Planning the required nursing personnel to respond to care needs

Dora Lucia Gaviria-Noreña[1]

Planning the required nursing personnel to respond to care needs

Abstract

An approach is undertaken of the concepts and methodologies concerning the planning of the nursing personnel required to respond to the care needs of individuals, families, and groups. Planning is evermore founded on the nature of caring for human beings within the context of life, which endows the existence of the person-patient with sense and significance, as well as the nursing personnel, according to the culture and the social setting in which it is developed. Knowing what and how much personnel is required to offer caregiving has been marked by the calculation of coefficients and time averages to execute activities, the description of the work load that includes studying times and movements, analysis of supply and demand of human resource, mediated by the profession's regulations in each country and by inquiry within the context of caregiving. However, consensus has not been reached with respect to this process, but it is concluded that it is a policy action that requires regulation, investigation, and group work by nursing to make caregiving visible and legitimate as a public service that maintains life and health and which also favors and mitigates processes of disease and death faced by human beings.

Key words: nursing staff; health personnel management; health management.

Planeación del personal requerido de enfermería para responder a las necesidades de cuidado

Resumen

Se realiza una aproximación a los conceptos y metodologías alrededor de la planeación del personal de enfermería requerido para dar respuesta a las necesidades de cuidado de individuos, familias y colectivos. La planeación se fundamenta cada vez más en la naturaleza de los cuidados del ser humano en el contexto de la vida, que dota la existencia de la persona-paciente de sentido

1 RN, M.Sc. Professor. Universidad de Antioquia, Colombia.
email: dgaviria@udea.edu.co

Subventions: none.

Conflicts of interest: none.

Receipt date: March 15th 2012.

Approval date: September 19th 2012.

How to cite this article: Gaviria-Noreña DL. Planning the required nursing personnel to respond to care needs. Invest Educ Enferm. 2013;31(1): 116-124.

y de significado, así como del personal de enfermería, según la cultura y el entorno social en el que se desarrolla. Conocer cuál y cuánto personal se requiere para brindar el cuidado ha estado marcado por el cálculo de coeficientes y promedios de tiempo para la ejecución de actividades, la descripción de la carga laboral que incluye el estudio de tiempos y movimientos, el análisis de oferta y demanda del recurso humano, mediado por las reglamentaciones de la profesión en cada país y por la indagación del contexto del cuidado. Sin embargo, aún no existen consensos con respecto a este proceso, pero se concluye que es una acción política que requiere de la reglamentación, regulación, la investigación y del trabajo colectivo de enfermería para visibilizar y legitimar el cuidado como un servicio público que mantiene la vida y la salud, y que, a su vez, favorece y mitiga los procesos de la enfermedad y de la muerte que afrontan los seres humanos.

Palabras clave: personal de enfermería; administración del personal en salud; gestión en salud.

Planejamento do pessoal requerido de enfermagem para responder às necessidades de cuidado

Resumo

Se realiza uma aproximação dos conceitos e metodologias ao redor de planejamento do pessoal de enfermagem requerido para dar resposta às necessidades de cuidado de indivíduos, famílias e coletivos, que se fundamenta cada vez mais na natureza dos cuidados do ser humano no contexto da vida, que dota de sentido e de significado segundo a cultura e o desenvolvimento social no que se desenvolve. Conhecer qual e quanto pessoal se requer para brindar o cuidado, tem estado marcado pelo cálculo de coeficientes e médias de tempo para a execução de atividades, a descrição do ônus trabalhista que inclui o estudo de tempos e movimentos, a análise de oferta e demanda do recurso humano, mediado pelas regulamentações da profissão em cada país e pela indagação do contexto do cuidado. No entanto, ainda não existem consensos neste processo, mas se conclui que é uma ação política que requer da regulamentação, regulação, a investigação e do trabalho coletivo de enfermagem para visibilizar e legitimar o cuidado como um serviço público que mantém a vida e a saúde e favorece e mitiga os processos da doença e da morte que enfrentam os seres humanos.

Palavras chave: recursos humanos de enfermagem; administração de recursos humanos em saúde; gestão em saúde.

Introduction

Now, more than ever, planning of nursing personnel requires having evidence that accounts for the relationship that exists among an adequate number of personnel and other variables like number of patients, actions to undertake, work schedule, among others, to achieve quality and security in the act of caring and satisfying the need to establish a closer interaction with the subjects of care, who are now more participant, have more knowledge and information on the maintenance of their health and recognize the adaptation processes as key to confront disease and death.

