

CHAPTER IV

RESULTS AND DISCUSSION

This chapter consists of 3 parts as following:

Part I Roles of Hospital Pharmacy Personnel from the Perspective of the Hospital Pharmacists.

1. General information of respondents.
2. Current manpower of hospital pharmacy personnel.
3. Roles of hospital pharmacy personnel from the perspective of the hospital pharmacists.
 - 3.1. Comparison of the actual and the expected roles of hospital pharmacists.
 - 3.2. Comparison of the actual and the expected roles of hospital pharmacy technicians.
 - 3.3. Comparison of the actual and the expected roles of hospital pharmacy employees.
 - 3.4. Comparison of the actual technical roles of hospital pharmacists and hospital pharmacy technicians.
 - 3.5. Comparison of the expected technical roles of hospital pharmacists and hospital pharmacy technicians.
 - 3.6. Comparison of the actual technical roles of hospital pharmacy technicians and hospital pharmacy employees.
 - 3.7. Comparison of the expected technical roles of hospital pharmacy technicians and hospital pharmacy employees.
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Part II Roles of Hospital Pharmacy Technicians from the Perspective of the Hospital Pharmacy Technicians.

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2. Roles of hospital pharmacy technicians from the perspective of the hospital pharmacy technicians.
 - 2.1. Comparison of the actual and the competent roles of hospital pharmacy technicians.
 - 2.2. Comparison of the actual and the expected numbers of hospital pharmacy technicians.

Part III Comparison of the Actual and the Expected Roles and Numbers of Hospital Pharmacy Technicians from the Perspective of the Hospital Pharmacists and of the Hospital Pharmacy Technicians.

1. Comparison of the actual and expected roles of hospital pharmacy technicians from the perspectives of hospital pharmacists and of hospital pharmacy technicians.
2. Comparison of the actual and expected numbers of hospital pharmacy technicians from the perspectives of hospital pharmacists and of hospital pharmacy technicians.

Part I Roles of Hospital Pharmacy Personnel from the Perspective of the Hospital Pharmacists.

1. General information of respondents.

The questionnaire booklets were sent to the 755 pharmacists working in all 92 hospitals under the Provincial Hospital Division, Ministry of Public Health. After the follow-up in 2 months period, 404 usable responses were returned from pharmacists, accounted for 53.51% response rate. The distribution of the 404 respondents are shown in Table 4.1.

Table 4.1. The distribution of the hospital pharmacist respondents.

Type of Hospitals	No. of Hospitals	No. of the Respondents (n) (% response rate)		Total	% of the Total 404 Respondents
		Pharmacy Directors	Pharmacists		
1. Regional	17	9 (n=17) (52.94%)	122 (n=237) (51.48%)	131 (n=254) (51.57%)	32.42
2. General	73	53 (n=73) (72.60%)	215 (n=422) (50.95%)	268 (n=495) (54.14%)	66.34
3. Community	2	2 (n=2) (100%)	3 (n=4) (75.00%)	5 (n=6) (83.30%)	1.24
Total	92	64 (n=92) (69.57%)	340 (n=663) (51.28%)	404 (n=755) (53.51%)	100

For the 17 regional hospitals, 131 usable responses from 254 mailed questionnaire booklets were returned with 51.57% response rate and accounted for 32.42% of the total 404 respondents. Nine of those respondents, from 17 mailed questionnaire booklets, with 52.94% response rate were head of pharmacy departments and 122, from 237 mailed questionnaire booklets, with 51.48% response rate were pharmacists.

For the 73 general hospitals, 268 usable responses from 495 mailed questionnaire booklets were returned with 54.14% response rate and accounted for 66.34% of the total 404 respondents. Fifty-three of those respondents, from 73 mailed questionnaire booklets, with 72.60% response rate were head of pharmacy departments and 215, from 422 mailed questionnaire booklets, with 50.95% response rate were pharmacists.

For the 2 community hospitals, 5 usable responses from 6 mailed questionnaire booklets were returned with 83.30% response rate and accounted for 1.24% of the total 404 respondents. All two mailed questionnaire booklets sent to the head of pharmacy departments were returned, calculated for 100% response rate, and 3 from 4 mailed questionnaire booklets, with 75.00% response rate were pharmacists.

For the total 404 respondents, 64 persons from 92 mailed questionnaire booklets (69.57% response rate) were head of pharmacy departments and 340 from 663 (51.28% response rate) were pharmacists.

Table 4.2. Demographic data of hospital pharmacist respondents.

Demographic Characteristics	Number (n=404)	Percent
Sex		
male	128	31.70
female	276	68.30
Age (years)		
21 - 25	92	22.83
26 - 30	136	33.75
31 - 35	72	17.87
36 - 40	41	10.17
41 - 45	19	4.71
46 - 50	15	3.72
51 - 55	12	2.98
56 - 60	16	3.97
mean = 32.42 SD = 8.95 max. = 59 min. = 22 missing = 0		
Graduated University		
1. Medical Sciences	26	6.40
2. Chulalongkorn	81	20.00
3. Mahidol	61	15.10
4. Chiangmai	89	22.00
5. Prince of Songkhla	84	20.80
6. Khonkean	36	8.90
7. Silpakorn	17	4.20
8. others	10	2.50
Experience in Hospital Pharmacy Task (years)		
0 - 5.0	187	46.63
5.1 - 10.0	116	28.93
10.1 - 15.0	34	8.48
15.1 - 20.0	26	6.48
20.1 - 25.0	17	4.24
25.1 - 30.0	7	1.75
30.1 - 35.0	14	3.49
mean = 8.27 SD = 7.81 max. = 35.0 min. = 0.2 missing = 3		

The demographic data of the 404 respondents as shown in Table 4.2., 128 (31.70%) were male pharmacists and 276 (68.30%) were female pharmacists. The number of pharmacists in the largest age group, 26-30 years old, was 136 (33.75%). Ninety-two persons or 22.83% were in the group of 21-25 years of age and 72 persons or 17.87% were those at 31-35 years old. The average age was 32.42 years old with the standard deviation of 8.95 years. Eighty-nine (22.00%), 84 (20.80%), 81 (20.00%) and 61 (15.10%) of the respondents were graduated with Bachelor degree in pharmaceutical science or pharmacy from Chiangmai, Prince of Songkhla, Chulalongkorn, and Mahidol university, respectively. Two largest groups of respondents had 187 pharmacists with 0-5.0 years of experience in hospital pharmacy task representing 44.83% and 116 pharmacists with 5.1-10.0 years of experience representing 28.93%. The average experience in hospital pharmacy task was 8.27 years with the standard deviation of 7.81 years.

Table 4.3. Level of responsibility for hospital pharmacy tasks and position level of individuals.

Level of responsibility	Position Level (3-9)							Total (%)
	3	4	5	6	7	8	9	
1. head of the pharmacy department	1*	-	-	6	23	32	2	64 (15.84)
2. chief pharmacists for each working unit	7	32	68	53	24	-	-	184 (45.54)
3. staff pharmacists	39	53	49	13	1	-	-	155 (38.37)
4. others: consultant	-	-	-	-	-	1	-	1 (0.25)
Total	47 (11.63)	85 (21.04)	117 (28.96)	72 (17.82)	48 (11.88)	33 (8.17)	2 (0.50)	404 (100)

* interim head of pharmacy department (รักษาการหัวหน้ากลุ่มงานเภสัชกรรม)

As shown in Table 4.3., 117 pharmacists with the position level 5 were the largest group, representing 28.96%. Eighty-five individuals or 21.04% had position level 4 and 72 individuals or 17.82% had position level 6. The pharmacists with the position level 3 and 7 were almost equal, 48 (11.88%) with position level 7 and 47 (11.63%) with position level 3. Thirty-three individuals or 8.17% had position level 8. Only 2 individuals (0.50%) had position level 9, the highest position level in hospital pharmacy. The head of pharmacy department was the highest level of responsibility for hospital pharmacy tasks. Sixty-four respondents or 15.48% were head of pharmacy departments. All except one had high position level 6-9. The one with the position level 3 was the interim head of pharmacy department. For chief pharmacists of each working unit, 184 (45.54%) pharmacists had position level 3-7. Staff pharmacists were the 155 individuals with the position level 3-7 or 38.37%.

Only one pharmacist with the position level 8 served as a consultant of the pharmacy department.

