

Supply and Requirement Projection of Professional Nurses in Thailand over the Next Two Decades (1995 -2015 A.D.)

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Abstract:

Studies dating from 1993 show shortages of nursing personnel in Thailand, with many professional nursing positions in government institutions going unfilled. Attrition is high, with many nurses leaving public service because of low pay, poor working conditions, and little opportunity for advancement. To estimate the requirement and supply of professional nurses, and propose solutions to the problem of shortages of professional nurses, a study was conducted between October 1995 and June 1996.

Descriptive research was employed to review health policies and to conduct interviews with nurse experts, academic leaders, and clients using nursing services. Three methods of requirement estimation were used, i.e., Health Demand Analysis, Health Service Development, and Nurse Population ratio. The results showed that the requirements of professional nurses in 2015 lie between 137,997-142,365. The researchers estimated the turnover rate on three levels; high, medium and low. Comparing the nurses remaining in the system to the demand for nurses showed very little difference.

Results of this research indicate a need to be particularly careful with any plans to increase the production rate of nurses since it may result in a surplus of professional nurses in the future. It also recommends the strengthening of teaching staff in nursing faculties and nursing colleges as a means of improving the quality of graduates. Other recommendations include measures to reduce the attrition rate by, improving remuneration and welfare for nurses, implementing more consistent nursing career plans and improving opportunities for post-graduate training and continuing education.

Key words: nurse manpower, health demand, service target, manpower projection, population ratio

Introduction

Nurses and midwifery personnel comprise 70% of all the health personnel of Thailand's health care system. Their responsibilities include health promotion, disease prevention, care and rehabilitation of patients both in hospitals and in the community. The practice of nursing, at present and in the past has encountered quite similar recurring problems. Shortages of nursing personnel occur continually. A survey in 1991 showed the existence of 40,685 professional nurses in the country⁽¹⁾, or at a ratio of 1:1,393 population. From the statistics of the Ministry of Public Health, only 30,120 out of the total 58,503 positions for professional nurses were filled in 1994, reflecting a rate of 52.8%. As for the hospitals under the Ministry of University Affairs, only 40% of such the positions were filled⁽²⁾. The shortage also occurred in the private sector due to a high turn-over rate, regardless of the higher salary received when compared to the government sector. In response to these shortages, several projects to increase the

production capacity for professional nurses by the Ministry of University Affairs and the Ministry of Public Health were proposed and approved by the cabinet in 1992. In addition, there was a maldistribution of professional nurses. A survey in various regions of the country in 1995 showed that Bangkok had the lowest professional nurse to population ratio of 1:347, followed by the central, southern and northern regions, while those in the northeast had highest ratio of 1:2,246⁽³⁾ (Table 1).

Table 1 Distribution of Professional Nurses in Thailand (1985-1995)

Region	Year					
	1985	1987	1989	1991	1993	1995
BMA	11,831 (501)	12,982 (460)	14,338 (436)	13,514 (413)	14,979 (374)	16,089 (347)
Central	5,032 (2,012)	6,488 (1,777)	7,368 (1,613)	8,795 (1,469)	10,526 (1,240)	13,240 (1,010)
North	3,313 (3,112)	4,234 (2,477)	4,620 (2,332)	6,747 (1,636)	7,823 (1,454)	9,370 (1,266)
South	2,423 (2,570)	2,962 (2,362)	4,138 (1,775)	4,900 (1,463)	5,694 (1,284)	6,498 (1,161)
Northeast	3,420 (5,209)	4,086 (4,558)	5,251 (3,653)	6,729 (2,964)	7,649 (2,621)	9,065 (2,246)
Total	26,019 (1,987)	30,752 (1,743)	35,715 (1,478)	40,685 (1,393)	46,671 (1,229)	54,262 (1,092)

BMA = Bangkok Metropolitan Area

() = population to nurse ratio

Source : Health Resource Survey, Bureau of Health Policy and Plan, 1996.

A significant problem found in the production of qualified nurses is the inadequacy of faculty members, in terms of number, qualifications and experience. It was found that a number of nursing institutions had faculty members of a lower standard than that established by the Ministry of University Affairs. Very few faculty members in the nursing colleges and universities hold doctoral degrees. This kind of deficiency greatly affects the quality of the graduates.

