

Full Length Research Paper

The creation of pharmacists' core competence assessment scale

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With the trend towards in the creation of people's income and consumers' awareness of their rights as, pharmacists' service attitude and competence become one of the reasons that lead people to pharmacies to take medicine. The study aims at discussing pharmacists' competence and working out pharmacists' core competence assessment scale. The investigation data are analyzed by the analysis of importance before it is being formally questioned. After the data were questioned, they were analyzed by a great deal of statistics methods such as sample analysis, reliability analysis, discrimination analysis, validity analysis, etc. The result of the study is to create pharmacists' core competence assessment scale preliminarily.

Key words: pharmacies, pharmacists, competence.

INTRODUCTION

In the 1980s, the idea in Taiwan was that the pharmaceutical and medical industries should be independent from each other. The separation has been practiced till today. Compared with the standards established by developed countries, the practice of medicine and pharmacy in Taiwan is still far from the global standard. In the early stages, the tasks of a pharmacist emphasized manufacturing medicines and scientific study. But today, the pharmacy is patient-oriented and concerned about practical skills that apply to hospitals, clinical situations, and communities. This means that domestic pharmaceutical development has followed the global trend and transformed itself from a traditional chemical-oriented position to a patient-oriented approach, the so-called clinical pharmacy services. This situation does not represent a great turn in pharmaceutical development, but an extension of the functional role of pharmaceutical services. Today, the clinical pharmacist's role is to assist physicians in managing drug therapies so that the patients can obtain appropriate treatment.

The purposes of care include offering appropriate medication treatment so side effects can be decreased. Therefore, the goals of pharmaceutical education in the

21st century should be encouraging pharmacists to research and to provide good services to patients. Based on the empirical and practical results, pharmacists should learn how to become professionals who can work as members of the team and utilize modern technology, biomedicine, and pharmaceutical science to treat patients, improve people's knowledge about their health, and provide relevant medication therapies. The medical care system in Taiwan is the National Health Insurance. When patients seek medical advice, they do not pay any extra charges apart from their deductibles. Any charges by the hospital will be directly reported to the Bureau of National Health Insurance (BNHI). The professionals at the BNHI will evaluate the reasonableness of the costs and pay the charges. If the BNHI finds that some of the charges are unreasonable, it will refuse to pay for these costs, which can lead to losses for the hospitals. Under the National Health Insurance system, the importance of pharmacists becomes significant. The current National Health Insurance system in Taiwan forces hospitals and clinics to seriously consider how to take care of the patients with the least waste of medical resources. Savings on medication costs are always a significant indicator of "the least waste of medical resources," and are also the domain in which a pharmacist should make efforts. Under the supervision of clinical pharmacists, the goal of medication-use safety, promotion of pharmacological effects, and prevention of medication and medical waste

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can be achieved so that medical costs can be effectively lowered. Competence has been applied in various professional fields (Spencer and Spencer, 1993), and it is performance of knowledge and skill (Cardy and Selvarajan, 2006; Parry, 1998; Ulrich, 1998). In recent years, some healthcare mistakes were frequent occurred like taking miss injection and giving wrong medicines in Taiwan. In the past study result, it showed that in 19.0% questionable prescriptions, if have not the pharmacists' check, there would be 28.3% ones causing direct harm to patients' health (Rupp, 1988). So the practice pharmacists' competence has relationship with patients' life safety and health. The study wants to create pharmacists' core competence assessment scale to exam pharmacists' professional competences, and taking NHI pharmacies in Taichung County of Taiwan as an example then reach a consensus that about one pharmacist's professional competence and conditions to be as a reference for community pharmacies training and developing.

(A) By organizing the related literature and interviewing hospital pharmacists, NHI pharmacists and professors from College of pharmacy to find out and confirm the core competence items that one outstanding pharmacist should have.

(B) Through organizing literature and interviewing results to work out the pharmacists' core competence assessment scale.

