

Professional Nursing Education Development: A Transitional Milestone from Diploma Level to Graduate Level in Macao

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Abstract This original paper used sources of information including published materials accessible to the public, institutions' documents and records, first-generation nursing educators' information and knowledge of the historical background and the authors' knowledge as content experts regarding the development of professional nursing education in Macao. A higher diploma training course in an academic setting has been successfully introduced in the 21st century (2000). In less than a decade (last year), all nursing students graduated with bachelor's degrees. This year, the first Master's level nursing students will graduate locally. The latest development in the history of the transition of nursing management in education from the hospital setting to an academic setting is the recent awarding of bachelor's degrees to nursing student. With the improvement of academic training programs for nursing students, the image of professional nursing has been strongly established and developed. Professional nursing education is a continuation of the assessment and evaluation of the standard curriculum standard to help nurses to fulfil the complex challenges of society. Of course, inadequate support for nursing education in soft and hardware services, as a result of the policies of government, health departments in financial support, has not fully realized this innovation.

Keywords Nursing Education Development, Hospital Setting Program, Bachelor Level Program

1. Introduction

Knowledge, technology and skills have been modernizing and improving quickly. Education is the most basic of all of these elements. Therefore, investment in education is among the best plans for earning a profit. The world's population has been growing older. The older the society is, the greater the investment in necessary nursing education will be. Qualified and professional nurses should be invested in because nurses constitute the greatest number of health-care providers, and their education must continuously be updated, improved and innovated. The United States was the first country to move from the hospital setting into an academic setting. It was also the first country to make an attempt to transition training programs out of hospitals and into the university setting. The University of Minnesota, in 1909, was the first university to offer a bachelor's of science degree in nursing (BSN)[1]. However, there is also the claim that Yale University established the first bachelor's degree program in 1925 and

that applicants were required to complete two years of general education studies before they could apply to nursing school[2]. The United States has also urged to the rest of the world to modernize by investigating critical thinking and by providing holistic care to the patients. According to holistic nursing practice standards, nursing care should assess the patient's physical, psychosocial and spiritual needs to provide efficient care[3]. In the past, nurses were trained at the bedside to a level of qualification and competence in caring for the sick. The major teaching concept in the tradition of nursing education was to develop nurses to have strong "observation skills and empathy"[4]. In Europe, the University of Edinburgh was the first institution of higher education to offer a nursing degree. The University of Manchester in the United Kingdom was the first university to offer a degree level in nursing, in 1996[5]. The university is proud to announce that its qualified nurses are 100% employed in health-care institutions both locally and abroad. In Australia, the first school to offer nursing education was the School of Nursing at Sydney Hospital in 1868[6]. In 1984, the Australian government requested the transfer of basic nursing education into the higher education sector and, in 1989, into the university sector. In mainland China, Peking Union Medical College announced the first bachelor's program in nursing in China[7]. Japan

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established its first nursing university in 1952[8]. Thailand offered its first four-year bachelor's degree program in nursing in 1956[9].

Professional nursing is now quite different, and the burden and responsibility are not only placed on primary care hospitals. These hospitals must perform a variety of tasks. The current position of professional nurses in society was best summarized by a group of specialists[10]: (1) educated nurses are better than uneducated nurses; (2) physicians and hospitals demand much more of their nurses than they used to; and (3) preparation for bedside nursing requires good teaching; preparation for public health nursing, which consists largely of instruction, requires further teaching. Those nurses who are to teach other nurses, hold executive positions and become leaders must not only be of a higher intellectual caliber but must also have had more extensive formal education (pp. 276). Therefore, the role of nursing is a combination of several posts in a variety of settings.

There are many research studies showing that a nurse with a BSN can provide better patient care, has stronger critical thinking skills and has received more health education[11-13]. In mainland China, it is planned that at least 30% of nurses will have university diplomas[14]. However, the percentage of nurses with bachelor's degrees is still low (2.8%)[15], while in the United States, 35% of nurses had bachelor's degrees in 2004[16]. In Macao, the percentage of nurses with bachelor's degrees reached 65.6% in 2010[17] because a new policy in Macao allows only RNs with bachelor's degrees to enter the professional nursing field in the public health-care system.

