
v. Other, please specify	_____
_____	

B. Please indicate the percentage **you would like to spend** in each of the following major categories of pharmacy activities.

Category of Activity	% of Time
i. Management	_____
ii. Dispensing	_____
iii. Patient Care	_____
iv. Public Health	_____
v. Other, please specify	_____
_____	



your patient and his/her health care providers.

Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5
Practicality scale :	1 ( Yes )		2 (No )		9

2. The pharmaceutical care relationship will need to be maintained throughout the care, so direct contact with the patient should be frequent.

Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5
Practicality scale :	1 ( Yes )		2 (No )		9

3. You must see the patient, explained the proposed relationship, discuss the various choices, obtain information, and seek cooperation, trust and permission.

Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5
Practicality scale :	1 ( Yes )		2 (No )		9

4. A comprehensive data base is needed to identify drug-related problems, to resolve the actual problems, and to prevent potential problems.

Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5
Practicality scale :	1 ( Yes )		2 (No )		9

5. Patient's medication history taking is mandatory in order to provide an effective PC service.

Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5
Practicality scale :	1 ( Yes )		2 (No )		9

6. Your concerns relating to the patient's drug therapy issues will be a reminder that you are his or her advocate.



Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5
Practicality scale :	1 ( Yes )		2 (No )		9

7. Your key role is to help patient create a realistic expectation of their drug therapy.

Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5
Practicality scale :	1 ( Yes )		2 (No )		9

8. The desired therapeutic goals should reflect the patient's wishes and you should develop these with him/her and/or with his/her caregivers and document it.

Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5
Practicality scale :	1 ( Yes )		2 (No )		9

9. Your plan should be based on the patient's wishes and priorities which can include what drug the patient should receive, changes in current therapy, and patient education.

Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5
Practicality scale :	1 ( Yes )		2 (No )		9

10. Referrals to other health care teams ( e.g. dietitian, nurses, podiatrists, ophthalmologists, etc. ) should be considered as part of your PC plan.

Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5
Practicality scale :	1 ( Yes )		2 (No )		9

11. You need to assure your patients that you are the focal point of their pharmaceutical care.

Importance Scale :	1	2	3	4	5
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Competence Scale :	1	2	3	4	5
Practicality scale :	1 ( Yes )		2 (No )		9

12. A follow-up programme provides an excellent opportunity for you to improve patient/customer satisfaction and loyalty, and improve your job satisfaction.

Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5
Practicality scale :	1 ( Yes )		2 (No )		9

13. The best way to discuss and determine progress with a patient is through having a dialogue with him/her, and melding his/her desires with your professional assessment of what progress is achievable from his/her drug therapy.

Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5
Practicality scale :	1 ( Yes )		2 (No )		9

14. Documentation is crucial throughout the pharmaceutical care process.

Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5
Practicality scale :	1 ( Yes )		2 (No )		9

15. A collaborative pharmaceutical care practice between the pharmacists and other members of the health care team ( e.g. physicians, general practitioners ) is needed to optimize the quality of life of the patients and community.

Importance Scale :	1	2	3	4	5
Competence Scale :	1	2	3	4	5
Practicality scale :	1 (Yes )		2 (No )		9

## SECTION 5

**Barriers to the provision of pharmaceutical care (PC) services**

Given below are the lists of perceived barriers to the provision of PC services. Please indicate your response which best represents your immediate reaction to the opinion expressed based on the following scale. Circle the appropriate number.

1                      2                      3                      4                      5  
 ←----->  
**strongly disagree                      neutral & unsure                      strongly agree**

I feel that the following are major barriers to the provision of PC in my practice :

(1) lack of time	1	2	3	4	5
(2) lack of patient's demand for PC services	1	2	3	4	5
(3) time consuming to collect and record patient information	1	2	3	4	5
(4) pharmacist's refuse to document patient data	1	2	3	4	5
(5) pharmacist lacks knowledge related to disease states	1	2	3	4	5
(6) pharmacist's clinical skills are not up to the mark	1	2	3	4	5
(7) lack of drug information resources	1	2	3	4	5
(8) pharmacist's unwillingness to provide PC on a consistent basis	1	2	3	4	5
(9) pharmacist lacks confidence	1	2	3	4	5

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(10) poor pharmacist-patient Communication	1	2	3	4	5
(11) poor pharmacist communication with other health care professionals	1	2	3	4	5
(12) lack of a clear definition of PC for which reimbursement is sought	1	2	3	4	5
(13) lack of economic incentives and reimbursement for providing PC	1	2	3	4	5
(14) lack of support by physicians and other health professionals	1	2	3	4	5
(15) no standard guideline for PC practice	1	2	3	4	5
(16) insufficient physical space	1	2	3	4	5
(17) lack of information technology (IT) support for data collection and documentation	1	2	3	4	5

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(18) other barriers (Please specify):

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(19) What do you think can be done to overcome barriers to the provision of  
PC in the Malaysian setting ?