Table 4.4. Major area of work for individual pharmacists

Major area of work	Number (n=461)*	Percent
1. Pharmacy service group		
1.1. outpatient	119	25.81
1.2. inpatient	79	17.14
1.3. patient drug counseling	16	3.47
1.4. drug related problems monitoring	19	4.12
1.5. therapeutic drug monitoring	1	0.22
Total	234	50.76
2. Drug products and drug information services group		
2.1. drug products purchasing and distribution	49	10.63
2.2. drug products inventory management	43	9.33
2.3. drug information services	21	4.55
Total	113	24.51
3. Production group		
3.1. general (non-sterile) production	33	7.16
3.2. sterile production	25	5.42
3.3. aseptic dispensary	1	0.22
3.4. quality control	6	1.30
Total	65	14.10
4. Community services group		
4.1. consumer protection	3	0.65
4.2. supporting primary health care service	-	-
4.3. supporting other health service setting	4	0.87
4.4. home pharmaceutical care	2	0.43
Total	9	1.95
5. others		
5.1. general administration	37	8.03
5.2. other	3	0.65
Total	40	8.68

* some individuals responsible for more than one major areas of work.

Each pharmacists had different major areas of works as shown in Table 4.4. About one half of the respondents, 234 pharmacists or 50.76%, worked in pharmacy service groups. There were 119 pharmacists (25.81%) in outpatient service duties and

79 pharmacists (17.14%) in inpatient service duties. For drug products and drug information service group, there were 113 pharmacists or 24.51%. Forty-nine (10.63%) and 43 (9.33%) pharmacists were responsible for drug products purchasing and distribution duties, and drug products inventory management duties respectively. Sixty-five pharmacists (14.10%) worked in production group: 33 (7.16%) in general (non-sterile) production duties and 25 (5.42%) in sterile production duties. A few pharmacists, 9 or 1.95%, worked in community service group such as consumer protection duties and supporting other health service setting duties. Thirty-seven pharmacists or 8.03% were responsible for general administration. When classifying works as clinical and non-clinical pharmacy activities, it was found that only 12.80% or 59 pharmacists worked mainly in clinical pharmacy area which included patient drug counseling, drug related problems monitoring, drug information service, and home pharmaceutical care. Of those practicing clinical pharmacy; 16 (3.47%), 19 (4.12%), and 21 (4.55%) worked on patient drug counseling, drug related problems monitoring, and drug information services respectively. Only 2 of them (0.43%) worked on home pharmaceutical care area and 1 pharmacist (0.22%) worked on therapeutic drug monitoring activities.

2. Current manpower of hospital pharmacy personnel. (the data was from the 65 hospitals which includes the data from head of pharmacy departments or pharmacists assigned by head of pharmacy departments)

Hospital pharmacy personnel working in the hospitals under the Provincial Hospital Division, Ministry of Public Health were categorized as following:

- 1) hospital pharmacists.
- 2) hospital pharmacy supportive personnel.
 - 2.1) supportive personnel with the training course of technical pharmacy knowledge and skill by the Ministry of Public Health.
 - 2.1.1) "pharmacy technicians" with 2 years training course.
 - 2.1.2) "pharmacy assistants" with 1 years training course and now the Ministry of Public Health has retrained all of them to be a pharmacy technicians.
 - 2.2) supportive personnel without any training course of technical pharmacy knowledge and skills by the Ministry of Public Health but they might have on-the-job training for technical knowledge and skills by the pharmacists or trained pharmacy supportive personnel.
 - 2.2.1) pharmacy employees: permanent employees and temporary employees.
 - 2.2.2) personnel from other fields such as technical nurses, nurse aids, etc.

Table 4.5. Current number and average working experience of hospital pharmacy personnel^a in 65 hospitals (January 1996).

Type of personnel	No. of Personnel (%)	Average Experience (range) (years)
Pharmacists		
1. position level 9	2 (0.41)	32.50 (30.00 - 35.00)
2. position level 8	37 (7.63)	25.28 (15.00 - 34.00)
3. position level 6-7	133 (27.42)	13.54 (8.00 - 31.00)
4. position level 3-5	313 (64.54)	3.52 (1.00 - 6.00)
Total	485 (100)	8.05 (1.00 - 35.00)
Pharmacy technicians		
1. position level 4-5	153 (47.37)	10.11 (6.00 - 25.00)
2. position level 3	84 (26.01)	4.89 (3.00 - 10.00)
3. position level 2	86 (26.62)	2.16 (1.00 - 6.00)
Total	323 (100)	6.64 (1.00 - 25.00)
Pharmacy assistants		
1. position level 4	12 (9.16)	17.00 (12.00 - 20.00)
2. position level 3	111 (84.73)	12.32 (10.00 - 20.00)
3. position level 1-2	8 (6.11)	11.67 (10.00 - 15.00)
Total	131 (100)	12.71 (10.00 - 20.00)
Personnel from other fields		
1. registered nurses	- (0)	-
2. technical nurses	7 (58.33)	22.00 (20.00 - 24.00)
3. others	5 (41.67)	20.00 (-)
Total	12 (100)	21.17 (20.00 - 24.00)
Employees		
1. permanent employees	810 (66.50)	12.30 (2.00 - 33.00)
2. temporary employees	408 (33.50)	4.88 (1.00 - 11.00)
Total	1,218 (100)	9.81 (1.00 - 33.00)

^a = do not including personnel working outside the scope of pharmacy profession or technical knowledge, for examples, delivering drug products, cleaning general floors or stocks.)

As shown in Table 4.5., the number and the estimated average working experience of hospital pharmacy personnel were from the 65 hospitals. There were 485 pharmacists with the average working experience of 8.05 years working in 65 hospitals. Majority, 313 pharmacists (64.54%), had position level 3-5. Thirty-seven pharmacists (7.63%) with the position level 8 had average working experience of 25.28 years and 133 (27.42%) with the position level 6-7 had 13.54 years. Only 2 pharmacists (0.41%) with the position level 9 had the longest average working experience of 32.50 years. For the pharmacy technicians, 323 persons had the average

working experience of 6.64 years. Almost a half of them, 153 persons (47.37%), with the position level 4-5 had the 10.11 years of the average experience. Eighty-four persons (26.01%) with the position level 3 had 4.89 years of the average experience and 86 persons (26.62%) with the position level 2 had 2.16 years of the average experience. Table 4.5. also showed that there were 131 pharmacy assistants with the average working experience of 12.71 years. The largest group of them was 111 persons (84.73%) with the position level 3 who had 12.32 years of the average experience. Twelve persons (9.16%) with the position level 4 had 17 years of the average experience and 8 persons (6.11%) with the position level 1-2 had 11.67 years. Twelve pharmacy supportive personnel with the average working experience of 21.17 years were from other fields such as technical nurses. The massive group of untrained pharmacy supportive personnel was the pharmacy employees, 1,218 persons with the average working experience of 9.81 years. About two-third of them, 810 persons representing 66.50%, were the permanent employees with 12.30 years of the average experience. The remaining 408 persons (33.50%) were temporary employees with the 4.88 years of the average experience.

All of the pharmacy supportive personnel, including pharmacy technicians, pharmacy assistants, pharmacy employees, and personnel from other fields, were totaled 1,684 persons. The trained supportive personnel, pharmacy technicians and pharmacy assistants, consisted of 454 persons calculating for 26.96% of all pharmacy supportive personnel. The untrained supportive personnel, pharmacy employees and personnel from other fields, consisted of 1,230 persons calculating for 73.04% of all pharmacy supportive personnel. This finding coincides with the previous study by Subcommittee on study for pharmacist requirement in government sectors and the Provincial Hospital Division, Ministry of Public Health (March 1993) that in central and general hospitals, 22% of all pharmacy supportive personnel were pharmacy technicians and pharmacy assistants and 78% were other personnel. The current manpower situation (January, 1996) of the hospital pharmacy supportive personnel working in the pharmacy department seems to be the same situation as in March, 1993.

The numbers of available and filled positions of the trained pharmacy supportive personnel (pharmacy technicians and pharmacy assistants) in 65 responded hospitals were shown in Table 4.6. For regional hospitals, the number of available of pharmacy technician positions for each hospital was 22, calculated for 176 in 8 responded hospitals. The number of filled pharmacy technician positions worked in 8 responded hospitals were 95, accounted for 53.98% of the available positions of pharmacy technicians. For general hospitals with more than 250 beds, the number of available pharmacy technician positions for each hospital was 15, calculated for 675 in 45 responded hospitals. The number of filled pharmacy technician positions working in 45 responded hospitals were 306, accounted for 45.33% of the available positions of pharmacy technicians. For general hospitals with less than 250 beds, the number of available pharmacy technician positions for each hospital was 8, calculated for 80 in 10 responded hospitals. The number of filled pharmacy technician positions worked in 10 responded hospitals were 44, accounted for 55.00% of the available positions of pharmacy technicians. For community hospitals, the number of available

pharmacy technician positions for each hospital was 3, calculated for 6 in 2 responded hospitals. The number of filled pharmacy technician positions worked in 2 responded hospitals were 9, accounted for 150.00% of the available positions of pharmacy technicians. For the total 65 responded hospitals, the number of available pharmacy technician positions were 937 and the number of filled pharmacy technician positions were 454, accounted for 48.45% of the available positions of pharmacy technicians. These data showed that there was not enough trained pharmacy supportive personnel or pharmacy technicians in every type of hospital except in the community hospitals that had more pharmacy technicians than the available positions. At that time, the 2 responded community hospitals were in the transition period to change from the community hospitals to be the general hospitals, therefore the number of working pharmacy technicians for them were expanded more than the number of available positions of regular community hospitals. However, in general, the total number of working pharmacy technicians were insufficiency.

