Analysis of a government policy to address nursing shortage and nursing education quality

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Background: A well-educated, sufficient nursing workforce improves population health and standards of nursing care. Analysing workforce policies assists nurses to learn from the past and develop better future policies.

Aim: Describe policy-making processes in the first Thai government plan to increase nursing capacity and improve nursing education quality.

Design: A qualitative study employing Longest’s model to examine policy-making processes.

Methods: Data were obtained from 28 in-depth interviews with key informants, who had been committee members and former deans of nursing involved with the policy processes in the 1990s. Both qualitative and quantitative data were extracted from relevant documents, and content analysis employed with all data.

Findings: Three policy phases were identified. Policy formulation, where three streams of problems, politics and policy resulted in identification of nursing shortage, changes of government incumbents and needing to increase nurse production; Policy implementation included creating methods of implementation, appointing responsible people and committees, creating operational plans, producing more nurses and faculty development projects and Policy modification which incorporated implementing the first Thai international doctoral degree in English, a collaborative programme between universities.

Study limitations: Not all key informants could be accessed due to the passage of time. Findings are unique to Thailand but inform internationally of nurses’ abilities and need to be involved in policy.

Conclusion: Nurses were involved in all policy phases. While the policy produced positive developments in growing nursing capacity and education in the past, nursing shortages remained and are now acute in Thailand.

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Implications for Nursing/Health Policy: Lessons learned from this policy analysis help explain why the nursing education and nursing shortage policy was legislated through the government agenda, and the active involvement of Thai nurses in this process. Nurses globally need to be at the policy-making table to try to reduce nursing shortages, and enhance practice and education environments.

Keywords: government policy, nursing education, nursing shortage, policy analysis, Thailand

Background
Adequate human resources for health are essential for improving the efficiency, equity and quality of care (Kabene et al. 2006). However, there is a critical shortage of human resources for health (Webber 2011), an estimated global shortage of seven million healthcare workers, projected to rise to 12.9 million by 2035 (World Health Organization 2013a). Nurses are essential to the health of the world’s population (International Council of Nurses 2014), and improving nursing education standards globally is imperative (Turale 2015). ‘The worldwide shortage of well trained, properly educated health workers, including nurses and midwives, remains a core challenge to achieving universal health coverage.’ (World Health Organization 2013b, p. 10), and the shortage of nurses occurs across countries and continents (Institute of Medicine 2011). Anecdotal evidence and early literature indicate that nursing shortages were prevalent >50 years ago in Thailand (Office of the National Economic and Social Development Board 1961). These shortages are still acute, with an extra 46,996 registered nurses (RNs) required over the country (Office of the Permanent Secretary, Ministry of Public Health 2014). Similarly, a Thailand Nursing and Midwifery Council (TNMC) analysis of the nursing shortage (Srisuphan & Sawangdee 2012), found that 43,250 more nurses are required to meet a RN-to-population ratio of 1:400 by 2019.

Like governments in other countries, The Royal Thai Government has made a number of efforts to address the nursing shortage through national policies and the quality of nursing education, including its first specific policy on this: the Plan for Increasing Production and Development of Educational Management in Nursing (PIPDEMN) (1993–2001). The overall aims were to produce 5500 more nurses, improve nursing education through supporting nursing instructors to attend short training courses and undertake master and doctoral degrees, and establish higher standard education facilities. No similar policy has since been implemented in Thailand and it is critical that this is analysed. By researching how Thai nurses were involved in past policy-making, we argue that this adds internationally to nursing’s knowledge and strategic directions for future involvement policy-making, implementation, monitoring and evaluation.