The problems concerning nursing practice in public hospitals are those related to the work environment, equipment, remuneration and opportunity for advancement. Some of the problems have been resolved to a certain degree, for example special payment for evening and night shifts, providing more equipment and personnel, allowing more opportunities for advancement, and producing more nurses at the professional and technical level. However, the scarcity of nurses continues to exist. The frequent evening and night shifts resulted in low quality services, stress, and inadequate relationships with patients and their relatives. To compensate for low salaries, nurses seek part-time jobs in private hospitals, which further reduce their chances for personal development⁽⁴⁾. Some private hospitals also suffer from shortages of personnel as many of their nurses go for continuing education, resign as a result of dissatisfaction with the welfare provided or with the administration, or change to other kinds of jobs. Hospital administrators have tried to solve the problem by arranging for overtime work, hiring part-time nurses, having other hospital personnel assist in the work, or by increasing payments, etc.⁽⁵⁾.

In conclusion, the nursing personnel situation needs to be improved. To achieve this, a study on the long term supply and requirements for the nursing profession was conducted in order to provide guidelines for policy development in nursing education and management.

This study aims at projecting the supply and requirements for professional nurses during the next two decades and proposing appropriate policy recommendations.

Methods

1. Literature reviews

- 1.1 The National Health Development Plan in the 8th National Economic and Social Development Plan (1997-2001)⁽⁶⁾, Population Projection of Thailand by the Human Resources Planning Division, Office of the National Economic and Social Development Board⁽⁷⁾ and other papers on health futures studies were analysed in order to determine the appropriate future health care systems and future roles of nursing professions.
- 1.2 Health Resources Survey of the Bureau of Health Policy and Plan⁽²⁾ and database of nurses licensed at the Nursing and Midwifery Council were reviewed to determine the data on human resources in nursing services.
- 1.3 Plans for increasing the production and educational development in nursing according to the Cabinet Resolutions on September 2, 1992⁽⁸⁾ and Educational Development Plan for Nursing in the 7th National Plan for Higher Education (Ministry of University Affairs, 1992)⁽⁹⁾ were reviewed to estimate the number of annual admissions of nursing students.
- 1.4 Previous research studies on the attrition rate of nursing professions^(4, 5, 13).

2. Interviews

Leaders in the nursing profession and academic institutes were interviewed to determine their views on future requirements for nursing qualifications and roles.

3. Brainstorming

Twenty one academics and experts in nursing and administrators of various nursing institutes discussed the methods for future supply and requirement projection and approved the projected outcomes.

4. Future Requirement Projection for 1995-2015

This was achieved by three methods⁽¹⁰⁾:

- 1) **Health Demand Analysis:** Future workload, derived from future demand of health services⁽¹¹⁾, and productivity norms were used for estimation of future requirements.
- 2) **Health Service Development Analysis:** Future requirements were estimated from projected health facilities development and staffing norms.
- 3) **Nurse Population Ratio:** projected nurse: population ratio was applied to the projected population of corresponding years to project future requirements of professional nurses.

5. Future Supply Projection for 1995-2015.

The number of new graduates was projected from the student admission plans of academic nursing institutes. The researchers proposed that the educational loss rate was 5% or 95% of students who will graduate after four years of study. Future supplies of professional nurses were projected by adding the current figures plus the number of expected new graduates and then subtracting annual loss rate.

6. **Comparing** the supply projection of professional nurses to the requirement projection.

7. Public hearing and revision of the projections.

7.1 The results were presented to the meeting of the relevant academics and experts for their feedback and recommendations.

7.2 The report was then revised and sent back to the previous team members for their additional comments and suggestions.

7.3 The revised report was finally presented to policy analysts, administrators and academicians from the Ministry of Public Health, the Ministry of University Affairs and other relevant organizations for final suggestions. The final revised figures are reported here.