Table 4.6. Number of pharmacy technician positions available and positions filled in 65 responded hospitals (January 1996).

Type of hospital	no. of responded hospitals	no. of pharmacy technicians ^a		
		no. of available positions per hospital ^b	total no. of available positions	no. of filled position (% of available positions)
1. regional	8	22	176	95 (53.98)
2. general: more than 250 beds	45	15	675	306 (45.33)
3. general: less than 250 beds	10	8	80	44 (55.00)
4. community	2	3	6	9 (150.00)
total	65	-	937	454 (48.45)

^a = including both pharmacy technician and pharmacy assistant positions.

^b = specified by the Civil Service Commission since 1996

The results from Table 4.5. and Table 4.6. suggested that the inadequate quantity of trained pharmacy supportive personnel would affect the quality of pharmacy services. Pharmacists have to spent a lot of time training the pharmacy employees while they are on the job and if the pharmacy employees cannot fulfill some technical tasks, pharmacists may have to do those by themselves. This situation is one of the factors that restrict pharmacists from developing and progressing the clinical activities because pharmacists have not enough time for them. Expanding the number of the trained pharmacy supportive personnel and using computer technology in the pharmacy department may increase pharmacists' time for clinical pharmacy activities.

3. Roles of hospital pharmacy personnel from the perspective of the hospital pharmacists.

To analyze the role of hospital pharmacy personnel, each job of each working unit was classified as a technical or a professional task. A technical task means an activity performed by using only pharmacy technical knowledge or not need pharmacy professional judgmental immediately. A professional task means an activity performed by using professional knowledge or judgmental immediately. The classification of jobs as technical and professional was based on the job description of pharmacy technicians and pharmacy technicians training curriculum. The lists of them were shown in Appendix... The regularity of each activity operated by each hospital pharmacy personnel was rated by the respondents as activity performed routinely or sometimes. Routinely means performing consistently, about 90-100% of ordinary workload. Sometimes means performing occasionally, much fewer than ordinary workload, because the number of the personnel might not be enough or other reasons. Each activity might be actually performed or expected to be performed by more than one type of personnel. The role of each hospital pharmacy personnel from the perspective of the hospital pharmacists was analyzed by comparing the number of the actual and/or the expected roles performed by each hospital pharmacy personnel for each of 10 working units.

3.1. Comparison of the actual and the expected roles of hospital pharmacists.

The actual and the expected roles of hospital pharmacist were compared as shown in Table 4.7.

1) For technical tasks.

When only the technical tasks were analyzed, those jobs that were responded as routine works, the expected roles were statistically significant higher than the actual roles for general production and community service unit. For outpatient unit, the expected roles were statistically significant less than the actual roles. When analysis was done for jobs that were both sometimes and routine works, the expected roles were statistically significant less than the actual roles for outpatient, inpatient, and inventory management and purchasing unit.

This finding showed that pharmacists might have to perform some technical tasks of every working unit and expected to do some technical tasks in general production and community service units. It seemed contrary to the fact that pharmacists should do more professional tasks and less technical tasks. There were 2 possible reasons for this finding, first reason might be the quantity and/or the quality of the pharmacy technicians were not enough for these tasks. The other reason might be the limitations of tasks' classification and the detailed of job list in the questionnaire. For example, in general production unit, the activities of weighing and calculating drug chemicals and other substance were classified as technical tasks and should be performed by the pharmacy technicians. However, these activities were not finished until being rechecked by pharmacists. While the job list detailed the activities in each working unit, it did not include the responsibility levels, e.g., weighing and calculating, or checking. This put some limitations on classification of

jobs into technical and professional aspects. Like the example in the general production unit, the activities defined as technical were not necessarily performed only by pharmacy technicians alone but could be by both pharmacy technicians and pharmacists. For 3 major units in pharmacy department, outpatient jobs and some of inpatient and inventory management and purchasing jobs, pharmacists expected to decrease their technical tasks.

2) For professional tasks.

When considering the group of professional tasks, for routine works only, the expected roles were statistically significant higher than the actual roles for every working unit. For activities performed both routinely and sometimes, the expected roles were not statistically significant higher than the actual roles for only 3 working units: outpatient, sterile production, and aseptic dispensary.

Table 4.7. The difference between the number of the actual roles and the expected roles performed by hospital pharmacists (mean of paired differences \pm SD).

working unit	no. of pairs	technical tasks		professional tasks	
		routinely	routinely+ sometimes	routinely	routinely+ sometimes
1. outpatient	272	0.28 \pm 1.89*	0.88 \pm 1.93*	-3.01 \pm 2.85*	-0.18 \pm 2.47
2. inpatient	212	0.05 \pm 1.82	0.56 \pm 1.89*	-5.20 \pm 2.92*	-2.20 \pm 2.80*
3. general production	139	-0.35 \pm 2.39*	0.17 \pm 2.15	-1.41 \pm 1.62*	-0.37 \pm 1.57*
4. sterile production	117	-0.21 \pm 2.44	0.20 \pm 2.36	-1.17 \pm 2.17*	-0.10 \pm 1.92
5. aseptic dispensary	35	-0.14 \pm 1.24	0.20 \pm 1.30	-0.60 \pm 1.29*	-0.06 \pm 1.21
6. quality control	43	- ^a	- ^a	-6.77 \pm 4.41*	-4.35 \pm 4.83*
7. inventory management and purchasing	162	0.38 \pm 4.25	1.57 \pm 4.01*	-6.31 \pm 8.24*	-1.22 \pm 6.76*
8. drug information service	140	- ^a	- ^a	-3.16 \pm 2.27*	-0.97 \pm 2.14*
9. community service ^b	27	-1.30 \pm 1.49*	-0.37 \pm 1.15	-3.56 \pm 2.93*	-1.59 \pm 3.09*
10. others	171	- ^c	- ^c	-1.70 \pm 2.70*	-0.46 \pm 2.13*

* = statistically significant at $\alpha = 0.05$ two-tailed.

^a = only one activity, keeping and reporting related statistics, was classified as technical task.

^b = only data from pharmacists working in the small general hospitals located in the remote districts apart from the Muang district and in the community hospitals were analyzed.

^c = no activity was classified as a technical task.

Note: - means that the number of the expected roles is more than the number of the actual roles.

+ means that the number of the actual roles is more than the number of the expected roles.

This finding showed that pharmacists should perform more professional tasks for every working units routinely.

The overall actual and expected roles of the hospital pharmacists from the perspective of hospital pharmacists revealed that

- hospital pharmacists expected to perform more professional tasks for every working unit.
- hospital pharmacists performed excess technical roles for outpatient jobs significantly.

Putting all results together, pharmacists tended to increase work responsibilities in the department. This trend might portrait a delegation problem from the pharmacist side, or a competency problem from the side of pharmacy supportive personnel, or a personnel shortage problem.

3.2. Comparison of the actual and the expected roles of hospital pharmacy technicians.

The actual and the expected roles of hospital pharmacy technicians were compared as shown in Table 4.8.

1) For technical tasks.

If only the technical tasks were considered, for those jobs that were responded as routine duties, the expected roles were statistically significant higher than the actual roles for every working unit. For both jobs performed routinely and sometimes, the same findings as routine duties were found except for the outpatient unit that the expected roles and the actual roles were not statistically different.

This finding showed that pharmacy technicians should be delegated more technical tasks routinely for every working unit.

2) For professional tasks.

When only the professional tasks were analyzed, for routine duties only, the expected roles were statistically significant higher than the actual roles for every working unit. For both jobs performed routinely and sometimes, the same outcomes as routine duties were found.

This finding showed that pharmacy technicians were also expected to do more technical tasks for every working unit routinely.