Macao is small; however, it has one of the highest popular densities in the world. Recently, Macao became one of the cities with social and economic growth and two-digit GDP. With great improvement in its financial resources, the government of Macao has attempted to solve the nursing manpower shortage, which has been a problem for some time. With this goal, the government has changed rank and grade level system for nursing staff. Based on a law passed two years ago, all newly recruited nurses must have a bachelor's degree of nursing to work for a public health-care institution. It also established an academic nursing program to provide higher education toward a BSN, which has been begun in two local nursing schools (a private school in 2002 and a public school in 2008).

This goal has the deeper purpose that nursing strategies in professional education be up to the present needs of society and the aging population. Nursing requires a combination of science and art as the most basic foundation of nursing care, as established by our famous founder Florence Nightingale[4]. The primary aim of this study was to present milestones of nursing's contributions to educational history as it has transitioned from hospital settings and diploma programs to academic settings with more intensive diploma programs and then to bachelor's of science in nursing programs; other postgraduate and continuing education programs will be mentioned. A variety

of important points of comparison will be highlighted, and expectations of what should be added to the traditional training apprenticeship system will be discussed.

1.1. Professional Nursing Education Development in Macao

1.1.1. Early Nursing Education Development

The hospital setting diploma programs in Macao date back to the 19th century. By 1923, the first nursing school (private school) was established, and it is also the longest standing nursing school in Macao. It offers hospital setting training and provides nursing diplomas. This first nursing school is private and still exists today, with a renamed curriculum that is a combination of basic nursing theory and clinical instruction. Nurses are trained in a 3-year program and learn mostly through hands-on technical applications. Theory and evidence-based practice were not the primary focuses. Nurses then became midwives if they attended a 1-year training program during World War II. The decision to create a 1-year midwife training program was a result of many babies being born after the war ended and the Baby Boom began. In 1896, Bangkok, Thailand, established its first school of nursing and midwifery[9]. Japan also began providing midwifery training in 1915[18]. In 1956, Columbia University in the United States offered the first program in nursing midwifery[2]. Based on this changing strategic method, the nursing administration thought critically about the need to meet society's demands. By 1999, this hospital setting private school had transitioned into an academic setting. For years, the private school has been adhering to an educational philosophy of "From personhood to benevolence" and has been dedicated to the promotion of nursing care education. The school has fostered more than 2,000 quality nursing professionals across health-care service posts in Macao, Hong Kong and overseas countries over 87 years. This school has also adapted to meet the challenge of training professional nursing students (co-author's affiliation). The second nursing school (a missionary school) had a history of 43 years, from 1939 to 1982. This nursing school trained 560 nurses during that period of time. These students were also mostly trained in hospital wards. Most of these nurses have already reached retirement, with some having obtained positions in administration and nursing education. The purpose of this missionary nursing school was to assist the government in training nurses. The third school (a public school) had a 40-year history and then was transformed from a hospital setting into an academic setting, with school renamed in 1997. This school has long provided courses for nursing students as one of its responsibilities since its establishment. The public school trains students to become qualified nurses who are also recognized by the government of Portugal because the training program's curriculum is equivalent to those used in Portugal nursing schools. The school has a team of experienced and internationally qualified health care professionals who are familiar with

academic teaching. In recent years, the private and public nursing schools have been located in a new, fully equipped building with its own nursing laboratories, which provide the students with the best practice environment to learn and to engage in academic and research activities.