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## Appendix A-2

### The demographic characteristics of the participating pharmacists in phase two (n= 32)

<b>Pharmacist Characteristics</b>	<b>N</b>	<b>%</b>
<b>Gender</b>		
Male	13	40.6
Female	19	59.4
<b>Age category (year)</b>		
22 – 27	14	43.8
28 – 33	5	15.6
34 – 39	8	25
40 – 45	5	15.6
<b>Ethnic group</b>		
Malay	12	37.5
Chinese	8	25
Indian	9	28.1
Other	3	9.4
<b>Graduate university</b>		
USM	17	53.1
UKM	5	15.6
UM	4	12.5
Other	6	18.8
<b>Practice setting</b>		
Community pharmacy	17	53.1
Hospital pharmacy	13	40.6
*Other	2	6.3

\* Teaching staff

### Appendix A-3

#### Means and standard deviations of understanding and comprehension of pharmaceutical Care (n= 32)

No	Item label	Mean	Std Dev
1.	A philosophy of PC	3.38	1.41
2.	*PC can be viewed as sophisticated medication counseling service	1.91	1.03
3.	Pharmacist guides patient to use drugs safely, effectively, and appropriately	3.13	1.56
4.	Pharmacist identifies the patient's DRNs	3.69	1.56
5.	*PC can be considered an extension of current pharmacy services	3.66	1.26
6.	Pharmacist assesses patient's actual and potential DRPs	3.88	1.24
7.	Pharmacist initiates a monitoring plan to check patient progress	3.88	1.31
8.	*Clinical pharmacy is the same as pharmaceutical care	1.88	1.29
9.	Pharmacist empowers patient compliance	3.13	1.41
10.	Pharmacist documents his/her intervention	3.22	1.41
11.	*All patients taking medication require PC	3.72	1.28
12.	The primary aim of PC is to improve the patient's quality of life	3.63	1.48
13.	The pharmacist prepare PC plan in collaboration with patient and other health care professionals	2.93	1.50
14.	*A pharmacist require a post-graduate qualification to practice PC in Malaysia	3.44	1.29
15.	Pharmacist establishes therapeutic	2.72	1.28

The incorrect answers as determined by the researcher are marked with an asterisk (\*)

## Appendix A-4

### Means and standard deviations of importance and competence scale of current pharmacy practice (n= 32)

No	Item label	Importance		Competence	
		Mean	Std Dev	Mean	Std Dev
1.	General management	3.41	1.34	3.31	1.15
2.	Personal management	3.56	1.16	3.47	1.05
3.	Purchasing and controlling inventory	3.69	1.15	3.72	1.14
4.	Financial management	3.47	1.14	3.44	1.22
5.	Sales and promotions	3.41	1.10	3.61	1.05
6.	Dispensing functions	3.66	1.34	3.59	1.13
7.	Developing and maintaining patient records and profile	3.66	1.18	3.72	1.57
8.	Compounding prescription extemporaneous	3.47	1.08	3.88	1.36
9.	Preparing parenteral therapy	3.78	1.13	3.78	1.50
10.	Implementing and utilizing a unit-dose distribution system	3.59	1.19	3.50	1.52
11.	Counseling patients about their medications	3.66	1.43	3.75	1.39
12.	Counseling patients/ patrons on OTC drugs	3.63	1.41	3.63	1.31
13.	Proper use of self-monitoring and self-diagnostic products	2.84	1.39	3.91	1.15
14.	Consulting with doctors concerning dosage regimen	3.72	1.42	4.09	1.17
15.	Screening of diabetes and monitoring blood pressure	3.78	1.21	3.78	1.21
16.	Providing ward pharmacy services	3.47	1.37	3.66	1.26
17.	Presenting and discussing patient cases related to drug therapy problems	3.72	1.35	3.94	1.22
18.	Answering poison control and drug information calls	3.63	1.34	3.63	1.19
19.	Sponsoring and participating in health fairs	3.59	1.27	3.72	1.02
20.	Delivering a public talk related to rational drug use	3.53	1.39	3.56	1.16