Policy analysis is an approach to public policy with the purpose of explaining the interaction among institutions, interests and ideas of the policy-making process (Walt et al. 2008). This analysis is crucial for drawing lessons learned from past experience to help identify critical elements for developing policy processes, and guide resource allocation for policy-makers to develop future workforce policies. Applying the Longest’s (2010) model on public policy-making processes, developed in the USA in the 1990s, and used in various policy analysis studies (e.g. Altmann & Collins 2007; Deschaine & Schaffer 2003), was the most appropriate as the model was designed for national health policy as well as having clear steps for analysis. The model consists of three continual cycles or phases: policy formulation, implementation and modification (Longest 2010). Policy formulation involves decision-making, which may result in forming new public laws or making amendments to existing laws. Formulation is a process of agenda setting or the junction of three streams: problem, possible solution and political (Kingdon 2003). The problem stream denotes urgent and important issues that capture the attention of decision-makers. The possible solution stream refers to solutions for addressing a problem, while the political stream considers the political circumstances or events within the government that move the problem and the potential solution to be placed on a government’s agenda. Development of legislation is the step that follows agenda setting to create a specific legislative proposal. Policy implementation involves formulating rules and regulations that are necessary for public law operation, and conducting activities or programmes to enact the public law. Policy modification is the feedback process for modifying existing policies (Longest 2010). All of these phases were applied in the supporting framework and analysis of data in this study.

Policy analysis has been inadequately applied in low- and middle-income countries (Buse 2007) and there is insufficient research focus on nursing workforce policy analysis. This study was crucial to understand and learn about processes that how the PIPDEMN went to the government agenda, implemented and modified. The analysis of policies is needed now and into
the future, to help inform the profession, decision-makers and policy-makers about how more effective policies can be developed and implemented in the future (Mason et al. 2016). Since the way a policy is developed affects the success of policy implementation (World Health Organization, Western Pacific Region 2006), the development of effective policy requires solid and accurate information for policy-makers to identify issues and develop solutions to address these. Additionally, Dussault & Dubois (2003) claim that the development of policies depends on multiple analytical tasks including policy analysis, and this is needed to provide lessons learned for policy-makers and others to make decisions about how to develop and implement policy to address the problem or improve health outcomes. Nurses are critical to health policy (Kunnaviktikul 2014), and their increased involvement will assist in the successful reduction of shortages, improving education, and eventually improving population health through nursing practice. This is the first article resulting from a PhD study of the first author (Abhicharttibutra 2012).

Methods

Design
This qualitative study involved interviews and document examination, and Longest’s (2010) model of public policy-making was employed to frame the study.

Informants
Informants in this study were originally involved in the policy-making process of the PIPDEMN. Purposive sampling and snowball sampling techniques were used to identify potential key informants (KIs) who met the inclusion criteria of being involved in PIPDEMN development and implementation. Eventually, 28 KIs from across Thailand participated in the study after personal contacts were made. Thirteen had been members of the Working Subcommittee for Studying the Demand for Nursing Personnel (WSSDNP) which helped to create the PIPDEMN and were involved in the policy implementation and modification phases during 1990–2001. Fifteen had been former deans of faculties of nursing and directors of nursing colleges.

Data collection
Data were collected using interviews and examining documents. Interviews were conducted from April 2010 to April 2011 at homes and offices of the KIs in Thailand, using semi-structured questions such as: ‘How did the PIPDEMN get onto the government agenda?’; ‘What were the development processes of the PIPDEMN?’ and ‘How was the PIPDEMN implemented?’ Probes were used throughout the study to clarify the meaning of data. The interviews were undertaken ~60–90 min with all KIs at their offices or homes, and were digitally recorded. Secondary interviews were conducted with two KIs to clarify more data. Documents related to the PIPDEMN were also extensively searched and examined, including official letters, records, government and research reports, policies and plans, minutes of meetings and other material. Sixty-five documents and literature obtained from the Office of the Higher Education Commission, the Ministry of Public Health, nursing institutes, the TNMC and government websites were reviewed in this study.

Data analysis
Content analysis (Marshall & Rossman 2006) was used to analyse all data from interviews and documents. In-depth interviews were transcribed verbatim, and the transcripts were given to KIs to modify as necessary. These were then read and re-read to gain familiarity with data. Data were also extracted from pertinent documents and literature relevant to the policy processes. Data from interviews and documents were coded, and concepts were grouped and interpreted and evaluated for meaning. Afterward potential themes and sub-themes were extracted and consolidated, under the three phases in Longest’s model (policy formulation, implementation, and modification) as a framework for data display. Feedback was then sought from the KIs regarding the findings, and eventually these were validated.