1.1.2. Milestone Transition: Diploma to Higher Diploma Program

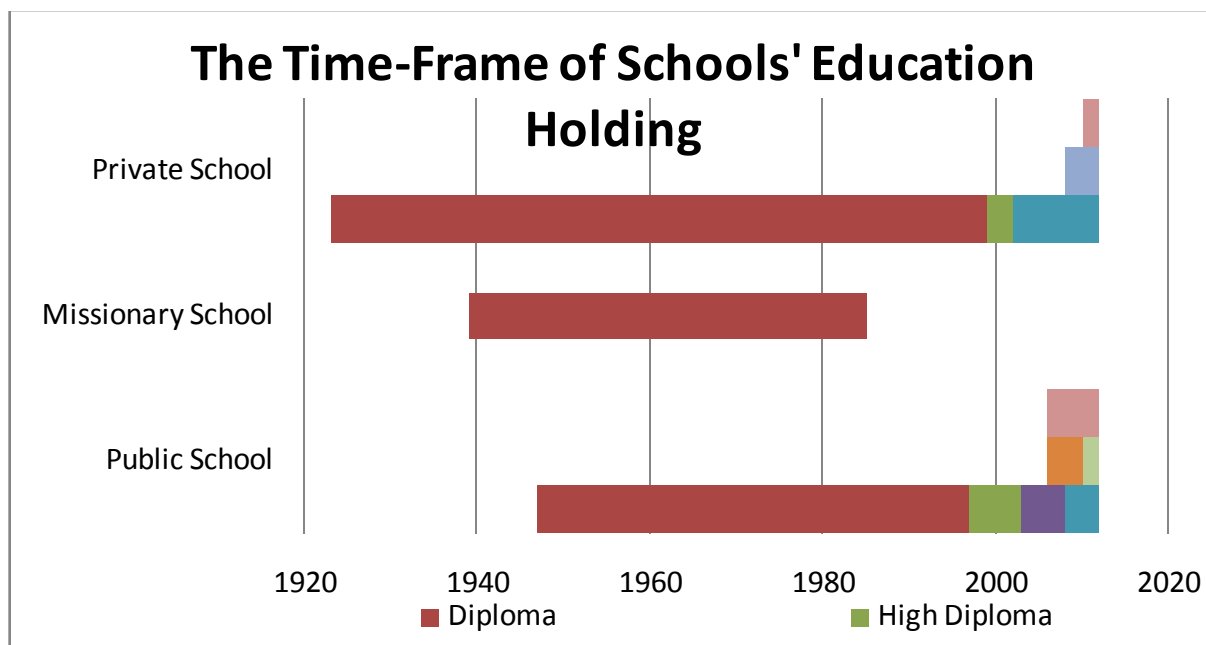
Two major nursing schools (one private and one public) have been mentioned because these two nursing schools are the only programs that have survived the transition from being diploma programs to becoming higher diploma programs. These schools are the only two nursing schools in Macao, and they have a history of providing diploma certification to nursing students in the early and mid-20th century. The private school has the longest experience with nurse training and additional experience with training midwives. It was also the first school to educate nursing students, whom were allowed to enrol when they completed grade 13 of secondary school (changed in 1991 to allow students to enrol after grade 12). Therefore, with the long history of talent management in nursing education, nurses and nurse midwives in Macao were mostly products of this private school. The public school had a similar background in training nursing students for more than four decades. Nursing students attended 12 grades of school to be enrolled in this public nursing school ever since the school was first established. In the past, the school did not recruit new nursing students every year; it recruited new students only after the previous 3-year nurse training program had been completed.

The significance of these two nursing schools with diploma programs, as with many other hospital setting training programs, is that nursing students are provided a tuition-free education, in addition to living expenses and accommodation provisions. Religious orders and experienced nurses have been the major fellows in education and administration, and medical physicians have been employed as part-time lecturers. Hospital setting training encompasses more hours as the nursing students learn patient care skills, rather than much attention being paid to the underlying theory. Nursing students are also required to take responsibility for the workload in the ward. Therefore, nursing students learn while they work and gain experience. Regarding to the serious problem of inadequate nursing educators, newly graduated nurses who performed excellently in school must be recruited. Some senior nursing students are occasionally needed to provide support to freshman students in the hospital ward. Therefore, nursing is not very highly respected. Then, the trend toward higher diploma systems began at these one public and one private nursing schools in 1997 and 1999, respectively. Classrooms already located within hospitals were transformed from hospital settings to academic settings. Starting the development of a higher diploma program, one very obvious innovation has been that nursing students have

begun to pay tuition and fees, without many types of allowances. More hours in theory courses have been added to traditional subjects, such as geriatric nursing, community health-care and nursing management, at one of these schools. Continuous assessment and evaluation in theoretical knowledge have been maintained and improved to meet individual or group presentations and assignments. Traditional assessments with testing have also remained. The background of nursing education development is summarized in Figure 1.