(C) Researching pharmacists from the NHI pharmacies in Taichung County of Taiwan to test the validity and accuracy of the scale.

MATERIALS AND METHODS

The reason that this study did not clearly state the research question and assumptions of this study is because we considered on the nature of the methodology of this research. The main purpose of this study is a type of confirmatory research, which is to construct, test, and verify the scale developed to evaluate the core competences of pharmacists. However, the research design is actually featured in its explorative nature and text. In addition, the focus of this study is to test the reliability and validity of the developed scale. The content of this study has scrupulously explained the test results on the aspects of its reliability and validity. That is to say, we did not mean to neglect the presentation of the hypothesis of this research.

The research process

The study uses the qualitative research and the quantitative research, drawing the deep discussion of the qualitative research and objective analysis of the quantitative research the study also depend on the interview and questionnaires to know the pharmacists' business to make suitable duty table (Pelkman and Veenswijk, 2008).

The samples

Through knowing about the occupation type and occupation

environment of hospital pharmacists, NHI pharmacy pharmacists and professors of Pharmacy College to understand pharmacists' competence and its importance to design the competence scale.

The sample of the analysis of importance

Before the formal testing, the study first does the pre-testing to delete unsuitable questions the objects of the pre-testing is hospital pharmacists, NHI pharmacy pharmacists and Pharmacy College.

Normal test

Through study numbers' discussion and thinking over the time, human resource and physical resource, the study decides the object of this study are pharmacists of NHI pharmacists in Taichung County of Taiwan. The population in this county is approximately 1,520,000 citizens. There are 473 pharmacies and 195 NHI pharmacies in it. The samples (pharmacists) are from 189 NHI pharmacists expert 6 pharmacies which are used for the analysis.

The scale perspectives definition

Based on the literature reviewing, analyze the pharmacists' basic professional competence preliminary, and the deep interview hospital pharmacists, NHI pharmacies pharmacist, professors from the pharmacy colleges. Then according to the study, define the four perspectives of the scale including "interpersonal communication", "professional field", "job attitude", and "higher education" (Table 1). The average of the question is lower which would be deleted. $\sigma = 0.71$ is the lowest standard value under this all the question should be deleted, the average of the question which is under 3.45 would be deleted. There are 22 questions in interpersonal communication, the average is 4.31 and the average of each question is above 3.45. Therefore all the questions are kept.

In professional field, the whole average is 4.15 (Table 2). From the question 23 to the question 42, only the question 26 is 3.42 under 3.45, so the question 26 should be deleted. In job attitude, the whole average is 4.01. From the question 43 to the question 61, only the average of the question 43 is 3.33, so the question 43 should be deleted. In higher education, the whole average is 4.15. All the average of the question from the question 62 to the question 82 is above 3.45, so all questions are kept.

RESULTS

Sample analysis

We sent 189 questionnaires to the samples in 19 towns and collected 72 questionnaires. There are 72 valid samples, and the collected rate is 38.1%. The proportion of male samples is 70.8%, the proportion of the age from 51 to 60 is 36.1%, from 31 to 40 is 27.8%; the proportion of college graduation samples is 72.2%, the year of employment from 1 to 5 years is 23.6%, the proportion of 20 years employment is 16.7%.

Reliability analysis

Using the reliability analysis, the consistency and stability of research result should be discussed. The research

Table 1. The definition of the scale perspectives.

Definition of competence	Traits connotation
Interpersonal communication	1. Having Strong troubleshooting skill. 2. Respecting the patients, know about patients' need and feeling, being the patients' point of view and establishing good relationship. 3. Willing to solve problems of various kinds, complaint and requirements.
Professional field	Supplying good service by professional competence.
Job attitude	1. Working hard and cooperating with colleagues. 2. Persistent work and Proactive encouragement to the work.
Higher education	Learning new knowledge and technology by oneself and colleting information about the work.

Table 2. The average of the important of competence item.