Rigour and trustworthiness
Rigour in this study was determined by the principles of credibility, dependability and confirmability (Lincoln & Guba 1985). To address credibility, a triangulation technique was used to compare findings from KI data, and the documents were examined to ensure accuracy in facts and meaning. Member checks with all KIs were undertaken with transcripts and findings to enhance validity of findings. Confirmability was ensured by arranging a rigorous and systematic collection of audio-recordings, interview transcripts, themes and documents, so that all the sources of findings could be examined and verified by an audit trail.

Ethical considerations
Study approval was obtained from the Ethics Committee, Faculty of Nursing, Chiang Mai University, and appropriate permissions were given regarding access to relevant documents from the Office of the Higher Education Commission, the Ministry of Public Health, nursing education institutes, and the TNMC. The ethics approval number is 037/2014.
Each KI was given verbal and written explanations of the purpose, process and benefits of participating in the study, and then signed a consent form. Confidentiality and anonymity of the KIs and data were undertaken throughout the study. Pseudonyms were applied to all the transcriptions and the transcript extractions.

Findings

Content analysis using Longest’s (2010) public policy analysis model resulted in data being categorized into three policy-making distinct phases: policy formulation, policy implementation and policy modification. See Fig. 1 which outlines data from each of these phases.

Phase 1: Policy formulation

The policy formulation phase included two stages of agenda setting and development of legislation as followings.

<table>
<thead>
<tr>
<th>The process</th>
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<tr>
<td>Formulation phase</td>
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<tr>
<td>Agenda setting</td>
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<tr>
<td>• Problem stream: nursing shortage</td>
</tr>
<tr>
<td>• Possible solution: increase production</td>
</tr>
<tr>
<td>• Political stream: change to a new government</td>
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Development of legislation

• The development of the PIPDEMEN

Operation

• Implementation of the increased production project
• Implementation of the faculty development project


Fig. 1 The policy-making process of the PIPDEMEN.
Table 1 Streams of agenda setting, sub-themes and examples of evidence