It seemed opposite to the fact that pharmacy technicians should perform more technical tasks and less professional tasks. There were 2 possible reasons for this finding, first might be the limitation of the tasks' classification and the detail of job list in the questionnaire like the finding of increasing expected technical roles for pharmacists. For example, the activity of mixing drug chemicals and other substances in general production unit was classified as a professional tasks for pharmacists, but it should be done by both pharmacy technicians (mixing) and pharmacists (controlling and rechecking). In answering the questionnaire, the pharmacist respondents could provide more than one type of personnel as an answer of who performed each activity. If each activity of each working unit in the questionnaire could be clarified more details, it would be clearer that which aspect of the activity should be the tasks of pharmacists or of other supportive personnel. For example, the activity of drug chemicals mixing could be separate to 3 components as following:

- specifying the procedures of drug chemicals mixing steps (professional tasks)
- doing drug chemicals mixing (technical tasks)
- controlling and rechecking (professional tasks).

Separating each activity to many smaller and clearer components would provide the advantage for tasks' classification. The study on Hospital Pharmacy Workload measurement: Case Studies in Srisaket General Hospital using more detailed tasks' classification had provide more information on jobs in pharmacy department (Pitaknitinun et al., 1994). However, the data collection of this detailed classification was not feasible at the aggregate level. Another disadvantage of the long and detailed questionnaire was the low response rate. Another possible explanation of professional expectation of pharmacy technicians could be that pharmacists had an attitude to delegate some parts of professional tasks that pharmacy technicians could do because they were trained by the training program or on-the-job training. For example, the activity of inspecting the qualities of raw materials was classified as a professional tasks in this study, while in the study of the effectiveness of the pharmacy-technician curriculum (Vidhayakorn et al., 1994) found that from the perspective of both pharmacists and pharmacy technicians, pharmacy technicians graduated from the Ministry of Public Health could well perform this activity. In other countries, there were trends to delegate more professional tasks to pharmacy technicians. For example, in the United States of America, the "Model Curriculum for Pharmacy Technician Training (First Edition)" established by the ASHP (1996) described one of the major areas of job responsibility for a pharmacy technician as assisting the pharmacist in the identification of patients who desired counseling on the use of medications, and equipment, and devices while this study described it as professional tasks for pharmacists only.

The overall actual and expected roles of the hospital pharmacy technicians from the perspective of hospital pharmacists suggested that:

- pharmacy technicians should be delegated more roles of technical and professional tasks for every working unit.

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

Table 4.8. The difference between the number of the actual roles and the expected roles performed by hospital pharmacy technicians (mean of paired differences \pm SD).

working unit	no. of pairs	technical tasks		professional tasks	
		routinely	routinely+ sometimes	routinely	routinely+ sometimes
1. outpatient	272	-1.10 \pm 3.52*	-0.29 \pm 3.40	-0.91 \pm 1.59*	-0.32 \pm 1.54*
2. inpatient	212	-1.90 \pm 3.81*	-1.12 \pm 3.81*	-0.94 \pm 1.44*	-0.45 \pm 1.50*
3. general production	139	-1.29 \pm 2.64*	-0.91 \pm 2.62*	-0.81 \pm 1.41*	-0.65 \pm 1.42*
4. sterile production	117	-1.72 \pm 3.10*	-1.42 \pm 3.11*	-1.13 \pm 1.56*	-0.90 \pm 1.65*
5. aseptic dispensary	35	-0.94 \pm 1.11*	-0.77 \pm 0.97*	-0.46 \pm 0.66*	-0.34 \pm 0.80*
6. quality control	43	- ^a	- ^a	-1.88 \pm 3.19*	-1.60 \pm 3.03*
7. inventory management and purchasing	162	-4.01 \pm 5.28*	-3.06 \pm 4.95*	-1.91 \pm 2.91*	-1.36 \pm 2.88*
8. drug information service	140	- ^a	- ^a	-0.78 \pm 1.26*	-0.56 \pm 1.13*
9. community service ^b	27	-0.74 \pm 0.94*	-0.48 \pm 0.94*	-0.85 \pm 1.29*	-0.70 \pm 1.27*
10. others	171	- ^c	- ^c	-0.23 \pm 0.69*	-0.16 \pm 0.63*

* = statistically significant at $\alpha = 0.05$ two-tailed.

^a = only one activity, keeping and reporting related statistics, was classified as technical task.

^b = only data from pharmacists working in the small general hospitals located in the remote districts apart from the Muang district and in the community hospitals were analyzed.

^c = no activity was classified as a technical task.

Note: - means that the number of the expected roles is more than the number of the actual roles.

+ means that the number of the actual roles is more than the number of the expected roles.

3.3. Comparison of the actual and the expected roles of hospital pharmacy employees.

The actual and the expected roles of hospital pharmacy employees were compared as shown in Table 4.9.

1) For technical tasks.

When considering only the group of technical tasks, for routine duties only, the expected role were statistically significant less than the actual roles for 4 working units: outpatient, inpatient, general production, and sterile production. For aseptic dispensary and community service unit, the expected role were statistically significant higher than the actual roles. There were no statistical difference between the expected and the actual roles for inventory management and purchasing unit. For both duties performed routinely and sometimes, the same findings as routine duties were found

except for the aseptic dispensary unit that the number of the actual and the expected roles were not statistically different and for the inventory management and purchasing unit that the actual roles were statistically significant higher than the expected roles.

This finding showed that pharmacy employees were delegated much more technical roles for outpatient, inpatient, general production, sterile production, and some of inventory management and purchasing jobs than they should do. Pharmacy employees should be delegated more technical roles for aseptic dispensary and community service unit.

It could be explained that from the perspective of pharmacists, pharmacy employees were not expected to do many technical tasks. The possible reason might be that pharmacy employees were the untrained pharmacy supportive personnel, if pharmacists had an opportunity to choose their supportive personnel, they would prefer trained pharmacy supportive personnel like pharmacy technicians. For aseptic dispensary and community service unit, pharmacists might expect to delegate more technical tasks to pharmacy employees. The possible reason might be that pharmacy technicians had inadequate knowledge and skill in these areas. It was confirmed by the course description of the "Certificate in Public Health Program (Pharmacy technique), revision 1995" (Institution of Health Manpower Development, 1995) that the contents were not included enough knowledge and skill of those areas. If the pharmacy supportive personnel had to work in those areas, pharmacists had to trained them on-the-job and pharmacists could choose both trained or untrained pharmacy supportive personnel. Another possible reason might be that there was not enough number of pharmacy technicians for all hospital pharmacy tasks, as shown in Table 4.6., and the distribution of their major areas of work tended to be in pharmacy service group (51.19%), but there was nobody in aseptic dispensary job and very few in community service group (1.19%), as shown in Table 4.15.

2) For professional tasks.

If only the professional tasks were analyzed, for those jobs that were responded as routine duties only, the expected roles were statistically significant higher than the actual roles for drug information service unit. On the other way, the expected roles were statistically significant less than the actual roles for outpatient, inpatient, general production, sterile production, and inventory management and purchasing unit. There were no statistical difference between the actual and the expected roles for aseptic dispensary, quality control, community service, and others units. For both duties performed routinely and sometimes, the same finding as routine tasks were found except for the aseptic dispensary unit that there was no complete data to analyze.

This finding showed that pharmacy employees performed much more professional tasks for outpatient, inpatient, general production, sterile production, and inventory management and purchasing unit than they were expected to do. For drug information service unit, it seemed that pharmacy employees should be delegated more professional tasks. The possible reason might be that drug information service unit contained all professional activities except for the only one activity of keeping and reporting related statistics. Pharmacy technicians could not help much in this area because the activities were not the technical tasks and they were not be trained for. It

was confirmed by the study at Srisaket General Hospital which provided the example of practical case in educational jobs (Pitaknitiun et al., 1994). If pharmacists wanted some pharmacy supportive personnel, they could train their own supportive personnel from both pharmacy technicians or pharmacy employees.

Table 4.9. The difference between the number of the actual roles and the expected roles performed by hospital pharmacy employees (mean of paired differences \pm SD).

working unit	no. of pairs	technical tasks		professional tasks	
		routinely	routinely+ sometimes	routinely	routinely+ sometimes
1. outpatient	272	0.78 \pm 3.33*	1.54 \pm 3.13*	0.73 \pm 1.11*	0.93 \pm 1.19*
2. inpatient	212	0.52 \pm 3.96*	1.18 \pm 3.77*	0.28 \pm 0.85*	0.43 \pm 0.83*
3. general production	139	0.33 \pm 2.20*	0.65 \pm 2.07*	0.27 \pm 0.83*	0.35 \pm 0.80*
4. sterile production	117	0.78 \pm 2.42*	1.10 \pm 2.35*	0.32 \pm 1.06*	0.55 \pm 1.14*
5. aseptic dispensary	35	-0.31 \pm 0.96*	-0.09 \pm 1.15	-0.03 \pm 0.17	- ^d
6. quality control	43	- ^a	- ^a	0.93 \pm 1.17	0.28 \pm 1.86
7. inventory management and purchasing	162	-0.01 \pm 4.78	0.68 \pm 4.24*	0.25 \pm 1.68*	0.40 \pm 1.53*
8. drug information service	140	- ^a	- ^a	-0.16 \pm 0.52*	-0.08 \pm 0.51*
9. community service ^b	27	-0.33 \pm 0.73*	-0.30 \pm 0.78*	-0.15 \pm 0.60	-0.11 \pm 0.64
10. others	171	- ^c	- ^c	-0.01 \pm 0.11	-0.01 \pm 0.08

* = statistically significant at $\alpha = 0.05$ two-tailed.