1.1.3. Innovation in the Bachelor of Science in Nursing

It is a very common pattern that a better educational level leads to better quality of care, better critical thinking, better theoretical knowledge and, of course, better payment and better job satisfaction. This is a very simple concept. A greater number of nurses are willing to work in more advanced industrial countries, such as the United States, Canada and the European countries. Many research studies have provided evidence that bachelor's degrees in nursing are more in demand than supply[19]. Japan and Thailand established their first nursing universities in 1952 and 1956, respectively. Therefore, graduating nurses have tended to have bachelor's degree more often for entry into the professional field. In comparison, the bachelor's level program was introduced later; however, after several external evaluations and modifications, in 2002, the private school launched a Bachelor's of Science program in nursing. There have been several academic validations conducted by a panel of specialists over the past few years. These inspections were passed successfully. One year after the private school founded its program (2003), the public school also initiated a 1-year supplementary bachelor's degree for students who graduated from a 3-year higher diploma program. In 2008, the public school launched a 4-year Bachelor's of Science degree in nursing. Last year, the public school has had its first nursing students graduate with a BSN. This is also a turning point in that all of the nursing students who graduate locally will hold bachelor's degrees from last year forward. For this reason, the corresponding author is writing this paper to celebrate this happy moment with our professional staff. It is also the end of one milestone but the start of another one. Graduating at the baccalaureate level, nurses are also accepted by some Australian and United Kingdom universities to study for Master's degrees. This program has also been accredited by RMIT University in Australia. Therefore, viewing this current trend and other important issues, the nursing student training program has begun to make the transition from more hours in clinical practice in a hospital setting to more hours in theoretical learning in both a variety of general subjects and in specialty courses. The differences in major components are briefly summarized in Table 1, which compares the characteristics of these three major programs: diploma, higher diploma and bachelor's degree.



3Hd+1Supp degree = 3-year higher diploma + 1-year supplementary degree; BSN = bachelor of science in nursing;
 PgDSN = postgraduate diploma in specialty nursing;
 PgDAN = postgraduate diploma in advanced nursing program;
 MNS = Master's of nursing science program;
 MSC = Master's of science in specialty nursing

Figure 1. Time trends in nursing education

Table 1. Characteristics and Development of Nursing Programs

Course setting	School provision			Significance
	Diploma	Higher diploma	BSN*	
Teaching hours	More hours in clinical practice	More hours in theoretic learning	More hours in theoretic learning	Pays more attention to critical thinking, decision-making and holistic care
Tuition	Free of charge with subsidies for daily living and accommodations	Need to pay tuition and no allowances	Same as higher diploma courses	Needs more tuition fees, as it is held by the college and institute More time to understand and become familiar with knowledge
Length of time	3 years	3 years	4 years	
Main course	Fundamental, medical-surgical, mental, pediatric, OBGYN, community health	Adds geriatric nursing, nursing management and health promotion 117 or 152.5 credits (PrS and PuS, resp.)	Adds information technology, nursing research and terminology in English 115 or 163.5 credits (PrS and PuS, resp.)	Diversity of knowledge and technology are added
Theory assessment and evaluation	Tests and examinations	Individual, group presentations, assignments, tests and examinations	Presentations in groups, tests and examinations, less grading in tests but with continuous assessment in the last year	A variety methods to assess and evaluate continuously
Skill examination	Skill examinations annually, continuous assessment at bedside	Skill examination required for year 1 only	All students need to pass except year 4 students, who have no skill examination	Enhancing nursing skills

Note: BSN = Bachelor's of Science in nursing; PrS = Private School; PuS = Public School