<table>
<thead>
<tr>
<th>Stream</th>
<th>Themes/subthemes</th>
<th>Evidence from documents or KIs</th>
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<tr>
<td><strong>Problem stream: Issues capture the attention of decision-makers</strong></td>
<td>Nursing shortage: Insufficient nurses for patient care. Inadequate production of nursing graduates. There were 56 nursing institutes responsible to produce nurses in Thailand. However, the demand of nurse increased and these institutes could not increase the production as required.</td>
<td>During the Sixth National Economic and Social Development Plan (1987–1991), nursing institutes could increase production by 2.7% per annum. In the Seventh National Economic and Social Development Plan (1992–1996), nursing institutes had to increase production by 14.5% to meet the demand of the country (Jindawatana et al. 1999).</td>
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<td>Lack of coordination of nurse production and utilization. There was no workforce planning in Thailand and a lack of coordination between the nursing institutes that produced nurses and the hospitals that utilized them. Demand and supply of nurses did not fit.</td>
<td>Service sectors that expand their health service do not cooperate with nursing institutes in production. As a result, there are not enough working nurses because it takes 4 years to produce a nurse. This is a problem of planning between the service and education sectors (KI4).</td>
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<td>Performing non-nursing activities. Nurses had to do some physicians’ work because of a shortage of physicians and also were assigned to do administrative work outside of their scope of practice.</td>
<td>Many nurses are assigned to do non-nursing activities, in such fields as finance, pharmacy, materials handling, as well as laboratory work. This is one of the causes of the nursing shortage (Jindawatana et al. 1999).</td>
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<td></td>
<td>Educational accreditation. To produce nurse, every nursing institute had to achieve the quality standards. However, these standards were not met because there were problems with both quantity and quality of nursing instructors.</td>
<td>At that time, the question of the quantity and quality of nursing instructors was raised. For instance, one nursing instructor was responsible for more than ten students. Moreover, the ratio of nursing instructors to students of the MUA was 1:10 or 1:12, as well as 1:10 or 1:8 in clinical practice. We had to propose to the Cabinet that it was a serious situation, especially in nursing institutes under the Ministry of Public Health (KI6).</td>
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<td>Changing demographic and social structures. The demographic and social elements of the population such as size, density, distribution, growth rate, gender, age, educational level and the life style were the key factors affecting health and nursing workforce demand.</td>
<td>One cause of the nursing shortage is the demand for professional nurses resulting from the increasing number of the population, increasing average age of the population, the development of the infrastructure, accessing to healthcare service from health insurance system, and the increasing number of professional nurses in industrial factories (Jindawatana et al. 1999). The severity of the nursing shortage is heightened because of the population increase and the changing social system, such as raising educational levels and the economic status of the population. This has had a significant impact on the health service demands, as is shown by the increasing numbers of older people and health centres (Jindawatana et al. 1999).</td>
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<td>Economic growth. Because the Thai economy grew during 1988–1990, the number of private hospitals increased, then the demand for nurses increased.</td>
<td>There is a fast expansion of the health service in the private sector that makes accurate prediction of the demand for nurses difficult. Because of this expansion, nurses in the public sector are drawn into the private sectors, generating a nursing shortage in the public sector (Jindawatana et al. 1999).</td>
</tr>
<tr>
<td><strong>The possible solution stream:</strong> Potential solution to address the nursing shortage</td>
<td>Increase nurse production. The alternative solution to fix the nursing shortage was by announcing it as a professional shortage crisis and increase the production.</td>
<td>For the nursing shortage, we proposed to the Cabinet to increase production and establish the new faculty of nursing . . . this was the same possible solution for the shortage of engineers (KI2).</td>
</tr>
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government. This new government implemented a policy to address human resource to develop the country in all aspects as in nursing. Nursing leaders then used personal connections to persuade people with authority in the government and parliament to support the agenda of nursing shortage. When all these three streams joined together, a window of opportunity opened to allow the nursing shortage to be placed on the government agenda.

### Development of legislation

The appointed WSSDNP consisted of nursing leaders from nursing schools throughout the country aided the development of the PIPDEMN. This policy was developed from a systematic study of the demand for nursing personnel over the next 10 years (1992–2001) by: analysing the current scope of practice of a nurse and potential likely changes to this after examination of international trends in nursing work; determining the ratio of nurses to population; and estimating the demand for nurses, the number being produced and future production feasibility which included the number of nursing students that would be admitted. Finally the nurse leaders worked hard to determine future measures and recommendations for increasing production.

The PIPDEMN included two main projects. The first project focused on producing 5500 RNs during the 1993–2001 academic years under the Ministry of University Affairs (MUA). The second project centred on developing faculty members and graduate programmes, for example, to enable faculty members to be educated through master and doctoral degrees studied within and/or outside Thailand, as well as grants for faculty members and administrators for short training courses. Funds were also provided to invite experts from abroad to teach students, be academic consultants to develop graduate curriculum and to assist faculty members to enhance their skills and knowledge.

The PIPDEMN was proposed to the cabinet, and finally approved on 11 May 1993 (The Secretariat of the Cabinet 1993). This was a rapid process of Cabinet approval because the MUA together with nursing leaders arranged a seminar where relevant state agencies and private sector stakeholders met to formulate ideas and give recommendations to the cabinet. Generally in Thailand the Cabinet Secretary-General asks for opinions and recommendations from relevant state agencies and submits those opinions to the Cabinet for consideration before approving a policy agenda, a much slower decision-making process.