^a = only one activity, keeping and reporting related statistics, was classified as technical task.

^b = only data from pharmacists working in the small general hospitals located in the remote districts apart from the Muang district and in the community hospitals were analyzed.

^c = no activity was classified as a technical task.

^d = the standard error of the difference was 0, therefore, this analysis could not be performed.

Note: - means that the number of the expected roles is more than the number of the actual roles.

+ means that the number of the actual roles is more than the number of the expected roles.

The overall actual and expected roles of the hospital pharmacy employees from the perspective of hospital pharmacists suggested that:

- pharmacy employees should be delegated more roles of technical tasks for aseptic dispensary and community service unit.
- pharmacy employees were delegated much more technical roles of technical tasks for outpatient, inpatient, general production, and sterile production unit than they were expected to do.

3.4. Comparison of the actual technical roles of hospital pharmacists and hospital pharmacy technicians.

As shown in Table 4.10., when analysis was done for only routine actual technical roles, pharmacy technicians performed significantly more than pharmacists for 3 working units of outpatient, inpatient, and inventory management and purchasing. For aseptic dispensary and community service unit, pharmacists performed routine actual technical roles significantly more than pharmacy technicians and 2 working units of general production and sterile production, there was no difference between pharmacists and pharmacy technicians. For actual technical roles performed both routinely and sometimes, the same findings as routine technical roles were found.

This finding showed that pharmacy technicians currently performed more technical roles than pharmacists in outpatient, inpatient, and inventory management and purchasing jobs. For aseptic dispensary and community service jobs, pharmacists still performed more technical roles than pharmacy technicians.

It could be explained that at present, pharmacy technicians were responsible for the technical tasks of outpatient, inpatient and inventory management and purchasing units and pharmacists also expected them to do technical tasks of these area. It was confirmed by the findings in Table 4.7. that pharmacists expected themselves to do less technical tasks of these 3 working units. The results was also supported by the distribution of the number of pharmacy technicians in the Table 4.15. Pharmacy technicians tended to be assigned mostly to pharmacy service group (51.19%) and drug products and drug information service group (25.00%). For aseptic dispensary and community service unit, at present, pharmacists had to spend their time for the technical tasks of these jobs more than pharmacy technicians did. On the other hand, pharmacy technicians could not help pharmacists in these areas. The possible reason might be the same reason explaining the increasing expected technical roles for pharmacy employees in these 2 working units as shown in Table 4.9. that they were not trained for.

3.5. Comparison of the expected technical roles of hospital pharmacists and hospital pharmacy technicians.

As shown in Table 4.10., for the part of expected technical roles, pharmacy technicians were expected to perform more technical roles than pharmacists for 5 working units of outpatient, inpatient, general production, sterile production, and inventory management and purchasing. The number of expected technical roles performed by pharmacy technicians were statistically significant less than that

performed by pharmacists for community service unit. There was no statistically significant difference between the number of expected technical roles performed by pharmacy technicians and pharmacists for aseptic dispensary unit.

This finding showed that from the perspective of pharmacists, pharmacy technicians should be delegated more technical roles than pharmacists doing it themselves for 5 working units of outpatient, inpatient, general production, sterile production, and inventory management and purchasing, in particular, the technical functions of the general production and sterile production units were expected to be more responsible by pharmacy technicians than the current situation. Pharmacists still thought that other technical roles, especially in community service unit, should be kept within the profession.

Table 4.10. The difference between the number of the actual technical roles performed by pharmacists and pharmacy technicians and the difference between the number of the expected technical roles performed by pharmacists and pharmacy technicians (mean of paired differences \pm SD).

working unit	no. of pairs	actual technical roles		expected technical roles
		routinely	routinely+ sometimes	
1. outpatient	272	-4.90 \pm 3.40*	-5.11 \pm 3.57*	-6.29 \pm 3.06*
2. inpatient	212	-4.28 \pm 3.63*	-4.54 \pm 3.77*	-6.23 \pm 3.05*
3. general production	139	-0.15 \pm 3.47	-0.02 \pm 3.73	-1.09 \pm 3.14*
4. sterile production	117	0.19 \pm 3.74	0.29 \pm 3.89	-1.32 \pm 3.43*
5. aseptic dispensary	35	1.17 \pm 1.32*	1.34 \pm 1.37*	0.37 \pm 1.66
6. quality control ^a	-	-	-	-
7. inventory management and purchasing	162	-2.32 \pm 6.63*	-2.07 \pm 7.26*	-6.70 \pm 6.46*
8. drug information service ^a	-	-	-	-
9. community service ^b	27	0.70 \pm 0.82*	1.37 \pm 1.31*	1.26 \pm 1.83*
10. others ^c	-	-	-	-

* = statistically significant at $\alpha = 0.05$ two-tailed.

^a = only one activity, keeping and reporting related statistics, was classified as technical task.

^b = only data from pharmacists working in the small general hospitals located in the remote districts apart from the Muang district and in the community hospitals were analyzed.

^c = no activity was classified as a technical task.

Note: - means that the number of the actual or expected technical roles performed by pharmacy technicians is more than by pharmacists.

+ means that the number of the actual or expected technical roles performed by pharmacists is more than by pharmacy technicians.

3.6. Comparison of the actual technical roles of hospital pharmacy technicians and hospital pharmacy employees.

As shown the Table 4.11., when only the actual technical roles performed by pharmacy technicians and pharmacy employees routinely were analyzed, the number of those performed by pharmacy technicians was statistically significant higher than by pharmacy employees for only the working unit of inventory management and purchasing. The number of routine actual technical roles performed by pharmacy technicians was statistically significant less than by pharmacy employees for 3 working units of inpatient, sterile production and aseptic dispensary. There was no statistical difference for outpatient, general production, and community service unit. For actual technical roles performed both routinely and sometimes, the same findings as routine technical roles were found except for only the community service unit that number of actual technical roles performed by pharmacy technicians was statistically significant higher than by pharmacy employees.

This finding showed that pharmacy employees performed more current technical roles than pharmacy technicians for inpatient, sterile production, and aseptic dispensary unit. For the working unit inventory management and purchasing, pharmacy technicians performed more current technical roles than pharmacy employees.

The results suggested that, at present, the quantity and/or quality of pharmacy technicians might not be enough for 3 working units of inpatient, sterile production and aseptic dispensary, therefore, pharmacy employees were delegated technical roles more than pharmacy technicians. The outnumber of pharmacy employees would support this explanation. For inventory management and purchasing unit, at present, there might be enough pharmacy technicians to perform the technical tasks, thus pharmacy employees were delegated technical tasks less than pharmacy technicians.

3.7. Comparison of the expected technical roles of hospital pharmacy technicians and hospital pharmacy employees.

As shown in the Table 4.11., for expected technical roles, the number of expected technical roles performed by pharmacy technicians were statistically significant higher than by pharmacy employees for 5 working units of outpatient, inpatient, general production, sterile production and inventory management and purchasing. There was no statistically difference for 2 working unit of aseptic dispensary and community service unit. The results from the expected technical roles suggested differently from what was currently happening in every working unit except the inventory management and purchasing unit.

It could be explained that pharmacists desired to delegate more technical tasks to pharmacy technicians than to pharmacy employees for every working unit because pharmacy technicians were trained directly for technical tasks but for pharmacy employees, pharmacists had to spend time for training them on-the-job. For 2 working units of aseptic dispensary and community service, even there was no difference for the delegation of technical roles to pharmacy employees or to pharmacy technicians. The expectation still showed the different direction from the

actual situation. Comparing between the actual and expected situations, pharmacists still wanted to put more pharmacy technicians on these two jobs.