Interpersonal communication	Professional field	Job attitude	Higher education	The average
4.31	4.15	4.01	4.15	4.16

method is Cronbach's α as the evaluation criteria. The result is shown from Tables 3 to 5. The standard of deleted questions is item correlation below 0.20. So under this standard, all the questions are kept in this phase. Based on the result of reliability analysis, the Cronbach's α of each perspective is beyond 0.9, that is to say, the inner consistency level is high and the question correlation is approximate 0.5 showing that the scale has good stability and consistency.

Item analysis

After consistency analysis, the study uses the item analysis for the result. In this analysis, all marks from each perspective marks would be added. The mark which is above 25% shows the high mark group while under 25% shows the low mark group, t-test should be taken as the significant difference between questions in high mark group and low group. If $P\text{-value} < .05$, it means this question has discrimination and this question should be kept. The following analysis result shows that: In interpersonal communication, the p-value of all questions is below 0.05, all the questions should be kept. The p-value of 19 questions in professional field is below 0.5, so all the questions are kept. The p-value of 18 questions in job attitude is below 0.5, so all the questions are kept. The p-value of 19 questions in higher education is below 0.5, so all the questions are kept.

Validity analysis

After CFA the study deletes or adjusts the invaluable

questions. So the left questions are considered with the four competence perspectives. Therefore, the study still keeps four competence perspectives. The factor loading of every question and the common validity coefficient are above 0.4, showing the scale has wonderful structure validity. Table 3 shows the significance and connotation of each perspective.

Establishing the competence model

After the aforementioned analysis, four perspectives contain the related competence, and every question has distinguishing ability and factor loading. For the pharmacists' core competence assessment scale for NHI Pharmacies pharmacists is completed. The four competence perspectives and 61 questions are shown as Table 4 (Abereijo et al., 2007; Hu et al., 2009). After deleting the questions, the final reliability and validity of each perspective is shown in Table 5. Figure 1 shows the pharmacist's professional core competence framework. The framework contains all the competence of one pharmacist including knowledge, skills, behaviors, and characteristics (Gino and Pisano, 2006; Hu, 2010).

DISCUSSION

Competence is the popular topic for the HRM. To the people oriented hospital, it is more important to import new human resource (HR) concept and technology. The competence can supply more special and higher quality service. Due to this research results of core competence

Table 3. The significance and connotation of each perspective.

Perspective	Connotation	Numbers of questions
Interpersonal communication	The pharmacist can use warm attitude to listen and know patients' question, can convey the medication information accurately and quickly, be willing to establish good relation with patients, and actively take extra careful patients.	20 questions
Professional field	The pharmacist has special knowledge, be familiar with the name, traits, effect of all drugs, take the responsibility to check whether the prescription is abide by pharmacy policy, usage, dosage, and depends the medicine according to the prescription.	17 questions
Job attitude	Serving patients is the pharmacist's principle, the same time; the pharmacist can supply more safe and effective service for patients, and manages the pharmacy by the management method.	16 questions
Higher education	The pharmacist can takes part in various kind of academic forum, read new pharmacy books who keep the high learning will and develop the good habit of consistently soaking up the new knowledge.	8 questions

Table 4. The deleted questions.

Perspective	The deleted questions of importance analysis	The deleted question of reliability analysis	The deleted questions of item analysis	The questions of validity analysis	Total
Interpersonal communication	Q19	None	None	Q4, 5, 9, 13, 15, and 16.	7questions
Professional field	Q26	None	None	Q38.	2questions
Job attitude	Q43	None	None	Q44, 45, 4, 49, 50, and 58.	7questions
Higher education	Q70, and 71	None	None	Q5, 64, 72.	5questions
Total	5 questions	None	None	16 questions	21questions

Table 5. The reliability and validity table.