Results

1. Quality of future professional nurses.

Through qualitative analysis from the literature reviews, interviews and brain storming processes, the following future characteristics and scope of practice for professional nurses were agreed upon :-

1.1 Characteristics

- 1) **Possessing intellectual potential.** Professional Nurses must be equipped with knowledge in nursing science and other related fields.
- 2) **Possessing skills in nursing practice and communication.**
- 3) **Possessing good morals and ethics, both personally and professionally.**
- 4) **Possessing good human relations and being an honest and sincere person** who is emotionally stable and free from discrimination.
- 5) **Possessing qualities of leadership as well as being a good team member.**
- 6) **Capable of providing quality health care to patients** and participating in developing a network of services that includes all groups of the population.
- 7) **Having a good attitude** toward oneself and the nursing profession.

1.2 Scope of a professional nurse's practice

The scope of practice can be classified into 2 levels :

- 1) **Basic Nursing Practice** : At this level, the nurse should possess all the qualities stated earlier, and must be a graduate of an accredited nursing institute approved by the Ministry of University Affairs and the Nursing Council. The person must also obtain a license for practicing in the nursing profession.

- 2) **Advanced Nursing Practice** : This level deals with complicated health problems which require the knowledge and skills of an **expert or a specialist**. This means either having a Master's degree level of education or special training in a particular area of nursing approved by the Nursing Council. The person must be able to perform the work in the field of expertise and be able to independently make decisions and conduct research studies as well as systematically solve problems.

2. Supply projection

The supply projection was made based on the plan for the production of nurses from nursing academic institutes under the Ministry of University Affairs, the Ministry of Public Health and other Ministries. The number of admissions is projected to increase each year until the year 2000, following which the number of admissions remains constant. The future supply of professional nurses was projected from the current figure plus the number of new graduates, minus the annual loss rate. Previous research results show a loss of nurses resulting in the decline of the nurse population. However, the loss trend has decreased from 8.23% in 1969⁽¹²⁾, to 5.8% between 1976-1985, to 4.69% between 1986-1990⁽¹³⁾, and finally to 3.14% in 1993⁽⁴⁾. Data from a report from the Ministry of Public Health in 1986 and data of professional nursing graduates of the Ministry of University Affairs show that the loss of professional nurses was lower each year. If this trend continues to the year 2015, the annual loss rate could be as low as 1.5% as proposed in the scenario of low loss rate. However, we also projected other scenarios of a medium loss rate of 3.14% and a high loss rate of 5% over a 20 year period.

The future supply of these three scenarios over the next 20 years ranges from a low of 120,197 to a high of 173,321, with the production of 9,025 nurses a year as shown in Table 2.

Table 2 Number of future supply of professional nurses with three loss rates.

Year	Expected graduates ^a	high loss rate (5%)	medium loss rate (3.14%)	low loss rate (3.14-1.5%)
1993	4,159	48,287	49,232	49,232
1994	4,163	49,828	51,718	51,718
1995	4,237	51,362	54,199	54,199
1996	4,310	52,888	56,672	56,672
1997	4,513	54,531	59,264	59,655
1998	5,197	56,742	62,437	63,230
1999	5,501	59,131	65,805	67,013
2000	5,539	61,437	69,104	70,738
2001	8,579	66,515	75,214	77,334
2002	8,835	71,583	81,439	84,446
2003	9,025	76,578	87,623	91,602
2004	9,025	81,323	93,613	98,614
2005	9,025	85,830	99,415	105,486
2006	9,025	90,112	105,035	112,221
2007	9,025	94,180	110,479	119,427
2008	9,025	98,045	115,752	126,525
2009	9,025	101,717	120,859	133,517
2010	9,025	105,205	125,806	140,404
2011	9,025	108,519	130,597	147,188
2012	9,025	111,667	135,238	153,870
2013	9,025	114,657	139,733	160,452
2014	9,025	117,498	144,087	166,935
2015	9,025	120,197	148,304	173,321

a : Bureau of Policy and Plan, Ministry of University Affairs.

3. Requirement Projection

3.1 Nurse: Population Ratio Method.

The appropriate future nurse population ratio was projected by estimating future economic and population growth of Thailand in the year 2015. Nurse-population ratio of a country with the same projected level of economic development to Thailand in the year 2015 was applied to estimate the member of professional nurses needed. Estimation of each period of time was determined by experts.

The result of the projection is shown in Table 3.

Table 3 Future professional nurse requirements by nurse: population ratio method.