Table 4.11. The difference between the number of the actual roles technical roles performed by pharmacy technicians and pharmacy employees and the difference between the number of the expected technical roles performed by pharmacy technicians and pharmacy employees (mean of paired differences \pm SD).

working unit	no. of pairs	actual technical roles		expected technical roles
		routinely	routinely+ sometimes	
1. outpatient	272	0.11 \pm 4.41	0.16 \pm 4.78	1.99 \pm 4.59*
2. inpatient	212	-1.22 \pm 4.99*	-1.10 \pm 5.43*	1.20 \pm 5.08*
3. general production	139	0.34 \pm 3.54	-0.27 \pm 3.71	1.28 \pm 2.85*
4. sterile production	117	-0.74 \pm 3.75*	-0.77 \pm 3.98*	1.75 \pm 3.05*
5. aseptic dispensary	35	-0.46 \pm 1.22*	-0.51 \pm 1.31*	0.17 \pm 1.65
6. quality control ^a	-	-	-	-
7. inventory management and purchasing	162	2.36 \pm 7.08*	2.62 \pm 7.78*	6.36 \pm 7.15*
8. drug information service ^a	-	-	-	-
9. community service ^b	27	0 \pm 0.28	0.22 \pm 0.58*	0.41 \pm 1.25
10. others ^c	-	-	-	-

* = statistically significant at $\alpha = 0.05$ two-tailed.

^a = only one activity, keeping and reporting related statistics, was classified as technical task.

^b = only data from pharmacists working in the small general hospitals located in the remote districts apart from the Muang district and in the community hospitals were analyzed.

^c = no activity was classified as a technical task.

Note: - means that the number of the actual or expected technical roles performed by pharmacy employees is more than by pharmacy technicians.

+ means that the number of the actual or expected technical roles performed by pharmacy technicians is more than by pharmacy employees.

3.8. Comparison of the actual and the expected number (manpower) of hospital pharmacy personnel.

Table 4.12. The difference between the actual and the expected numbers of hospital pharmacy personnel from the perspective of pharmacists (means of paired differences \pm SD).

working unit	pharmacists (no. of pairs)	pharmacy technicians (no. of pairs)	pharmacy employees (no. of pairs)
1. outpatient	-0.87 \pm 1.11* (187)	-2.01 \pm 2.32* (184)	0.06 \pm 2.81 (181)
2. inpatient	-0.99 \pm 1.30* (153)	-1.74 \pm 2.54* (151)	-0.51 \pm 2.59* (150)
3. general production	-0.13 \pm 0.44* (102)	-0.94 \pm 1.12* (102)	-0.22 \pm 1.11* (102)
4. sterile production	-0.15 \pm 0.51* (83)	-1.63 \pm 2.47* (84)	0.42 \pm 2.15* (86)
5. aseptic dispensary	-0.25 \pm 0.55* (20)	-0.58 \pm 0.49* (20)	-0.38 \pm 0.67* (21)
6. quality control	-0.16 \pm 0.36* (28)	-0.53 \pm 0.63* (29)	-0.33 \pm 0.61* (30)
7. inventory management and purchasing	-0.38 \pm 1.80* (102)	-1.31 \pm 2.21* (99)	-0.57 \pm 2.42* (99)
8. drug information service	-0.31 \pm 0.92* (97)	-0.61 \pm 0.68* (106)	-0.20 \pm 0.56* (107)
9. community service ^a	0.26 \pm 0.99 (19)	-0.68 \pm 0.82* (19)	-0.30 \pm 0.08 (20)
10. others	-0.20 \pm 1.77 (99)	-0.40 \pm 1.05* (114)	-0.06 \pm 0.27* (115)

* = statistically significant at $\alpha = 0.05$ two-tailed.

^a = only data from pharmacists working in the small general hospitals located in the remote districts apart from the Muang district and in the community hospitals were analyzed.

Note: - means that the expected number of hospital pharmacy personnel is more than the actual number of hospital pharmacy personnel.

+ means that the actual number of hospital pharmacy personnel is more than the expected number of hospital pharmacy personnel.

From the perspective of pharmacists, the current and expected numbers of each hospital pharmacy personnel: pharmacists, pharmacy technicians, and pharmacy employees, working in each working unit were compared as shown in Table

4.12. For hospital pharmacists, the expected number was statistically significant higher than the current number for every working unit except for only two units of community service and others that had no statistical difference. For hospital pharmacy technicians, the expected number was statistically significant higher than the current number for every working unit. For hospital pharmacy employees, the expected number was statistically significant higher than the current number for every working unit except for outpatient, sterile production, and community service unit. There was no statistical difference for outpatient and community service unit. The current number of the hospital pharmacy employees was statistically significant higher than the expected number for sterile production unit.

These findings showed that there were the significant demand of the pharmacists for the roles of every working unit except community and others unit. The inadequacy of the pharmacy technicians was found in every working unit. The number of the pharmacy employees should be increased in every working unit except outpatient and community service unit that might had enough number of the pharmacy employees at that time. The number of pharmacy employee should be decreased for sterile production unit, that might require more technical knowledge and skills than other jobs so it should be appropriate for well trained pharmacy personnel, pharmacy technicians.

It could be explained that from perspective of pharmacists, there were demand on the number of pharmacists for every working unit except community service and others unit. The possible reason might be that the number of pharmacists was not enough or pharmacists wanted to expand their jobs. For community service unit, there might not be many pharmacists responsible for this areas because the community service jobs were involved with primary health care service that was not the major area of the regional and general hospitals. For others unit, there might be only the head of pharmacy departments who was responsible for the general administration activities and a few pharmacists for student training activities.

For the number of pharmacy technicians, pharmacists thought that it should be increased for every working unit. It might portrait the problem of trained pharmacy supportive personnel shortage for hospital pharmacy tasks. It was confirmed by the data in Table 4.6. that in 65 responded hospitals, there were only 48.45% of filled pharmacy technicians position for the available positions.

For the number of pharmacy employees, pharmacists thought that it should be increased for nearly every working unit, although they were untrained pharmacy supportive personnel, this might be the result from the problem of pharmacy technicians shortage. In sterile production unit, pharmacists did not expect to increase the number of pharmacy employees. The possible reason might be that this job needed much more technical skill than other jobs. Therefore, the pharmacy technicians might be more appropriate for this job than pharmacy employees.

Part II Roles of Hospital Pharmacy Technicians from the Perspective of the Hospital Pharmacy Technicians.

1. General information of respondents.

The questionnaire booklets were sent to the 97 sampled pharmacy technicians working in 12 selected hospitals, each hospital was selected from each of 12 provincial health sectors by clustered random sampling technique. After the follow-up in 2 months period, 63 usable responses were returned from hospital pharmacy technicians, accounted for 64.95%. The distribution of the 63 respondents were shown in Table 4.13.

Table 4.13. The distribution of the hospital pharmacy technician respondents.

Type of Hospitals	No. of selected Hospitals	No. of the Respondents (n) (% response rate)	% of Total 63 Respondents
1. Central	3	20 (n=38) (52.63%)	31.75
2. General	8	41 (n=54) (75.93%)	65.08
3. Community	1	2 (n=5) (40.00%)	3.17
Total	12	63 (n=97) (64.95%)	100

For 3 selected central hospitals, 20 usable responses from 38 mailed questionnaire booklets were returned with 52.63% response rate, calculated for 31.75% of the total 63 respondents. For 8 selected general hospitals, 41 usable responses from 54 mailed questionnaire booklets were returned with 75.93% response rate, representing 65.08% of the total 63 respondents. For one selected community hospital, 2 usable responses from 5 mailed questionnaire booklets were returned with 40.00% response rate, calculated for 3.17% of the total 63 respondents.

The demographic data of the total 63 hospital pharmacy technician respondents were shown in Table 4.14. Twenty-five (39.68%) of those were male and 38 (60.32%) were female. The age of 36-40 years group and the age of 21-25 years group represented the two largest groups. Seventeen persons or 27.87% were in the group of 36-40 years of age and 15 persons or 24.59% were those with 21-25 years old. Twenty-one (33.33%) of the respondents graduated a one year pharmacy assistant training course from the Pharmacy Assistant School, Rajavithi General Hospital. Thirty-eight (60.32%) of the respondents graduated a two years pharmacy technician training course from Pharmacy Technician School, Ratchavith General Hospital and Sirindhorn Public Health College in Chonburi, Konkhean, Pitsanulok, and Yala provinces. Two largest groups of respondents were 24 with the 5.1-10.0 years of experience in hospital pharmacy tasks accounting for 38.10% and 19 with the 0-5.0 years of the experience representing 30.16%. For the respondents with position level 5, 17 persons (27.42%) were the largest group. The respondents with position level 4 were equal to those with position level 3, 16 persons or 25.81% each. Thirteen respondents had position level 2 representing 20.96%.