Planning of nursing personnel requires, among other aspects, analysis of the supply and demand of the nursing team to meet the caregiving needs within context; the determination of the number of personnel in financing from the healthcare sector; and, finally, awareness of the working conditions, rotation, flexibility and stability of personnel, different types of contracts, availability of a nursing team with high leadership training,

regulations on nurse staffing to guarantee quality care. In this sense, the International Nursing Council in its document "*Reliable personnel lives saved*"[1] urges all governments and nursing organizations to analyze and establish policies that guarantee "healthy work environments, the health of nurses, and the adequate personnel to maintain and sustain healthy populations"; likewise, it establishes as principles to staff personnel knowing the patients' needs and the complexity of caregiving, the context, intensity of caregiving, diverse levels of nurses' preparation, experience of the nursing team, and support to management by nursing in operational and executive levels. This same organism, in 2009 in its *Guidelines on human resource planning,*[2] calls on the need to consolidate and establish efficient planning and development strategies of nursing human resources, which must be periodically revised, entailing political entities in charge of making decisions in this sense, supported by permanent analysis of supply and demand.

Consequently, the decisions on the size and combination of the nursing teams are a critical area for healthcare services; thereby, it has direct implications on quality, patient security, and caregiving costs. Also, satisfaction of nursing personnel, permanent education, development of levels of autonomy and recognition, as well as incentives policies are currently essential in health management.

The INC[1] asserts that in the investigations reviewed since the 1990s, a close relationship exists between the levels of personnel training and nurse staffing with the results in patient care in terms of quality and security, which show, in turn, decreased morbidity and mortality.

Minnick and Mion[3] affirm, through an investigation, that the results of studies on nursing work have had different definitions, variants and methodological approaches, which is why in many instances the conclusions are contradictory as of the difficulties given by the information systems and the composition of databases, personnel assignment strategies, and design of analytical techniques. They highlight the importance of studies that reflect the amount of work nurses must perform not only with patients and with the results in the organization, but also their participation in continuous education activities, information, and other specific tasks that are not visible and which is necessary to evidence. McHugh *et al*.,[4] analyzed, from 1997 to 2008, the application of the legislation that establishes the minimum nurse-per-patient ratio in California hospitals compared to other hospitals in the United States. This legislation did not reduce the level of skills of the nursing personnel, as was feared, and additionally permitted improving the level of certified expert nurses. Also, upon increasing a half hour of nursing per day, patient care is improved. In addition, Kutney-Lee *et al*.,[5] evidenced that if the development of nursing personnel is maintained, this becomes a quality indicator of the patient's general care. In services like intensive care, instruments have been developed, among them the *Therapeutic Intervention Scoring System* (TISS),[6,7] which permit objectively measuring the complexity and severity of the patient, interventions, and time. With advance in research, the *Nursing Activities Score* (NAS)[8-10] was created, which seeks to analyze the needs of nursing care in intensive care, the daily evolution of patients according to the nursing activities that in the most recent versions includes actions like support and assistance to family members, patients, and administrative and management tasks; also, the NAS expresses the percentage of time dedicated by a nursing professional in direct care to critical patients in the Intensive Care Unit (ICU) during 24 hours. These studies have shown that using objective instruments that evaluate the nursing work load favors decision making and improves practices in this discipline.

Gaviria,[11] in the revision of the scientific evidence on the evaluation of care, confirms how nursing care requires adequate and suitable personnel, financial and technological resources, as well as definition of the processes and functions as appropriate matters to achieve high-quality results, which are free of risks. Briefly, never before had it been so important for nursing to have adequate

instruments and information systems that permit efficient and effective planning of personnel as an essential aspect to guarantee the quality of care.

What is planning of nursing personnel?

Planning of nursing personnel requires understanding the nature of caregiving, hence, it demands placing them within the cultural and social context that endows them with sense and significance. As defined by Colliere:[12] "Caring is, above all, an act of life, in the sense that caring represents an infinite variety of activities aimed at maintaining and conserving life and allowing it to continue and reproduce".

The Pan-American Health Organization[13] defines planning of the human resource as an analytical process that determines the personnel according to the patients' needs, that is, having the right number and type of individuals in the indicated place and time, with the skills to perform the actions that improve the health of the population and accomplish their wellbeing. In 2003, the World Health Organization[14] established the guidelines for management of human resources in nursing and midwifery, through a conceptual framework that includes: healthcare policies and plans and nursing personnel, formation, development of nursing personnel, distribution and utilization of different categories of nursing, as well as regulations. These aspects, in general, are essential to plan and evaluate the situation of supply and demand of the human resource and become an imperative for nursing associations. In this sense, Rovere[15] considers that the development of healthcare human resources must be understood as "the complex educational process of individuals and groups that starts during the formation period and is prolonged throughout the professional life, determined by their social and cultural context where different institutions and players interfere. Additionally, it is an object of social transformation to improve the population's health and the quality and coverage of healthcare services".