Table 2. Comparison of Nursing Educators' Qualifications and Recruitment

Software service	Hospital setting	Academic setting	Expectation
Health care staff	Religious orders, medical physicians and experienced nurses	Professional nursing faculties with experience in clinical wards or specialties	Combine theory and scenarios together in teaching
No. of nursing educators	< 1/5 were full-time educators	> 4/5 were full-time	At least one specialist educator in each specialty, such as pediatric and mental health
Teachers' educational qualifications	Related experienced in a medical field	Clinical experience and Master's level degree at least	Might need to go back to clinical ward for a short period of time to experience a real situation
Recruitment	Newly graduated nurses with good school performances were recruited locally	Open and recruitment from different countries by advertisement	Might need to recruit locally graduated nurses starting with very basic positions and proceeding to upper positions via working and continuing learning to set an example locally for nursing students that anyone can be an educator if he or she works for it
Proportions of academic qualifications	No clear requirement	Most have PhDs or are PhD candidates, and a few have Master's degrees	Have academic credentials, leadership skills and a research and publication record
Laboratory assistant	N/A	Assistants must have good preparation and teaching skills	Follow-up students in lab practice if they are inexperienced in clinical settings
Clinical instructor	No clear requirement	Required to attend basic nursing preceptor training courses before mentoring nursing students in wards	Continuous attendance of advanced nursing preceptor training courses

Note: N/A = Not applicable

2. Discussion

2.1. Nursing Education Software

From an economic point of view, the training components necessary in nursing education include knowledgeable people (students and teachers), knowledge theory and guidelines for assessment and evaluations in nursing theory and nursing skills. Previously, there were no formal checklists for grading, but in recent years, most of the criteria for assessment and evaluation have had very detailed guidelines and checklists for passing or failing nursing students. In addition, the proportions of nursing educators and students have increased. The qualifications for nursing educators are very demanding, requiring at least a Master's or doctoral level degree. Teaching and clinical experience are not the only requirements of nursing educators; they also have greater responsibilities, such as exercising leadership and maintaining research and publication records. In addition, clinical instructors are required to attend nursing preceptor training courses and to pass examinations before mentoring nursing students in wards. There have been many studies that have reported that nursing students are very motivated and enthusiastic about patient care and about the preceptors as role models who apply skilful teaching techniques [20-22]. A comparison of nursing education software from the past to the future is provided in Table 2.

2.2. Nursing Education Hardware

Hardware includes facilities, such as classrooms,

computers, and furniture, advanced equipment and devices, such as automatic beds, automatic blood pressure devices, suction devices and environmental settings, such as large and brightly lit classrooms, meeting rooms, theaters and halls for conference organizations and different functions, as well as specialty laboratories. Nursing students are familiar with simulations and practice procedures, such as the use of intravenous injection models, several times before they enter clinical wards. These sessions provide an excellent opportunity for nursing students to practice administering injections and drawing blood, setting up an intravenous lock, administering intramuscular injections and simulations for dressing changes of surgical and medical wounds. Both the private and public schools are now located in their new buildings. Nursing students have many comfortable and well-equipped modernized classrooms that are equipped with Internet access for research whenever it is needed during lectures. In the laboratories, many new and disposable materials are available for nursing students to practice with when they are learning or practicing techniques. Even expensive automatic devices, such as intravenous drip devices, blood pressure devices and suction devices, are purchased for nursing students to familiarize themselves with their functions. Recently, the trend of including simulation models with setting scenarios has increased in many university courses, as well as the use of information technology to assist nursing students, even in hospital wards, and to allow them to search evidence-based literature for theoretic learning and skill practice, as well as for research [23, 24]. A summary of the hardware services,

indicating these tremendous improvements and advancements, appears in Table 3.

2.3. Importance of Continuing Education in Nursing

Returning to the history of hospital setting learning, specialist nurses have existed since 1985 in the public school[25]. At that time, the specialist training program used the Portuguese language as the teaching medium. Then, in 1992, the Cantonese language (a regional dialect) began to be used for those students who were talented but unfamiliar with Portuguese. A total of 60 specialist nurses were trained over 10 years, including Portuguese-based and Cantonese-based courses. However, only a few seats were recruited for those students who showed great talent and for capably performing nurses who had the opportunity. Therefore, starting in 2000, all frontline nurses were eligible to upgrade their education level to a higher diploma by attending evening classes. At that time, less than a thousand nurses were working in Macao, and it was not necessary to attend many additional courses, so nurses did not feel pressure to pursue further training. Immediately, within two years, all of the nurses were promoted to the higher diploma level, with the exception of some nurses who, because of personal reasons, did not upgrade themselves. This strategy was not very difficult and did not place much stress or a greater workload on frontline nurses. By 2003, the public school launched a 1 1/2-year supplementary bachelor's degree evening program with the same requirements as the 1-year supplementary bachelor's degree daytime program. From a survey[17] conducted locally on job satisfaction in public health care institutions, the demographic data showed that 65.6% of nursing staff held bachelor's degree. In the past few years (2006 onwards), programs such as postgraduate diplomas and Master's degrees in specialist nurse training

have been initiated in cooperation with Australia, Hong Kong or mainland China. A research study showed that nursing students with Master's degrees in nursing are better trained and better able to improve and adapt to significant practice, and they engage in better communication in teamwork and have superior skills in problem-solving[26]. All of this innovation, and the successful establishment of these specialty programs are credits to the tremendous support of local government departments.