## Appendix A-5

**Means and standard deviations of importance and competence scale of towards achieving and developing PC (n= 32)**

No	Item label	Importance		Competence	
		Mean	Std Dev	Mean	Std Dev
1.	Establishing a relationship with your patient	3.41	1.43	3.66	1.21
2.	Direct contact with patient should be frequent	3.56	1.52	3.56	1.29
3.	Explained the proposed relationship, obtain information	3.69	1.35	3.94	1.13
4.	A comprehensive database is needed to identify drug related problems	3.63	1.39	3.94	1.19
5.	Mandatory of patient's medication history	3.63	1.41	3.34	1.29
6.	Your concern relating to the patient's drug therapy issues will be a reminder that you are his or her advocate	3.62	1.41	3.84	1.14
7.	Help patients create a realistic expectation of their drug therapy	3.19	1.51	3.38	1.26
8.	The desired therapeutic goals	3.44	1.39	3.78	1.07
9.	Your plan should be based on the patient's wishes and priorities	3.38	1.48	3.63	1.21
10.	Referrals to other health care teams	3.50	1.46	3.47	1.41
11.	The focal point of the PC	3.41	1.43	3.97	1.12
12.	A follow-up programme	2.88	1.43	3.90	1.04
13.	The best way to discuss and determine progress with a patient	3.41	1.43	3.93	1.04
14.	Documentation is crucial throughout PC process	2.84	1.48	2.56	1.29
15.	A collaborative PC practice between the pharmacists and the health care team	3.88	1.31	3.50	1.30



## Appendix A-6

### Means and standard deviations of barriers to implement pharmaceutical care (n= 32)

No	Item label	Mean	Std Dev
1.	Lack of pharmacist time to provide PC	3.81	1.03
2.	Lack patient's time/demand for PC services	3.41	1.24
3.	Time consuming to collect and record patient's information	3.84	1.14
4.	Pharmacist's refuse to document patient data	2.72	1.14
5.	Lack of pharmacist's knowledge related to disease state	3.19	1.06
6.	Lack of pharmacist clinical skills	3.66	1.00
7.	Lack of drug information resources	2.81	1.38
8.	Lack of pharmacist's willingness to provide PC on a consistent basis	3.25	1.16
9.	Lack of pharmacist's self-efficacy (confidence)	3.34	1.15
10.	Poor pharmacist-patient communication	3.47	1.02
11.	Poor pharmacist communication with other health care professionals	3.66	1.12
12.	Lack of a clear definition of PC for which reimbursement is sought	3.72	1.14
13.	Lack of economic incentives and reimbursement for providing PC	3.41	1.36
14.	Lack of support by physicians and other health professionals	3.66	1.23
15.	No standard guideline for PC practice	3.72	1.28
16.	Lack of information technology (I T)	3.25	1.34
17.	Insufficient physical space	3.00	1.39

## Appendix A-7

**The mean score, standard deviation, range, and number of items of sub-scales of the questionnaire (n= 32)**

Section	Scale label	Mean	SD	Range	No of Items
Section (II)	Understanding of pharmaceutical care (PC)	65.03	6.04	48 – 73	15
Section (III)	(i) Current pharmacy practice (Importance scale)	71.69	14.12	42 – 95	20
	(ii) Current pharmacy practice (Competence scale)	75.56	6.46	41 – 98	20
	(iii) Current pharmacy practice (Practice scale)	29.03	6.92	20 – 40	20
Section (IV)	(i) Towards achieving and developing PC (importance scale)	68.28	5.94	57 – 75	15
	(ii) Towards achieving and developing PC (competence scale)	59.44	14.26	30 – 75	15
	(iii) Towards achieving and developing PC (practice scale)	28.41	5.94	15 – 53	15
Section (V)	*Barriers to Implement Pharmaceutical care (PC)	60.53	11.02	21 – 77	17

\*The last two open-ended question were not included (total number of items were 19)