### Phase 2: Policy implementation

Policy implementation included two stages of rulemaking and operation. Rulemaking was a process of setting formal rules and regulations for implementing the PIPDEMN and included many activities:

#### Creating methods for policy implementation

These were that the universities were responsible for: (1) increasing the number of admissions as required by the production plan; (2) utilizing teaching and learning methods for their students in line with the year plan and with the plan for increasing production; (3) utilize a specific operating budget for producing nurses, which would be obtained per head per year. Additionally, the nursing instructor development project was to be done concurrently with the increased production project (Luangtongkum 2002).
Appointing responsible people and committees
The University Affairs Board (UAB) appointed the Subcommittee for Nursing Faculty Member Development Planning, which was responsible for setting plans for faculty member development, including a short training course, studying abroad plans and a project for inviting experts. The UAB also appointed the Subcommittee for Nursing Production Planning which was responsible for managing and monitoring efforts to grow the nursing workforce by increasing the number of nursing students. At the university level, the deans of nursing appointed individuals and committee structures to manage PIPDEMN implementation. One KI recollected:

We set up a faculty member development committee and a programme committee under the jurisdiction of the administrative committee. These committees jointly identified and dealt with problems that occurred while carrying out the plan. (K125)

Creating operational plans
The UAB created action plans and budget requisitions for implementing the PIPDEMN. The operational plan included two projects of increased production of nurses and development of faculty members. At the faculty and department levels, the operational plan contained both short-term and long-term plans, with input from nurse leaders:

An operational plan was drawn up, the budget was raised yearly by the Ministry of University Affairs and distributed for each project, such as the increasing nursing production project, the continuing education project, and the short training course. (K12)

The analysis revealed that operationalizing the enactment of the PIPDEMN involved two projects within all 11 nursing departments and faculties across Thailand. The first project centred on increasing nursing student admissions at each nursing institute. These used different methods according to their regular admission numbers and increased quota, entrance requirements or special projects. Two informants noted:

...we added 80 students, as required by the increased production project, to 80 students of the regular plan, so that the total number of admissions was 160 students. In addition, we also included the expected lost numbers (attrition of applicants) from the interviews and reports, and then we announced the total number of admissions. However, the proportion of admissions between quota and entrance depended on each university. (K121) Moreover, the institutes supported their faculty members in different ways such as giving them leave to apply for the English language examination for study abroad and/or paying for this examination. Once faculty members obtained their scholarships and went to study abroad, the nursing faculties monitored progress and problems during their studies.

The second activity was inviting foreign experts into institutes to teach and be consultants for nursing faculty members and graduate students: Most experts were invited from the United States, namely Betty Neuman, Carolyn Williams, Rachel Booth, Jane Norbeck, Afaf Meleis, Callista Roy, Joyce Fitzpatrick and Sue Hinshaw. We invited a total of 24 experts. (K125)

The third activity was arranging short training courses for senior instructors or instructors who taught in doctoral degree programmes. Candidates were proposed by each nursing faculty and selected by the Deans’ Consortium, for example: There was an operational plan that provided for five nursing faculty members a year to attend short training courses abroad for which the Deans’ Consortium was responsible for allocating the scholarships. (K120)

From the assessment of the PIPDEMN, the results were: an overall increase of 58.7% in nursing graduates (Luangtongkum 2002); a 74.5% increase in faculty members studying abroad (Deans’ Consortium 2001); a 32.5% increase in faculty members attending short course training; and a 62.5% increase in the number of international nursing experts teaching in the country (Abhicharttibutra 2012). However, there were also significant obstacles during the implementation of the PIPDEMN, such as budget deficits and increased nurse academic workloads (Table 2).

Phase 3: Policy modification
This phase involves the modification of the existing policy using the feedback of the consequences of the policy and evaluation activities in the former stage. Data analysis revealed the PIPDEMN was modified into two ways:

Creation of a new doctoral degree nursing programme
The UAB found that projected numbers of faculty achieving a doctoral degree abroad were not achieved because of budget limitations arising from the 1997 economic crisis in Thailand. The UAB supported the development of another project, the
Table 2 Obstacles found during policy implementation