2.4. Great Support and Sponsorship by the Government of Macao

In the past few years, only a small percentage of nursing students has applied for subsidies. Considering the risks and consequences of having an inadequate number of nursing staff, different departments of the Macao government have cooperated in efforts to increase the number of young people entering this field. Financial incentive and motivation are among the major methods of attracting attention to nursing. Therefore, the doubling of the proportion of subsidized students has been very surprising, as well as the recent advances in salary and employee benefits for all nurses, as even newly recruited nurses enjoyed them. Almost 1/3 of high school students, more than previously, have registered as nursing students after the passing of the bill on the Rank and Grade System for nursing staff in salary and employment benefits[27]. After the new law went into effect in 2010, a newly recruited nurse was paid at least US\$3,359 (equivalent to MOP\$26,875) monthly, with the potential for additional types of allowances. This salary is more than one and half times the median monthly earnings of the employed population (4th quarter 2011), which was US\$1,250.05 per month, on average, in Macao[28].

Table 3. Development and Innovation in Nursing Skills Learning and Practice

Laboratory/clinical/learning setting	Nursing skill learning and practice		
	Past	Present	Future
Classrooms and facilities	Basic classrooms for theoretical learning	Regular and formal classrooms, formal halls for special lectures, equipped with computer devices and access Internet search information	Might include multimedia, simulations, and real-situation scenarios for teaching
Laboratories	Simple and small laboratories for all nursing students to use	Different specialty labs, such as OBGYN, health assessment and critical care	Might include more advanced technology used in labs
Disposable materials for practice	Only able to use recycled or expired materials, such as Foley catheters and dressing kits	A variety of new disposable materials is purchase, if they are currently used in the ward	Provide budget for purchase
Care/technology/modem devices	Very basic devices, such as manual blood pressure devices, stereoscopes and thermometers	Different types of automatic blood pressure devices, pulse oximeters, infusion pumps and even computerized simulation system are set up in critical care labs	More user-friendly and efficient cyber-style or touch screen, smaller in size and easier to carry and store
Internet	N/A	Available for use in the lab	Communicate with overseas nursing exchange students or peers to enhance global learning

In an impressive statement at a June 2012 international nursing conference at Peking Union Medical College Beijing, a keynote speaker stated, "Position is for performance." It is the awards for nursing management in education that have provided the qualifications to nurses to care for patients. Society awards good performance and professional care. Words in action also empower nursing educators, who work to accomplish many tasks and to fulfil their dreams, thus promoting and educating society about the professional status of nursing. Nursing educators are all nurses, having graduated from hospital settings and university settings, who then work in clinical wards for years, as well as maintain continuing education to obtain higher education levels (Master's and doctoral degrees). After more than a decade, it is a trend for all nursing staff in Macao that "only college graduates be regarded as professional nurses"[29]. Credit should be given to the government of Macao.

2.5. Encouragement and Awards from the Government

Without the great support and sponsorship of the government of Macao, nursing education and innovation would not have been accomplished as easily and rapidly. The government assisted the two existing nursing schools in moving to two new buildings. These buildings are well developed and equipped, with good hardware facilities. The nursing students are happier and are enjoying student life. The government also sponsored the establishment of a Nursing and Health Education Research Centre that provides health education to the elderly, such as about diabetes mellitus, and that is organized and scheduled by all of specialist nurses, who conduct patient evaluations and follow-ups after discharge. The government also understand the heavy workload that frontline nurses face in the health-care setting and has established the rank and post of assistant nurse to release basic care from the nursing staff, as well for payment.