Perspective	Reliability	Validity
Interpersonal communication	0.96	0.62
Professional field	0.96	0.63
Job attitude	0.95	0.63
Higher education	0.91	0.64

were limit, there were other important definition of "competence" worthy of further exploring. Through literature reviewing, practice information collecting, hospital pharmacists, NHI pharmacy pharmacists and professors of Pharmacy College interview, and questionnaires investigating ,the study finds out pharmacists' duty types and questions (Fairclough, 2005; Lave et al., 2007; Ukpata and Olukotun, 2008). And use the importance analysis, reliability analysis, item analysis, factor analysis to work out the formal measuring scale. Then, after testing and statistical analyzed results, the pharmacists' core competence assessment scale has high reliability and validity. This would be the useful HR reference data (Forchew,

2007; Kleczyk, 2008; Steyn and Plant, 2009).

Establish the framework of the literature reviewing and researching

Based on the literature review, collecting documents about competence, interviewing the pharmacists from the hospitals and pharmacies and scholars from the pharmacy academia, the study find out the pharmacists' competence type and questions - interpersonal communication, professional field, job attitude, and higher education

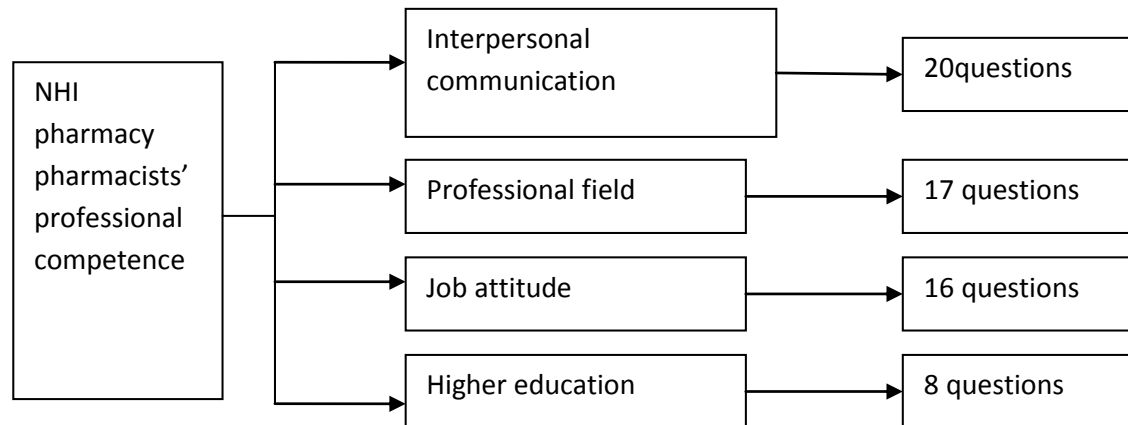


Figure 1. The framework of NHI pharmacy pharmacists' professional competence.

Framework and test the first draft of the scale

According to the competence types and questions, there are 82 questions in the first draft. After empirical analysis, delete the lower average questions by the standard of the average. The total standard deviation ($\sigma = 0.71$) of the study is the lowest standard value to deleted the question. So 2 questions are deleted for their standard deviation below 3.45, another 3 questions are deleted for unsuitable words or similar with others. The first scale has four perspectives and 77 questions, interpersonal communication has 21 questions, professional field has 19 questions, job attitude has 19 questions, and higher education has 19 questions. To the validity, after collecting related literature and acquiring the pharmacist's true practice workplace content, the scale is worked out and the validity is confirmed by pharmacists from the hospitals and pharmacies and scholars from the pharmacy academia.

Test and establish the scale

We sent 189 questionnaires to the samples in 19 towns and collected 72 questionnaires. There are 72 valid samples, and the collected rate is 38.1%. The aim of the study is to create pharmacists' core competence assessment scale with reliability and validity. After testing, the study detects its result and finds that the reliability of each perspective is between 0.91 and 0.95, and the validity is between 0.61 and 0.63. From this, it is proved that the scale has good reliability and validity. The study applies factor analysis to test the four perspectives. We found that there are 6 questions deleted on the interpersonal communication, 1 questions deleted on the professional field, 6 questions deleted on job attitude and 3 questions deleted on higher education. Some results reject the former hypothesis, so we should classify the

questions again.