## Appendix A-8

### Reliability coefficient (Alpha) of section (II) of the questionnaire (n= 32)

No	Item label	Corrected Item-total Correlation	Coefficient alpha if item deleted	Coefficient alpha
1.	A philosophy of PC	0.4706	0.6220	0.6554
2.	**PC is same as medication counseling service	0.2841	0.6386	
3.	Pharmacist guides patient to use drugs safely, effectively, and appropriately	0.3947	0.6327	
4.	Pharmacist identifies the patient's DRNs	0.5721	0.6206	
5.	**PC can be considered an extension of current pharmacy services	0.2031	0.6536	
6.	Pharmacist assesses patient's actual and potential DRPs	0.3040	0.6345	
7.	Pharmacist initiates a monitoring plan to check patient progress	0.6636	0.5946	
8.	**PC is merely a new name for clinical pharmacy	0.1013 *	0.6656 *	
9.	Pharmacist empowers patient compliance	0.0145 *	0.6746 *	
10.	Pharmacist documents his/her intervention	0.5216	0.6263	
11.	**All patients taking medication require PC	0.0892 *	0.6748 *	
12.	The primary aim of PC is to improve the patient's quality of life	0.2556	0.6416	
13.	The pharmacist prepare PC plan in collaboration with patient and other health care professionals	0.3975	0.6208	
14.	**A pharmacist require a post-graduate qualification to practice PC in Malaysia	0.0263 *	0.6859 *	
15.	Pharmacist establishes therapeutic	0.5607	0.5923	

\* Items marked with an asterisk (\*) denotes low corrected item-total correlation and highly coefficient alpha if item deleted

\*\*The incorrect answers as determined by the author are marked with an asterisk (\*\*)

## Appendix A-9

### Reliability coefficient (Alpha) of importance scale of current pharmacy practice (n= 32)

No	Item label	Corrected Item-total Correlation	Coefficient alpha if item deleted	Coefficient alpha
1.	General management	0.4371	0.8690	0.8736
2.	Personal management	0.5392	0.8656	
3.	Purchasing and controlling inventory	0.4768	0.8677	
4.	Financial management	0.4284	0.8693	
5.	Sales and promotions	0.4846	0.8675	
6.	Dispensing functions	0.6418	0.8619	
7.	Developing and maintaining patient records and profile	0.6021	0.8637	
8.	Compounding prescription extemporaneous	0.5304	0.8659	
9.	Preparing parenteral therapy	0.5343	0.8658	
10.	Implementing and utilizing a unit-dose distribution system	0.5145	0.8665	
11.	Counseling patients about their medications	0.5410	0.8654	
12.	Counseling patients/ patrons on OTC drugs	0.3661	0.8717	
13.	Proper use of self-monitoring and self-diagnostic products	0.2924	0.8744	
14.	Consulting with doctors concerning dosage regimen	0.3995	0.8709	
15.	Screening of diabetes and monitoring blood pressure	0.6297	0.8622	
16.	Providing ward pharmacy services	0.6193	0.8622	
17.	Presenting and discussing patient's cases related to drug therapy problems	0.4327	0.8693	
18.	Answering poison control and drug information calls	0.3728	0.8712	
19.	Sponsoring and participating in health fairs	0.1222 *	0.8804 *	
20.	Delivering a public talk related to rational drug use	0.5784	0.8639	

\* Items marked with an asterisk denote low corrected item-total correlation and highly coefficient alpha if item deleted

## Appendix A-10

### Reliability coefficient (Alpha) of competence scale of current pharmacy practice (n= 32)

No	Item label	Corrected Item-total Correlation	Coefficient alpha if item deleted	Coefficient alpha
1.	General management	0.4237	9323	0.9329
2.	Personal management	0.7247	9277	
3.	Purchasing and controlling inventory	0.6315	9288	
4.	Financial management	0.7167	9273	
5.	Sales and promotions	0.8558	9251	
6.	Dispensing functions	0.6689	9281	
7.	Developing and maintaining patient's records and profile	0.7016	9277	
8.	Compounding prescription extemporaneous	0.5579	9306	
9.	Preparing parenteral therapy	0.6810	9279	
10.	Implementing and utilizing a unit-dose distribution system	0.6642	9286	
11.	Counseling patients about their medications	0.7421	9270	
12.	Counseling patients/ patrons on OTC drugs	0.6140	9292	
13.	Proper use of self-monitoring and self-diagnostic products	0.7039	9276	
14.	Consulting with doctors concerning dosage regimen	0.6473	9286	
15.	Screening of diabetes and monitoring blood pressure	0.8492	9246	
16.	Providing ward pharmacy services	0.7154	9272	
17.	Presenting and discussing patient's cases related to drug therapy problems	0.6554	9284	
18.	Answering poison control and drug information calls	0.2027 *	9355 *	
19.	Sponsoring and participating in health fairs	0.2797 *	9347 *	
20.	Delivering a public talk related to rational drug use	0.3422 *	9342 *	

\* Items marked with an asterisk (\*) denote low corrected item-total correlation and highly coefficient alpha if item deleted