Year	expected nurse: population ^a ratio	Population ^b (mil.)	requirement for professional nurses
2000	1: 950	62.405	63,678
2005	1: 800	65.034	81,292
2010	1: 650	67.229	103,429
2015	1: 500	69.076	138,158

a : Estimated by comparing projected economic growth by experts.

b : National Economic and Social Development Board, Population Projection of Thailand. (Adjusted with death from AIDS)

3.2 Health Services Development Method

Future development of the health services infrastructure in the public sector was determined from the National Higher Education Development Plan. For the private sector, the future development was projected from adjusting past trends. The staff norms of each health infrastructure were then used to calculate the future requirement of professional nurses.

The results are shown in Table 4, and Table 5. Requirements for the years 2010 to 2015 do not show any change as there is no expected expansion in the infrastructure during these years.

Table 4 Future requirement for professional nurses in the Ministry of Public Health according to development plans and staffing norms.

MoPH units	Requirement in year			
	2000	2005	2010	2015
Permanent Secretary Office				
• Provincial hospitals	27,470	28,724	29,572	29,572
• District hospitals	19,858	21,377	23,052	23,052
• Provincial health offices	300	312	312	312
• Health Centres	9,349	9,629	9,979	9,979
• Nursing colleges	2,000	2,200	2,200	2,200
• Administrations	300	300	300	300
Department of Medical service	1,853	1,853	1,853	1,853
Department of Health	318	318	318	318
Department of CDC	447	447	447	447
Department of Mental Health	885	885	885	885
Total	62,748	66,045	68,918	68,918

Table 5 Future requirement for professional nurses by Health Service Development method estimated from the future development plans and the staff norms.

Year	Number of Professional Nurse			
	Governing Organizations			
	MoPH	MoU and other public facilities	Private sector	Total
2000	62,748 (64.70%)*	18,765 (19.35%)	15,466 (15.95%)	96,979
2005	66,045 (57.51%)	21,111 (18.38%)	27,678 (24.11%)	114,834
2010	68,918 (48.41%)	23,457 (16.48%)	49,991 (35.11%)	142,366
2015	68,918 (48.41%)	23,457 (16.48%)	49,991 (35.11%)	142,366

MoPH = Ministry of Public Health

MoU = Ministry of University Affairs

* number in () are percentage of each organization.

3.3 Health Demand Method

Future demand of health services was determined by econometric projections in relation to projections of death rates, future age structures, urbanization, and health insurance coverage. This was carried out by Thailand Development Research Institute⁽⁹⁾. Productivity norms set up by experts were then applied to determine the requirement of professional nurses for nursing services. The ratio of nurses to students in teaching institutes was set at 1:4-1:8 according to the Thai Nursing Council and the Ministry of University Affairs standards. Moreover, the number of occupational health nurses was estimated, so that in any factory having more than 200 employees there should be at least one professional nurse⁽¹⁴⁾. In addition, the number of mental health nurses was estimated by the mental health status of population. The results of the estimation are shown in Table 6.

Table 6 Future requirements for professional nurses by health demand methods.

Demand Components	Year			
	2000	2005	2010	2015
Nursing services	54,986 (85.41%)*	110,075 (91.02%)	115,722 (90.28%)	123,640 (89.60%)
Teaching	6,333 (9.84%)	6,833 (5.65%)	6,833 (5.33%)	6,833 (4.95%)
Occupational health nursing	1,000 (1.55%)	1,000 (0.83%)	1,000 (0.78%)	1,000 (0.73%)
Mental health nursing	1,209 (1.88%)	2,122 (1.76%)	3,678 (2.87%)	5,524 (4.00%)
Management and Technical	850 (1.32%)	900 (0.74%)	950 (0.74%)	1,000 (0.73%)
Total	64,378	120,930	128,183	137,997

* number in () are percentage of each component.

3.4 Requirements for advance level professional nurses.

Analysis of future epidemiological trends shows a high requirement for advanced nursing practice in the fields of elderly care, cardiovascular, accidents and emergency, rehabilitation, occupational health, mental health, home health care and cancer or other types of chronic illnesses.