The following is the inference to analyze the reason for difference occurred about the former hypothesis:

1. In order to get accurate result to judge the question, the person is added in the important analysis.
2. The questions should be reduced; some words should be check to avoid ambiguous meaning.
3. The collecting rate should be improved, and half of the questionnaires should be collected to reduce study result deviation.
4. In the former hypothesis, there are 19 questions in the perspective of higher education, but finally, 8 questions are left. Many questions adjust to other perspectives meaning that the definition of the perspective should be clearer.
5. When the pharmacists answer the question, maybe they do not know how to answer it from their own point of view or the customers. From this, we can know the illustration of the questionnaires is not very clear, which lead to deviation in the study results.

The suggestion and limitation to the pharmacists in pharmacies

After separation of the doctors' and pharmacists' duty, the relationship between pharmacists and patents becomes more and more important. Although the number retaking questionnaires is few, its result still can give the pharmacists some reference. Hope pharmacists improve the ability to answer the similar questionnaire to enhance the study of pharmacists' competence. We believe it can improve the relationship between them. If the pharmacy just has one pharmacist, the study suggests the pharmacist can spend his/her weekend days in jointing into the activity that the community holds to give health lecture or recruit new pharmacists.

The follow-up research and suggestion

The object of study is just one county, the result may have a little difference with others. For this reason, the study suggested researchers can do larger follow-up study involving more areas, if they have enough time for human resource and material resource. Now, the competence study in the healthcare field, lots of the research objects are nursing, so suggest the follow-up researchers can study other stuff's competence, like doctors' pharmacists and so on. Confronting with the current developmental trend and future medical needs, this study had the notion that pharmacist should hold the key to success, which is their core competences in their workplaces. Moreover, the core competence is the key success element of pharmacists, particularly when referring to some specialized disciplines.

Core competence is the fundamental element, condition, and capability held by professionals for competing with others within the related industries. In order to construct the sustainable competitive advantages, professional pharmacists need to possess their core competences as described within this research. Pharmacy is a global profession. Although job contents of pharmacists may vary due to local endemic diseases, the core competences of pharmacists are the same worldwide. Therefore, the assessment results regarding to the core competences of the profession of pharmacists should be applied not only to Taiwan but also to other countries in Asia or even Africa. The study just point out the pharmacists' competence, do not study the interaction among the every competence item and the performance that competence item is influenced. The follow-up researchers can make a deep research on this part.

In the pharmaceutical field, it is important for a pharmacist to be aware of how to improve his or her competencies by acquiring advanced knowledge. Since they may know less about diagnostics, therapeutics, medical laboratory science, microbiology, immunology, and the like, pharmacists may not be able to communicate well with patients or to make appropriate suggestions to physicians about clinical cases. Therefore, one of the key procedures in developing clinical pharmacy is supplementation and updating of clinical and pharmaceutical knowledge. Pharmaceutical services make pharmacists walk to the "front stage" and directly face the patients. Pharmacists not only have the right to make decisions about medication treatments, but also need to be in charge of their legal and social responsibilities. However, complex factors in the life sciences, limited knowledge about human beings, individual differences, and other possible uncertain elements have led to inconsistent medication treatment results, and thus cause higher risks for the pharmaceutical profession. Therefore, competent authorities should make laws that

clearly regulate the job description and functions of a pharmacist.

The vision for education and goals for development of pharmacists are distinctive because of the differences in the sub-domains of the pharmaceutical field. However, the common goal of the pharmacy is to promote people's health and protect the health of the public by providing the best medication treatment. Hence, the main task of pharmacists currently is to put into effect the education of pharmacists to foster pharmaceutical professionals who care about people, are professionals, and can bring the pharmaceutical service function fully into play immediately.

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