## Appendix A-11

### Reliability coefficient (Alpha) of practice scale of current pharmacy practice (n= 32)

No	Item label	Corrected Item-total Correlation	Coefficient alpha if item deleted	Coefficient alpha
1.	General management	0.4671	0.9463	0.9458
2.	Personal management	0.6110	0.9440	
3.	Purchasing and controlling inventory	0.6995	0.9425	
4.	Financial management	0.7501	0.9417	
5.	Sales and promotions	0.8382	0.9403	
6.	Dispensing functions	0.7511	0.9416	
7.	Developing and maintaining patient records and profile	0.7636	0.9415	
8.	Compounding prescription extemporaneous	0.6743	0.9429	
9.	Preparing parenteral therapy	0.8094	0.9412	
10.	Implementing and utilizing a unit-dose distribution system	0.7780	0.9415	
11.	Counseling patients about their medications	0.6982	0.9425	
12.	Counseling patients/ patrons on OTC drugs	0.6391	0.9435	
13.	Proper use of self-monitoring and self-diagnostic products	0.6239	0.9437	
14.	Consulting with doctors concerning dosage regimen	0.6858	0.9427	
15.	Screening of diabetes and monitoring blood pressure	0.7530	0.9417	
16.	Providing ward pharmacy services	0.7084	0.9424	
17.	Presenting and discussing patient cases related to drug therapy problems	0.5921	0.9443	
18.	Answering poison control and drug information calls	0.4518	0.9465	
19.	Sponsoring and participating in health fairs	0.4813	0.9461	
20.	Delivering a public talk related to rational drug use	0.5619	0.9448	

## Appendix A-12

### Reliability coefficient (Alpha) of importance scale towards achieving and developing PC (n=32)

No	Item label	Corrected Item-total Correlation	Coefficient alpha if item deleted	Coefficient alpha
1.	Establishing a relationship with your patient and his/her health care providers	0.3881	0.8650	0.8683
2.	Direct contact with patient should be frequent	0.5832	0.8558	
3.	Explained the proposed relationship, obtain information, and seek cooperation, trust and permission	0.6192	0.8539	
4.	A comprehensive database is needed to identify drug related problem	0.4240	0.8633	
5.	Mandatory of patient's medication history	0.2672 *	0.8696 *	
6.	Your concern relating to the patient's drug therapy issues will be a reminder that you are his or her advocate	0.5507	0.8576	
7.	Help patients create a realistic expectation of their drug therapy	0.5250	0.8588	
8.	The desired therapeutic goals	0.6088	0.8545	
9.	Your plan should be based on the patient's wishes and priorities	0.6363	0.8540	
10.	Referrals to other health care teams	0.3685 *	0.8685 *	
11.	The focal point of the PC	0.5905	0.8517	
12.	A follow-up programme to improve patient/customer satisfaction and loyalty	0.6784	0.8515	
13.	The best way to discuss and determine progress with a patient	0.6541	0.8517	
14.	Documentation is crucial throughout PC process	0.4480	0.8629	
15.	A collaborative PC practice between the pharmacists and the health care team	0.3807	0.8650	

\* Items marked with an asterisk (\*) denote low corrected item-total correlation and highly coefficient alpha if item deleted

### Appendix A-13

#### Reliability coefficient (Alpha) of competence scale of towards achieving and developing PC (n= 32)

No	Item label	Corrected Item-total Correlation	Coefficient alpha if item deleted	Coefficient alpha
1.	Establishing a relationship with your patient and his/her health care providers	0.8798	0.9641	0.9641
2.	Direct contact with patient should be frequent	0.8466	0.9644	
3.	Explained the proposed relationship, obtain information, and seek cooperation, trust and permission	0.7252	0.9665	
4.	A comprehensive database is needed to identify drug related problem	0.8394	0.9644	
5.	Mandatory of patient's medication history	0.8229	0.9647	
6.	Your concern relating to the patient's drug therapy issues will be a reminder that you are his or her advocate	0.7668	0.9657	
7.	Help patients create a realistic expectation of their drug therapy	0.6740 *	0.9692 *	
8.	The desired therapeutic goals	0.8107	0.9650	
9.	Your plan should be based on the patient's wishes and priorities	0.6692 *	0.9678 *	
10.	Referrals to other health care teams	0.8128	0.9649	
11.	The focal point of the PC	0.8466	0.9643	
12.	A follow-up programme to improve patient/customer satisfaction and loyalty	0.8820	0.9637	
13.	The best way to discuss and determine progress with a patient	0.8439	0.9644	
14.	Documentation is crucial throughout PC process	0.8700	0.9641	
15.	A collaborative PC practice between the pharmacists and the health care team	0.8829	0.9637	