At present there are approximately 1,000 nurses holding a Master's or Doctoral Degree from institutes in Thailand and abroad. The production capability in the six nursing institutes of the Ministry of University Affairs is limited to only 240 graduates per year. If the ratio of advance level professional nurses and the basic level nurses were to be at 1:20 by the end of the Eleventh National Economic and Social Development Plan (2011-2016), the number of advance level professional nurses must be 7,500 persons, or increased by 6,500 in 20 years or 325 persons per year, calculated from a nursing population of 150,000. Thus a proper production plan must be developed and implemented to ensure the achievement of the appropriate ratio.

4. Comparison of supply and requirement

Table 7 and Figure 1 compare the future supply and requirements for professional nurses from the year 2000 to 2015.

Table 7 Comparison between future supply and the requirements for professional nurses

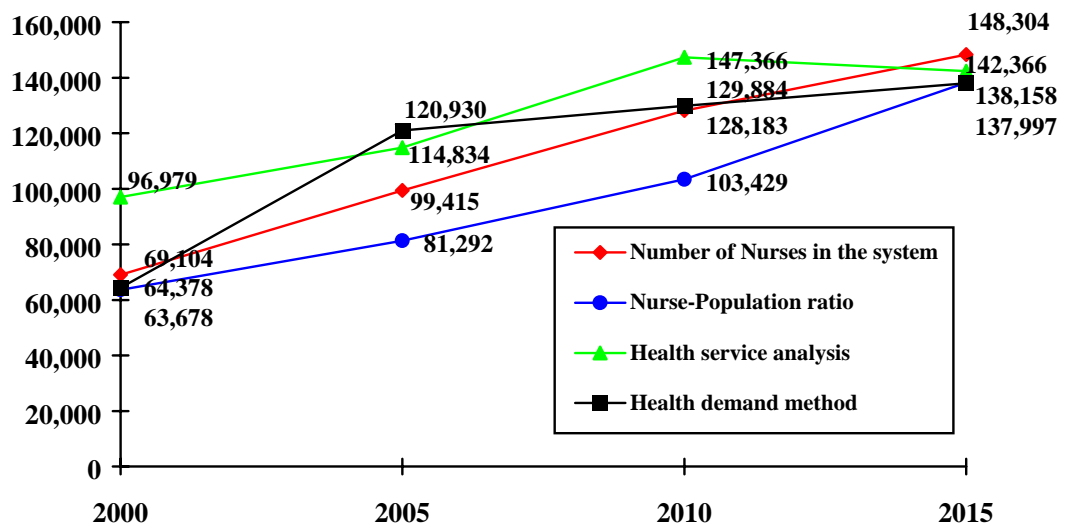
Year	Future supply	Future requirement for professional nurses		
	High-Medium-Low loss	Population Ratio	Health Service Development	Health Demand
2000	61,437, 69,104, 70,738 (1:1,016, 1:904, 1:882)*	63,678 (1:980)	96,979 (1:644)	64,378 (1:969)
2005	85,830, 99,415, 105,486 (1:758, 1:689, 1:617)	81,292 (1:800)	114,834 (1:566)	120,930 (1:538)
2010	105,205, 129,884, 140,404 (1:639, 1:534, 1:479)	103,429 (1:650)	147,366 (1:456)	128,183 (1:525)
2015	120,197, 148,304, 173,321 (1:575, 1:466, 1:399)	138,158 (1:500)	142,366 (1:485)	137,997 (1:501)

* number in () are nurse : population ratio.

The projected supply of professional nurses in the year 2015 ranged from 120,197 (1:575), to 148,304 (1:466), and 173,321 (1:399) for high (5%), medium (3.14%), and low (1.5%-3.14%) annual loss rates, respectively. The projected requirement ranged from 137,997 (1:501), to 138,158 (1:500), and 142,366 (1:485) by health demand, population ratio, and health services development methods, respectively.

Thus by comparing the supply and requirement, there may be a scenario of highest shortage (supply of 120,197 compared to requirement of 142,366) of 15.6 % to scenario of highest surplus (supply of 173,321 compared to requirement of 137,997) of 25.6 %.