From nursing, the criteria that have guided the determination of the needs for personnel have been modified over time[16]. In fact, these have obeyed the scientific-technological and communication advances in healthcare, reforms of healthcare services that interfere in the organization, and the availability and qualification of personnel. Today, we have higher levels of formation, which has permitted transforming the scope in scenarios like research, teaching, and enterprise. In this sense, McGillis[17,18] considers that, besides the aforementioned, we must consider the work load, work environment, the complexity of each patient, level of skills of the nursing personnel, the combination of nursing personnel, economic efficiency and effectiveness, and the impact of nursing care upon the patient's health. Additionally, in his most recent work, the author highlights the value of the staff models of personnel linked to the results obtained in patients and to the combination the personnel's skills and to their retention to guarantee their stability.[19,20]

The work carried out by Hurst,[21] ratified by the INC[1], in *reliable personnel lives saved,* provides a complete report on the five methods for nursing human resource planning: professional judgment by experts, the method of nurses per bed occupied, the method analyzing dependency by the degree of caregiving complexity and the quality of the activities, the timed task-activity method, and – lastly – those based on regression analysis.

These systematic reviews, Greenberg,[22] are of fundamental value for decision making within the context of nursing care, which is currently debated among the requisites to improve equity and access to healthcare services, as well as to overcome inequalities of most vulnerable and excluded people, families, and human groups; to the attention of pandemics and natural disasters that increasingly affect greater numbers of people throughout the world and economic recessions that have given way, on the one hand, to the scarcity of nurses and, on the other, to high healthcare costs.

In Colombia, the investigation by the Ministry of Social Protection[23] on the model of supply and demand of healthcare human resources emphasizes on the need to develop an appropriate

system of healthcare personnel planning, which incorporates new methodologies that respond and are compatible with the characteristics and requirements of the nation's General Healthcare Social Security System. Also, the investigation defines as priority the need to create a Human Resource Planning Unit that meets the demands of the new institutional context, models of service and care delivery. By 2000, there were 23,063 nursing professionals and 82,406 nursing aides, for an estimated index in 2003 of 5.6 and 20.1 per 10,000 inhabitants, respectively. In the projections of this study, the authors conclude that the offer of nursing personnel will be evermore lower than the demand if healthcare coverage increases. In the study by Castrillón and Malvárez,[24] this same index shows big differences like that presented between Haiti (1.1) and the United States (97). The authors affirm that "without enough nursing professionals in quality and quantity, the Objectives of the Millennium and Healthcare for All will be mere rhetorical expressions. It is necessary to have intense awareness action on the problem, in terms of the impact upon the lives and health of the people and upon the security of the people hospitalized and to make efforts and alliances to align nursing education and research to the healthcare needs and development of the people".

According to the Colombian National Nurses Association (ANEC, for the term in Spanish),[25] in 2010 the country had 39,346 nursing professionals of which 62% were registered. Regarding the working conditions at that time, 38% were unemployed; in addition, of those who were employed, their job conditions were flexible in one of every two.

Nursing staff personnel: a perception from research

Planning of the nursing human talent is part of the complexity and uncertainty of healthcare services and is within the challenge of responding to the needs of human beings within the global, national, and local contexts. Kerouac *et al.*,[26] expressed that the environment in which nursing care operates presents numerous challenges and paradoxical situations. Among them, there are: the institution's financial survival and the human values that characterize nursing care, continuity of care and instability of the work teams, the hierarchical authority and the autonomy of the care personnel, the power struggles and intra- and inter-professional collaboration, standardization and respect to diversity and individuality. Also, technology and cost-effective decisions regarding values are the ethical dilemmas faced by nursing personnel during their daily practice.

In recent years, research[27-30] has focused on revealing the contexts of caregiving and its relation to the results. In this sense, research coincides in evidencing that nursing personnel is fundamental to guarantee quality and that it is possible to achieve better health levels of the population in general if there is higher training, retention, and maintenance of adequate numbers of nursing personnel.

Flynn L *et al.,*[31] consider how the dependence on caregiving by elderly patients and handicapped individuals, or individuals with mental disorders, evidences the requirement of greater time for their care and greater support, which is still not contemplated in any healthcare system. Hanrahan *et al.,*[29] in a study on the adverse events associated to factors of the organization of caregiving for psychiatric patients, reveal verbal abuse against nursing personnel and family complaints as the most frequent adverse events (79%), associated to lack of hearing, a dimension that needs to be developed in security and quality.