The major area of work for each pharmacy technician respondents were shown in Table 4.15. About a half of those, 43 persons or 51.19%, worked in the major area of pharmacy service group. There were 28 persons working in outpatient service representing 33.33% and 14 persons or 16.67% working in inpatient service. Twenty-one respondents (25.00%) worked in the major area of drug products and drug information service group. There twelve persons (14.29%) working in drug products inventory management duties and 8 persons (9.52%) working in drug products purchasing and distribution duties. For major area of production group, 7 persons (8.33%) were in general (non-sterile) production duties and 5 persons (5.95%) were in sterile production duties.

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Table 4.14. Demographic data of hospital pharmacy technician respondents

Demographic Characteristics	Number (n=63)	Percent
Sex		
male	25	39.68
female	38	60.32
Age (years)		
21 - 25	15	24.59
26 - 30	9	14.75
31 - 35	11	18.03
36 - 40	17	27.87
41 - 45	7	11.48
46 - 50	1	1.64
51 - 55	1	1.64
mean = 32.93 SD = 7.79 max. = 54 min. = 21 missing = 2		
Graduated Institution		
1. one year pharmacy assistant training course		
1.1. Pharmacy Assistant School, Rajavithi General Hospital	21	33.33
2. two years pharmacy technician training course	12	19.05
2.1. Pharmacy Technician School, Rajavithi General Hospital		
2.2. Sirindhorn Public Health College,		
2.2.1. Chonburi Province	5	7.94
2.2.2. Konkhaen Province	6	9.52
2.2.3. Pitsanulok Province	5	7.94
2.2.4. Yala Province	10	15.87
3. others	4	6.35
Experience in Hospital Pharmacy Task (years)		
0 - 5.0	19	30.16
5.1 - 10.0	24	38.10
10.1 - 15.0	9	14.28
15.1 - 20.0	8	12.70
20.1 - 25.0	2	3.17
25.1 - 30.0	-	-
30.1 - 35.0	-	-
35.1 - 40.0	1	1.59
mean = 9.19 SD = 6.84 max. = 38.0 min. = 0.5 missing = 0		
Current Position Level		
1. position level 5	17	27.42
2. position level 4	16	25.81
3. position level 3	16	25.81
4. position level 2	13	20.96
		missing = 1

Table 4.15. Major area of work for individual pharmacy technicians

Major area of work	Number (n=84)*	Percent
1. Pharmacy service group		
1.1. outpatient	28	33.33
1.2. inpatient	14	16.67
1.3. patient drug counseling	1	1.19
1.4. drug related problems monitoring	-	-
1.5. therapeutic drug monitoring	-	-
Total	43	51.19
2. Drug products and drug information services group		
2.1. drug products purchasing and distribution	8	9.52
2.2. drug products inventory management	12	14.29
2.3. drug information services	1	1.19
Total	21	25.00
3. Production group		
3.1. general (non-sterile) production	7	8.33
3.2. sterile production	5	5.95
3.3. aseptic dispensary	-	-
3.4. quality control	3	3.57
Total	15	17.85
4. Community services group		
4.1. consumer protection	-	-
4.2. supporting primary health care service	-	-
4.3. supporting other health service setting	1	1.19
4.4. home pharmaceutical care	-	-
Total	1	1.19
5. others		
5.1. general administration	3	3.57
5.2. other	1	1.19
Total	4	4.76

* some individuals responsible for more than one major areas of work.

2. Roles of hospital pharmacy technicians from the perspective of the hospital pharmacy technicians.

2.1. Comparison of the actual and the competent roles of hospital pharmacy technicians.

The actual and the competent roles of hospital pharmacy technicians were compared as shown in Table 4.16.

Table 4.16. The difference between the number of the actual roles and the competent roles performed by hospital pharmacy technicians from the perspective of pharmacy technicians (mean of paired differences \pm SD).

working unit	no. of pairs	technical tasks		professional tasks	
		routinely	routinely+ sometimes	routinely	routinely+ sometimes
1. outpatient	47	-4.79 \pm 4.92*	-0.53 \pm 3.90	-4.38 \pm 3.06*	0 \pm 2.54
2. inpatient	41	-5.24 \pm 5.22*	-1.27 \pm 4.46*	-3.80 \pm 3.12*	-0.54 \pm 2.70
3. general production	18	-4.22 \pm 4.85*	-0.39 \pm 3.60	-2.11 \pm 2.54*	-0.39 \pm 1.79
4. sterile production	12	-4.08 \pm 3.42*	-0.17 \pm 0.72	-2.67 \pm 1.78*	-0.25 \pm 1.22
5. aseptic dispensary	9	-1.89 \pm 2.09*	-0.22 \pm 1.20	-1.22 \pm 1.20*	0.22 \pm 0.67
6. quality control	8	- ^a	- ^a	-2.50 \pm 3.07*	0.38 \pm 2.77
7. inventory management and purchasing	27	-4.85 \pm 5.24*	-1.48 \pm 4.19*	-6.37 \pm 5.26*	-1.85 \pm 3.59*
8. drug information service	8	- ^a	- ^a	-2.63 \pm 2.39*	-0.25 \pm 1.67
9. community service ^b	2	-3.50 \pm 0.71*	-2.50 \pm 0.71	-5.50 \pm 3.54	-5.00 \pm 4.24
10.others	12	- ^c	- ^c	-2.92 \pm 1.98*	-1.25 \pm 2.26*

* = statistically significant at $\alpha = 0.05$ two-tailed.

^a = only one activity, keeping and reporting related statistics, was classified as technical task.

^b = only data from pharmacists working in the small general hospitals located in the remote districts apart from the Muang district and in the community hospitals were analyzed.

^c = no activity was classified as a technical task.

Note: - means that the number of the competent roles is more than the number of the actual roles.

+ means that the number of the actual roles is more than the number of the competent roles.

1) For technical tasks.

When only the technical tasks were analyzed, those job that were responded as routine work, competent roles was statistically significant higher than actual roles for every working unit. When analysis was done for jobs that were both sometimes and routine works, only inpatient and inventory management and purchasing unit that the competent roles were statistically significant higher than the actual roles.

The results revealed that pharmacy technicians thought they could do more technical tasks than those assigned by pharmacists for every working unit because they were trained by the Ministry of Public Health. If there were some knowledge and skills that were extra from the training program, they might expect that they could learn it on-the-job by the pharmacists.

This finding accompanied with the finding from the perspective of pharmacists that they want to delegate more technical tasks to the pharmacy technicians (as shown in Table 4.8.) should reflect the problem of supportive personnel shortage.

2) For professional tasks.

When looking at the group of professional tasks, for routine works only, the competent roles were statistically significant higher than the actual roles for every working unit except community service unit. For both jobs performed routinely and sometimes, the competent and the actual roles were not statistically significant different for every working unit except for inventory management and purchasing and others units that the competent roles were statistically significant higher than the actual roles. It could be explained by the same reasons of the finding for professional tasks performing by pharmacy technicians from the perspective of pharmacists in Table 4.8. The possible reason that pharmacy technicians might be able to perform some part of professional tasks was agreed with the study by Vidhayakorn (1994). That study showed that from the perspective of pharmacy technicians for the pharmacy-technician curriculum of the Ministry of Public Health, they thought they could well perform some professional tasks, for example,

1. Dispensing unit: pharmaceutical product preparation for daily dispensing.
 - reporting for degraded or expired pharmaceutical products.
2. Production unit:
 - inspecting the qualities of water.
 - inspecting the qualities of raw materials.
3. Educational activities: including drug information service, education, training and preparing documents or displays for health education.
 - keeping and collecting related textbooks and documents
 - collecting, assessing, and presenting the drug information service data
 - developing materials for training and educations.

For community service unit, pharmacy technicians thought that the current and the competent roles were not different. The possible reason might be that there was not much content about community service job in the pharmacy technician training curriculum so pharmacy technicians might think that they had not much competency in this job.

The important findings of the overall actual and expected roles of hospital pharmacy technicians from the perspective of hospital pharmacy technicians were as following:

- pharmacy technicians had more competencies than the assignments by the pharmacists for every working unit especially for inventory control and purchasing unit.
- pharmacy technicians should be delegated more roles of technical tasks for every working unit that agreed with the pharmacists' perspective.