In addition, the schools themselves also provide scholarships for those students with excellent scores and school performance. Therefore, evaluation plays a critical role in benchmarking annually and in the encouragement process for those graduated students who will continue to study for Master's degrees. These strategies allow talented nursing students to emerge and step into the spotlight. Society is impressed by our nursing participation and development in fostering better health care among community residents, especially after the SARS epidemic occurred world wide, and many people died of this infectious disease. In Macao, with its excellent preventive medicine and information and knowledge among its residents, not a single person was infected or died. This success occurred thanks to frontline nurses, as well as, at least in part, the higher levels of education that the nurses have, having worked through stressful situations and continued their educations for the past several years[4]. These simple daily improvements will undoubtedly upgrade the image of nursing. Therefore, it is necessary that nursing education be

standardized to allow the nursing profession to be viewed as valid and respectable career.

3. Conclusions

Now, professional nurses must have enhanced educational experience like other professionals, with at least a 4-year BSN for an entry-level position. Some talented and hardworking nurses are enthusiastic about continuing their educations, pursuing training to become a clinical specialist nurse, even with the hardship and stress they already face in wards daily. The authors are certain that readers will understand that putting "words in action" takes much time and great effort to initiate and succeed. Of course, acknowledgement should be given to all nurse educators' infinite efforts in pushing for this dream to become a reality. The authors are also certain that nurse educators all start on the frontline and serve patients, who in return provide feedback to improve our quality of care, thus changing and innovating nursing education at its very roots. These results are a credit to all nurses, even our ancestors, such as Sisters from religious orders, nurse managers, specialist nurses and experienced frontline nurses, who considered themselves to have minimal impact but nonetheless contributed greatly to the success of nursing education, especially during clinical practice among nursing students. It is true that having qualified nursing students with critical-thinking and decision-making skills and who are skilled in nursing interventions benefits everyone, including nursing staff, health-care institutions and society. In short, to have qualified and professional nurses, qualified bachelor's level-educated nursing students must meet the challenges and demands of society in terms of their education and critical thinking and must demonstrate independence and responsibility in patient care. Furthermore, a lifetime of continuing professional education is also important to the upgrading and maintaining of new and advanced technologies and knowledge.

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REFERENCES

- [1] Bender J. (2012). *Associate's degrees in nursing: the road ahead*. Best Nursing Degree.com. Available at 10 June 2012.
- [2] Nursing degree guide. (2012). *History of nursing schools in the United States*. Available at http://www.nursingdegreeguide.org/articles/education_basics/history_of