<table>
<thead>
<tr>
<th>Themes</th>
<th>Evidence from documents or KIs</th>
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<tr>
<td>Budget deficit</td>
<td>The budget was insufficient to produce the number of nurses as planned. Therefore, some faculties of nursing had to decrease their intakes of new student nurses (Luangtongkum 2002)</td>
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<td>The nursing faculty development project was affected by a reduced budget, and scholarships for study abroad were postponed. Nursing faculty members were asked to meet the costs themselves if they wanted to study abroad (Ministry of University Affairs 1997)</td>
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<td>Clinical sites restricted the number of students and we could not use other sites because of many limitations. This affected our teaching–learning processes because of lack of clinical sites. Moreover, we needed more nursing instructors (KI14)</td>
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<td>The clinical site was a 200-bed hospital, but we had to find other hospitals. This increased costs of transportation and practice. We also hired preceptors for taking care of students (KI20)</td>
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<td>Projects to increase nurse production in Thailand, as well as develop nursing faculty members were implemented at the same time. When some faculty members were given leave to study overseas, many faculties remaining behind had higher workloads. As a consequence they became stressed and overworked (Luangtongkum 2002)</td>
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<td></td>
<td>Since there was the increased production project, nursing instructors spent their time on their students. Therefore, nursing instructors could not process their career advancements. Two master degree programs were frozen (KI14)</td>
</tr>
<tr>
<td>Teaching-learning problems</td>
<td>The PIPDEMN increased the intakes of student nurses, but nursing institutes could not fully manage the teaching-learning process because of deficits in textbooks, journals, classrooms, nursing dormitories, equipment, and clinical sites as well as nursing instructors</td>
</tr>
<tr>
<td>Increased workloads of faculty members</td>
<td>The increased production project was implemented at the same time as the nursing instructor development project. This led to stress and overwork of some nursing instructors</td>
</tr>
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</table>

KI, key informant.

Doctor of Philosophy Collaborative International Program, to be implemented in Thailand with support from famous universities abroad. A KI elaborated that:

The UAB called a meeting to address the problems faced by all professions encountering the shortage issue. The nursing profession proposed initiating the Doctoral Degree in Nursing Program because some nursing faculty members had already graduated from abroad and could initiate new doctoral programmes (in Thailand). Students of this programme would study in Thailand and go abroad for one year. (KI8)

A revision of the PIPDEMN

The Chair of the Deans’ Consortium proposed revisions to the PIPDEMN because 35.74% of the scholarships for study abroad had not been applied for (Faculty of Nursing, Thammasat University 2001). However, revision of the PIPDEMN was not permitted due to an estimation by the Bureau of Higher Education Policy and Planning that nursing institutes could produce 520 nurses more than what was envisaged in the plan. Moreover, 233 of the 251 education scholarships had been granted, which meant that only 18 scholarships were short of the total and that these would be allocated in the future (Bureau of Higher Education Policy and Planning 2002). Therefore, the PIPDEMN was completed as it had been implemented during the 2001 academic year.

Discussion

This policy analysis reported the application of the model of the public policy-making process proposed by Longest (2010) which has three interconnected phases: the policy formulation phase, the policy implementation phase and the policy modification phase. Although this policy was enacted many years ago, analysis of it has highlighted important steps taken by nurses to try to address the national shortage and improve the quality of nursing education. However, this study had limitations in that some key nursing informants were unavailable for interview due to the passage of time. Additionally, some key documents could not be accessed due to time constraints or confidentiality matters within government.
This policy analysis is a unique study for Thailand and indeed is one of the few globally in nursing literature that has used policy analysis of data to describe how a nursing workforce policy has been implemented. Dieleman et al. (2011) reviewed 16 case studies regarding the health workforce policy in low and middle income countries and confirmed that there were no case studies describing how workforce policy decision-making took place. Therefore, Thailand’s early experience of the enactment of nursing workforce policy can make for better understanding about policy-making processes and provide evidence about governance influence in policy development and implementation. Moreover, policy analyses can contribute to strengthen the field of human resource policy analysis (Gilson & Raphaely 2008).