Figure 1 Comparison between future supply and requirements for professional nurses



However, due to an initial high rate of increase (1998-2003) and a stable rate of production after 2003 (Table 2), we estimate that the initial annual loss rate will be low to medium (2%-3%) followed by a medium to high annual loss rate (3%-5%). Thus for the longer period of time (year 2015), the scenario of medium loss rate (3.14%) would be the most likely scenario. This would mean a population ratio of 1:466. It also means that there may be slight surplus (4.2%-7.5%) of professional nurses in 2015.

Discussion and Recommendation

The projections show a possibility of a slight surplus of professional nurses in the next two decades, thus any plan to increase the production of professional nurses should be reconsidered with great care. What should be done instead, is to expedite the improvement of academic quality and the qualifications of the teaching staff in those nursing educational institutes, especially the nursing colleges under MoPH. Coordination of producers and users can improve the quality of nursing graduates to an acceptable standard and be able to meet the needs of society in a realistic situation. Promotion and support for the production and development of teaching staff in the nursing schools should be planned immediately so that they will have acceptable qualifications to teach and supervise nursing students at a higher educational level. These personnel must also serve as role models for their students in terms of seeking more knowledge, conducting research and furthering personal and professional development. The role of nursing faculties under the MUA should focus on the expansion and quality of graduate education.

To ensure proper distribution of professional nurses in all regions, the administration system should give priority to the areas where the number of nurses are inadequate. It is suggested that local students be given priority in admission to a nursing school or a special quota of admission be granted to certain Provinces/Districts/Tambons. At the same time, professional nurse employment positions should be expanded in the areas that suffer a scarcity of nurses.

To increase the quality of students admitted to the nursing institutions, the method of selection should be reviewed in order to have qualified students that will possess the characteristics of nurse leaders.

A curriculum and teaching plan should focus on solving current and future health problems of the people. Health promotion, disease prevention and treatment, and rehabilitation schemes should go hand in hand.

Cooperation of the Nursing Council and nursing educational institutions will facilitate the preparation of an advanced level of training to produce specialists in some specific fields, i.e. qualified for certificates or Master's Degree. At least 5% of the professional nurses working in the nursing service or community should have the opportunity to achieve this level.

A national committee should be formed to plan and formulate policies for professional nurse development. This committee should comprise representatives from many nursing institutes. They should serve at least a five-year term, which is the duration of each National Economic and Social Development Plan.

Keeping personnel within the system longer is a most important task. Otherwise, no matter how many nurses are produced, there will always be shortages. One way to accomplish this task is to improve the management system. There should be an emphasis on continual quality improvement, delegation of authority, participatory management and systematic development based on family needs. That is, each person

is assigned duties in light of their personal and family situations. The system should provide a better chance for advancement both in pursuing educational opportunities and career tracks. There should be adjustments of remuneration and welfare in light of economic and social needs.

Research on the working life of nursing personnel and those in related careers should be carried out periodically, in order to use the results as guidelines to formulate a plan for development of the management and quality of nurses in the country. A study on the workload of each type of nursing department in hospitals and the community should also be conducted so that the results can be used to properly develop the staff norms.

Further comments

It is difficult to make an accurate prediction on a long term basis. This is especially true for human resources projections, because human resources have complex and dynamic relationships to health and socio-economic development. Previous experiences with future human resource planning have not given encouraging results. Sometimes these exercises were used as tools to support or reject plans to increase production rather than as real planning exercises. However, more experience with these studies will allow more development of techniques and provide basic information to systematically predict future.

Although human resources planning may not have yielded encouraging results in the past, countries using a market mechanism to determine the supply/requirement of human resources were mostly faced with eventually high oversupply, as can be seen from the case of Mexico and USA^(15, 16).

Since this study was conducted before the economic crisis in Thailand in mid 1997, the plan may have to be adjusted. One of the expected affects of the economic crisis in Thailand will be the closure of numerous private hospitals. Thus, the demand of nurses in the private sector, and for those government nurses working there in part-time jobs, will decrease, causing a surplus of nurses in the market. Moreover, the reduction policy which bars government agencies from recruiting new employees will effect the new graduates, who will have difficulty in finding jobs.

Therefore it is important to review the plan for the production of each institution within the MUA and MoPH and immediate action should be taken to adjust the existing plan. For example, the MoPH, in June 1998, has already decided to reduce their new nursing students enrollment by half over the next 5 years.

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