- [_nursing_schools_in_the_united_states/](#), accessed in 10 June 2012.
- [3] Frisch, N.C. (2001). *Standards for holistic nursing practice: a way to think about our care that includes complementary and alternative modalities*. Online Journal of Issues in Nursing 6(2), 4.
- [4] Kozier, B., Erb, G., Olivieri, R. (1991). *Fundamentals of nursing: concepts, process and practice 4th ed.* Addison - Wesley Publishing Company; California, pp. 1-52.
- [5] School of Nursing, Midwifery and Social Work. (2012). *Facts and figures*. The University of Manchester. Available at [http://www.nursing.manchester.ac.uk/aboutus/facts and figures/](http://www.nursing.manchester.ac.uk/aboutus/facts_and_figures/), accessed in 18 June 2012.
- [6] Commonwealth of education, science and training. (2001). *National review of nursing education: multicultural nursing education*. Available at http://www.dest.gov.au/archive/highered/nursing/pubs/multi_cultural/4.htm, accessed in 10 June 2012.
- [7] Wong, F. K.Y., Zhao, Y. (2012). *Nursing education in China: past, present and future*. Journal of Nursing Management 20, 38-44.
- [8] Japanese Nurses Association (JNA). (2011). *Basic nursing education in Japan. Nursing in Japan 2011(version) p7-10 Department of International Affairs: Japanese Nursing Association*. Available at <http://www.nurse.or.jp/jna/english/pdf/nursing-in-japan> 2012.
- [9] Anders, R. L., Kunaviktikul, W. (1999). *Nursing in Thailand*. Nursing and Health Sciences 1, 235-239.
- [10] Wunderlich, G.S., Sloan, F., Davis, C. K. (1996). *Nursing staff in hospitals and nursing homes: is it adequate?* Division of health care services, Institute of medicine, Washington, D.C.: National academy press p 267-277.
- [11] Aiken, L.H., Clarke, S.P., Cheung, R.B., Sloane, D.M., Silber, J.H. (2003). *Educational levels of hospital nurses and surgical patient mortality*. Journal of the American Medical Association 290 (12), 1617-1623.
- [12] Mignor, D., Cadenhead, G., McKee, A., 2002. High school counselors' knowledge of professional nursing as a career option. Nursing Education Perspectives 23 (2), 86-88.
- [13] Wong, K.S., Wong, J.Y., Hua, J.Y., Zhang, J.B., Ba, B.D. (2003). *Twenty first century research report: Macao professional nursing care and continuous nurse education policy development (Chinese version)*. The Hong Kong Polytechnic University.
- [14] Ministry of Education and Ministry of Health. (2009). *Several opinions of strengthening medical education : improving medical education quality*. Ministry of Education and Ministry of Health, Beijing (in Chinese).
- [15] Li, J., Ma, W. and Dai, Y. (2007). *Analysis of situation of nursing human resource in Sichuan province*. The Chinese Health Service Management (in Chinese) 8, 518-519.
- [16] Kalisch, B.J., Liu, Y. (2009). *Comparison of nursing: China and the United States*. Nursing Economics 27 (5), 322-331.
- [17] Leong, C.S.U., Ken, G., Liu, M. (2012). *Findings from a quantitative approach of nurses possibly related to the nursing shortage before policy modification in Macao*. International of Journal of Nursing Science 2 (1), 1-7.
- [18] Chiang-Hanisko, L., Ross, R., Boonyanurak, P., Ozawa, M., Chiang, L. (Sept. 30, 2008). *"Pathways to progress in nursing: understanding career patterns in Japan, Taiwan, and Thailand"*. OJIN: The Online Journal of Issues in Nursing 13(3), 4.
- [19] EL-Jardali F., Merhi, M., Jamal, D., Dumit, N., Mouro, G. (2009). *Assessment of nurse retention challenges and strategies in Lebanese hospitals: the perspective of nursing directors*. Journal of Nursing Management 17, 453-462.
- [20] Hellstrom-Hyson, E. M.-L. (2012). *To take responsibility or to be an onlooker, nursing students' experiences of two models of supervision*. Nurse Education Today 32, 105-110.
- [21] Khan, B. A. (2012). *Students' perceptions of clinical teaching and learning strategies: a Parkistani perspective*. Nursing Education Today 32, 85-90.
- [22] McGregor, A. (2006). *Academic success, clinical failure: struggling practices of a failing student*. Journal of Nursing Education 46(11), 504-511.
- [23] Fetter, M.S. (2009). *Collaborating to optimize nursing students' agency information technology use*. CIN: computers, informatics, nursing 27(6), 354-362.
- [24] Endacott, R., Scholes, J., Cooper, S., McConnell-Henry, T., Porter, J., Missen, K., Kinsman, L., Champion, R. (2012). *Identifying patient deterioration: using simulation and reflective interviewing to examine decision making skills in a rural hospital*. International Journal of Nursing Studies 49, 710-717.
- [25] Lam, O.C., Chiang, C.M., Luo, C.Y. (2001). *Macao Polytechnic Institute development of direction symposium (Chinese version)*. Publication: Macao Polytechnic Institute pp81-89.
- [26] Drennan, J. (2012). *Masters in nursing degrees: an evaluation of management and leadership outcomes using a retrospective pre-test design*. Journal of Nursing Management 20, 102-112.
- [27] Macao Yearbook. (2009). *Government Information Bureau of the MSAR*. Available at <http://www.gcs.gov.mo/>, accessed 26 February 2012.
- [28] Service, Statistics and Census. (2012). *Employment statistics: median monthly earnings of employed population (4th Quarter/2011) (MOP)*, Government of Macao Special Administrative Region. Available at: <http://www.dsec.gov.mo/Statistic.aspx>, accessed 26 F.
- [29] Pengelly, J. (2012). *The history of early nursing degrees*. EHow.com. Available at http://www.ehow.com/info_8088339_history-early-nursing-degrees.html, accessed in 10 June 2012.