Policy formulation
Our findings show that the successful policy formulation for the PIPDEMN was a rapid process of the Cabinet approval because the collaboration between the MUA and many Thai nursing leaders. The nursing leaders worked together to conduct a systematic study which provided the strong evidence for problems and measures to address nursing shortage. This evidence was captured by the central government which then approved the PIPDEMN. In addition, the MUA supported the process of the policy-making process both by arranging a seminar to obtain the ideas and recommendations from relevant state agencies and proposing the proposal to the cabinet. Thus, time spent waiting for recommendations from state agencies was reduced. Findings of this study revealed that nurses’ leadership and commitment contributed to the policy-making processes. Involvement of nurses in policy-making processes can make a huge impact on policy and practice (Shamian 2013).

Policy implementation
During the implementing of the PIPDEMN, obstacles included a budget deficit because of the Thai economic crisis, teaching-learning problems from insufficient facilities, and increased workloads of faculty members from the concurrent implementation of two projects. These were significant challenges for policy-makers and the university administrators who implemented the policy. Economic factors are not the only ones that affect policy, but include communication, coordination, as well as the gap between authority in developing and implementing the policy (Hamdan & Defever 2003). Obstacles occurred the PIPDEMN policy implementation emphasize that policy-makers to be cautious when they develop the policy and that university administrators need communication and operational strategies to try to address these obstacles. In the volatile world of economics it is very hard to predict when economic shifts will have a detrimental effect on what seems to be a good policy.

Policy modification
As mentioned findings showed that the most influencing factor affecting the implementation of the PIPDEMN was the economic crisis in 1997. This resulted in the deficit of budget for implementing the PIPDEMN and led to the modification of the new programme for nursing education in Thailand, the Doctoral Degree in Nursing Program. This programme enabled Thai nurses to stay in Thailand for part of their study and study abroad for a year. This experience has been that this Program later added to capacity building of faculty to instigate more PhD programs in nursing in Thailand.

After the implementing of the PIPDEMN, there was still nursing shortage in Thailand. The ratio of nurse to population was 1:739 in 2002, 1:687 in 2003, 1: 652 in 2004, and 1:613 in 2005 (Wibulpolprasert 2007) which was still lower than the goal of 1:400 but considerably better than before the policy was implemented. This was partially addressed when the Cabinet approved the new PIPDEMN in 14 March 2013 in order to increase production of 27 960 nurses during 2014–2017 (The Secretariat of the Cabinet 2015). It has taken a long time for a new policy to be implemented, and nursing has had to make continual efforts to monitoring the nursing shortage and gather evidence to support policy reformation.

Conclusion and lessons learned
Nursing shortage is an important issue that requires timely policy responses. The PIPDEMN remains the first and only major national Thai policy aiming to address nursing shortage by increasing the number of nurses and improving the quality and potential of nursing institutes. As many nations try to develop their policies to address nursing shortages, this study provides an understanding of how a nursing workforce policy was put on the government agenda, implemented and modified, we pay tribute here to the hard work of nurses who were involved. The processes, benefits and obstacles during implementation as well as how the policy was modified were discussed. Our analysis emphasizes the significance of policy development and implementation into action for further developing the nursing workforce policy.

Lessons learned from this study are that: (1) driving nursing shortage onto a government agenda requires nurses to work collaboratively together to provide strong evidence of a nursing shortage, and effective leadership in policy work. Nursing leaders require persistent commitment to problem solving, and collaboration with nurses, professional organizations, deans of nursing institutes, civil servants and networks
within and outside government agencies; (2) increasing nurse production and developing nursing education are effective concurrent strategies for addressing a nursing shortage since producing nurses need both qualified and sufficient faculties. However, to develop the effective policy, other strategies such as improving nurses’ salary and working environments should be included in the policy in order to retain nurses in the profession. Moreover, continued monitoring of a nursing shortage is required in order to immediately respond to issues at a policy level.

We hope that lessons learned from this study will be beneficial not only in Thailand but also for nurses in other countries who are engaged in battling nursing shortages and improving standards of nursing education.

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Author contributions
Study design: KA, WK, OW, WS
Data collection and analysis: KA, WK, OW, WS
Drafting manuscript: KA, WK, OW, WS, ST
Critical revision for intelligent content: KA, ST, WK, OW

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