\* Items were marked with an asterisk (\*) denote low corrected item-total correlation and highly coefficient alpha if item deleted



## Appendix A-14

### Reliability coefficient (Alpha) of practicality scale towards achieving and developing PC (n= 32)

No	Item label	Corrected Item-total Correlation	Coefficient alpha if item deleted	Coefficient alpha
1	Establishing a relationship with your patient and his/her health care providers	0.2229	0.7291	0.7304
2	Direct contact with patient should be frequent	0.2192	0.7277	
3	Explained the proposed relationship, obtain information, and seek cooperation, trust and permission	0.5058	0.6971	
4	A comprehensive database is needed to identify drug related problem	0.1918	0.7304	
5	Mandatory of patient's medication history	0.5020	0.6975	
6	Your concern relating to the patient's drug therapy issues will be a reminder that you are his or her advocate	0.2539	0.7243	
7	Help patients create a realistic expectation of their drug therapy	0.1135	0.7370	
8.	The desired therapeutic goals	0.4198	0.7065	
9	Your plan should be based on the patient's wishes and priorities	0.4336	0.7043	
10	Referrals to other health care teams	0.4096	0.7089	
11	The focal point of the PC	0.4930	0.6971	
12	A follow-up programme to improve patient/customer satisfaction and loyalty	0.0928 *	0.7407 *	
13	The best way to discuss and determine progress with a patient	0.4863	0.6996	
14	Documentation is crucial throughout PC process	0.4470	0.7046	
15	A collaborative PC practice between the pharmacists and the health care team	0.1534	0.7323	

\* Item marked with an asterisk (\*) denote low corrected item-total correlation and highly coefficient alpha if item deleted

## Appendix A-15

### Reliability coefficient (Alpha) of the scale of barriers to implement pharmaceutical care (n= 32)

No	Item label	Corrected Item-total Correlation	Coefficient alpha if item deleted	Coefficient alpha
1.	Lack of pharmacist time to provide PC	0.5595	0.8450	0.8656
2.	Lack patient's time/demand for PC services	0.4059	0.8519	
3.	Time consuming to collect and record patient information	0.6023	0.8424	
4.	Pharmacist's refuse to document patient data	0.2603	0.8590	
5.	Lack of pharmacist's knowledge related to disease state	0.5174	0.8466	
6.	Lack of pharmacist clinical skills	0.7707	0.8362	
7.	Lack of drug information resources	0.1398	0.8668	
8.	Lack of pharmacist's willingness to provide PC on a consistent basis	0.5268	0.8459	
9.	Lack of pharmacist's self-efficacy (confidence)	0.6790	0.8386	
10.	Poor pharmacist-patient communication	0.6261	0.8423	
11.	Poor pharmacist communication with other health care professionals	0.6485	0.8403	
12.	Lack of a clear definition of PC for which reimbursement is sought	0.5691	0.8440	
13.	Lack of economic incentives and reimbursement for providing PC	0.4506	0.8445	
14.	Lack of support by physicians and other health professionals	0.4670	0.8487	
15.	No standard guideline for PC practice	0.3640	0.8541	
16.	Lack of information technology (IT)	0.6261	0.8423	
17.	Insufficient physical space	0.0517 *	0.8681 *	

\* Items marked with an asterisk (\*) denote low corrected item-total correlation and highly coefficient alpha if item deleted

## Appendix A-16

The detectable difference in mean scores of main outcomes for the pilot phase (used for the sample size calculation) (n= 27)

Section	Scale label	Hospital (n= 12) Mean	Community (n= 15) Mean	*P- value
Section (II)	Understanding of pharmaceutical care (PC)	3.5	3.9	< 0.05
Section (III)	(ii) Current pharmacy practice (Importance scale)	4.6	4.1	< 0.05
	(iii) Current pharmacy practice (Competence scale)	3.8	3.2	< 0.05
Section (IV)	(i) Towards achieving and developing PC (importance scale)	4.2	4.7	< 0.05
	(ii) Towards achieving and developing PC (competence scale)	3.4	3.1	< 0.05
Section (V)	*Barriers to Implement Pharmaceutical care (PC)	3.2	3.8	< 0.05

\* Mann-Whitney U test  
P-value < 0.05