Table 4.17. The difference between the actual and the expected numbers of hospital pharmacy technicians from the perspective of pharmacy technicians (mean of paired differences \pm SD).

working unit	no. of pairs	mean \pm SD
1. outpatient	36	-1.86 \pm 2.67*
2. inpatient	31	-2.10 \pm 1.30*
3. general production	14	-0.71 \pm 1.44*
4. sterile production	10	-0.60 \pm 1.90
5. aseptic dispensary	6	-0.67 \pm 0.82
6. quality control	6	-0.50 \pm 0.55*
7. inventory management and purchasing	18	-1.39 \pm 0.70*
8. drug information service	1	N/A
9. community service ^a	2	N/A
10. others	5	-1.40 \pm 1.14*

* = statistically significant at $\alpha = 0.05$ two-tailed.

^a = only data from pharmacists working in the small general hospitals located in the remote districts apart from the Muang district and in the community hospitals were analyzed.

N/A = not applicable.

Note: - means that the expected numbers of hospital pharmacy technicians is more than the actual numbers of hospital pharmacy technicians.

+ means that the actual numbers of hospital pharmacy technicians is more than the expected numbers of hospital pharmacy technicians.

2.2. Comparison of the actual and the expected numbers (manpower) of hospital pharmacy technicians.

The number of pharmacy technicians was included the number of current pharmacy technicians and current pharmacy assistants because the Ministry of Public Health has a plan for retraining all pharmacy assistant to be pharmacy technicians. As shown in Table 4.17., from the perspective of hospital pharmacy technicians, the expected number of pharmacy technicians was statistically significant

higher than the current number for every working unit except for 2 working units of sterile production and aseptic dispensary that there was no difference between the expected and the current number. For 2 others working units of drug information service and community service, there was no complete data for analyzing. This section was not included the number of hospital pharmacy employees.

It suggested that from the perspective of pharmacy technicians, the number of pharmacy technicians was not enough in 6 working units of outpatient, inpatient, general production, quality control, inventory control and purchasing, and others which agreed with the perspective of pharmacists (Table 4.12.).



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Part III Comparison of the Actual and the Expected Roles and Numbers of Hospital Pharmacy Technicians from the Perspective of the Hospital Pharmacists and of the Hospital Pharmacy Technicians.

1. Comparison of the actual and the expected roles of hospital pharmacy technicians from the perspectives of hospital pharmacists and hospital pharmacy technicians.

The data of actual and expected roles of pharmacy technicians in Table 4.8., and Table 4.16. were compared.

1) For technical tasks.

When considering routine works only, pharmacy technicians thought that they could perform more technical jobs than pharmacists currently assigned them for every working unit and pharmacists also expected that they should delegate more technical jobs to pharmacy technicians in every working unit. For jobs performed both routinely and sometimes, pharmacy technicians thought that they could perform more technical jobs than pharmacists currently assigned them for only 2 working units of inpatient and inventory management and purchasing, while pharmacists expected that they should delegate more technical jobs to pharmacy technicians in every working unit except outpatient unit that there were no difference.

2) For professional tasks.

When only routine professional tasks were compared, those jobs that were responded as routine works only, the opinions of both pharmacy technicians and pharmacists were that pharmacy technicians could be increased professional roles in every working unit except community service unit that pharmacy technicians thought there was no need to increase the professional roles. For jobs performed both routinely and sometimes, pharmacy technicians thought that they could perform more professional tasks than they were assigned to do for only 2 working units of inventory management and purchasing, and others while pharmacists expected that they should delegate more professional jobs to pharmacy technicians in every working unit. In fact, pharmacy technicians should not be assigned to perform professional tasks but there might be the limitation of the tasks' classification or pharmacy technicians could really do some professional tasks.

2. Comparison of the actual and expected numbers of hospital pharmacy technicians from the perspectives of hospital pharmacists and hospital pharmacy technicians.

The data of number of pharmacy technicians in Table 4.12., and Table 4.17. were compared. Pharmacy technicians thought that the number of them was not enough for six working units of outpatient, inpatient, general production, quality control, inventory control and purchasing, and others. For sterile production and aseptic dispensary unit that required more technical knowledge and skills than other jobs, pharmacy technicians thought that the number of them should not be increased in those jobs. While pharmacists expected that the number of pharmacy technicians should be expanded in every working unit. The differences in opinion might emerge from the fact that the production units were still needed as a part of hospital pharmacy

workload. These units have been perceived to be able to produce a low cost medications which turned into hospital saving. If so, it showed the undoubted performance of hospital pharmacy.

These findings of actual and expected roles and quantity of pharmacy technicians showed that there were demand for both quantity and quality of pharmacy technicians helping pharmacists in every working unit especially for inventory control and purchasing unit.

In spite of the fact that hospital pharmacy practices were gradually changed from the product-orientation in the past to the current concept of pharmaceutical care involving the orientation of patient and social, the roles of hospital pharmacists should be changed as well. Although there were many factors affecting the development of the new roles, the delegation of technical tasks especially those associated with product-oriented roles formerly performed by the pharmacists to the pharmacy technicians is one of the key factor that allowing pharmacists to have more time for it.

Attitude of the Hospital Pharmacists on the Roles of Hospital Pharmacy Supportive Personnel

1. For trained hospital pharmacy supportive personnel: pharmacy technicians.

From the perspective of the hospital pharmacists, the findings of this study for the technical roles of pharmacy technicians agreed with the hypothesis which indicated that the expected roles of hospital pharmacy supportive personnel were higher than the actual roles. The agreements were found in every working unit. For the comparison of the expected technical roles only, pharmacy technicians were expected to do more technical roles than the pharmacists for 5 working units of outpatient, inpatient, general production, sterile production, and inventory management and purchasing units. Pharmacy technicians were expected to perform less technical roles than pharmacists for community service unit.

From the perspective of the pharmacy technicians, for the technical roles of the pharmacy technicians the results agreed with that hypothesis in every working unit.

These findings might be assumed that the hospital pharmacists had the attitude to delegate more technical tasks to the trained pharmacy supportive personnel, pharmacy technicians for every working unit and were confirmed by the perspective of the pharmacy technicians. What prevented the expectation from happening might be the problem of the personnel shortage.

2. For untrained hospital pharmacy supportive personnel: pharmacy employees.

From the perspective of the hospital pharmacists, the findings of this study for the technical roles of pharmacy employees were consistent with that hypothesis only in aseptic dispensary and community service units. In other working units, except the quality control, drug information service, and others units, the results pointed that pharmacy employees performed more technical tasks than they should do. For the comparison of the expected technical roles only, pharmacy technicians were expected to do more technical roles than the pharmacy employees in every working

unit except aseptic dispensary and community service units that there was no difference. However, the results still suggested the direction of increasing technical roles of pharmacy technicians in these 2 working units.

These findings might be assumed that the hospital pharmacists preferred to delegate more technical tasks to the trained pharmacy supportive personnel, pharmacy technicians, than to the untrained pharmacy supportive personnel, pharmacy employees.

Current manpower situation of the hospital pharmacy supportive personnel in pharmacy department (January 1996).

The current number of hospital pharmacy supportive personnel working in 65 respondent hospitals (not including tasks using no pharmacy professional or technical knowledge, for examples, delivering drug products, cleaning general floors or stocks), only 454 persons (26.96%) were trained personnel, pharmacy technicians (19.18%) and pharmacy assistants (7.78%), and 1,248 persons (73.04%) were untrained supportive personnel, pharmacy employees (72.33%) and personnel from other fields (0.71%).

From the perspective of hospital pharmacists, the expected number of pharmacy technicians should be increased in every working units. The expected number of pharmacy employees should also be increased in every working unit except outpatient, sterile production and community service units. In outpatient and community service unit, the current number of the pharmacy employees was enough and in sterile production unit the number of the pharmacy employees was in excess.

From the perspective of pharmacy technicians, the expected number of pharmacy technicians should be increased in outpatient, inpatient, general production, quality control, inventory control and purchasing, and others unit.

These findings might show that there were demand on both trained and untrained pharmacy supportive personnel. The pharmacy technicians should be increased in every working unit especially in outpatient, inpatient, general production, quality control, and inventory management and purchasing unit and the pharmacy employees should be increased in every working unit except outpatient, sterile production, and community service units. If considered together with the need for more pharmacy technicians than pharmacy employees in expected technical roles of every working unit from the perspective of pharmacists, it indicated that there were more demand on trained pharmacy supportive personnel than untrained pharmacy supportive personnel. From the current number of hospital pharmacy supportive personnel, about three fourth of all pharmacy supportive personnel were untrained. The target number of pharmacy technician students trained by the Institute of Health Manpower Development, Office of the Permanent Secretary, Ministry of Public Health, the major sources of pharmacy technician training institute, were 300 persons each year (totally for the whole country) in 1996 and 1997 (Institution of Health Manpower Development, 1995). The lack of trained pharmacy supportive personnel seemed to be the serious problem of the current manpower situation of the hospital pharmacy supportive personnel in pharmacy department.