Shimokura *et al.,*[32] in a study on caregiving practices to patients with chronic hemodialisis, show that increased hepatitis C infection has been related to the little time available for nursing personnel to change gloves between patients. In this sense, they state that an inadequate number of personnel can cause a lower adhesion to the practices to control the infection. Miranda *et al.,*[6] in their work on nursing activities with patients in ICU, using the NAS scale, demonstrate the importance of systematizing the work load in these units. Also, factors like age, gender, increased days of hospitalization, among others, are related to the high demand for caregiving by patients and their families.

Other concerns from research are related to stimuli and healthcare of the nurses.[33,34] This is one of the main motives why hospitals in the United States do not reach the optimal levels of nursing staff personnel, given that they do not receive wages according to the quality of care they provide. In another context, Buchan and Ball,[35] in their research to assess the impact of a new wage system for nurses in the United Kingdom, with a coverage of approximately 400,000 nurses and some objectives to improve the quality of caring for people, as well as recruiting, retaining, and motivating personnel, concluded that this system must be improved with efficient communication, adequate funding, and consistent direction of the system.

Baumann[28], regarding the repercussions of the rotation of nurses and the benefits of greater stability of nursing personnel, considers it important to have lower personnel rotation, analyze the high costs the rotation of nurses has had for organizations and the effects on the quality of care. The author considers it important to conduct an analysis stemming from national policies on healthcare human resources and establish guidelines and supervision from the political to guarantee adequate staffing with minimum personnel rotation. Consequently, she urges all nursing associations to permanently be aware of the analysis of the personnel's state of health, the phenomenon of migration, retirement processes, unemployment, and an updated information system for decision making. Similarly, Buchan[36] examines how personnel stability and retention of healthcare workers poses significant benefits for directors of sectoral policy in this sense and for the wellbeing of the people. Additionally, it has positive results in the complex interaction of the quality of care in the healthcare sector, as well as an impact upon costs, which could be more effective. Rothberg *et al.*,[37] corroborated how a cost-effective security intervention is related by the nursing personnel-patient ratio, analyzed the institutional profitability by comparing the patient-nurse ratios from 8:1 to 4:1, with the prior being less costly, but with the highest risk of death. The authors concluded that an intervention reflected on security care for patients has to do with ratios of 4:1. This is reasonably more profitable and is, generally, the most accepted.

Another one of the lines of research in this theme[6,31,38-40] is aimed at the construction of instruments that permit knowing the nursing activities and the time required. All authors coincide in that these instruments manage to detect over 40% of the nursing work.

In keeping with the aforementioned, Thorsell *et al.,*[38] performed a validity and reliability analysis with satisfactory results from the Time in Care Needs (TIC-n) version with 19 items to apply in two municipalities with elderly patients, who had greater dependency on care to support functions of daily living due to their decreased mobility and activity skills.

Gonçalves *et al.,*[7] characterized patients hospitalized in ICU in function of the bio-social and admission data and verified the daily needs of nursing care according to the *Nursing Activities Score* –NAS-. The sample comprised 50 adults admitted to ICU in a University Hospital in the municipality of Sao Paulo. Most of them were over 60 years of age, with an average of 3.5 days in ICU, and NAS result of 66.5%, verifying that it remained over 50% during the course of the hospitalization in this service. This work evidences the work load of the ICU nursing personnel and the benefits of NAS to verify this. In Colombia, the multicentric study by ACOFAEN[41] on the socio-demographic characteristics of nursing professionals graduating between 1995 and 2004 describe that 52% of the nursing professionals had between two and five years of experience, similarly, many of them had not entered the job market or ended up dedicated to other occupations, reflecting the effects of reforms to the healthcare sector. Of those working, 70% worked in a healthcare services provider institution (IPS), 27% worked in a second institution, and 4% also worked in a third institution to compensate for low wages. Additionally, half of those working with the normal Schedule had marked deterioration of the working conditions, given that a good proportion of them were hired through job cooperatives. Precisely, 60% of those surveyed considered that their work was not well paid.

The National Technical Nursing Counsil[42] states, in its declaration, that in Colombia there is no adequate recognition of the fundamental role played by nursing services in the healthcare system, although this profession has the occupational profile with the lowest level of substitution among professions in healthcare. In addition, "the social healthcare security model does not directly recognize nursing care within the skills and functions of the nursing professional, integrating such within the medical procedures, or within what is known as basic services". While the systematic review of studies related to planning of nursing personnel has not been exhausted, it is revealed that incentives policies have been earmarked in recent years to evidencing the effects on the quality of care. Some of these policies include: retention – stability – and wages, the methodologies to measure the work load and the care needs, and studies of human resource supply and demand as a complex field of health management and nursing in particular.

Final considerations

Planning of human talent in nursing must be based on the patients' needs, the families, and the human groups in objective and pertinent manner and close to the context and conditions surrounding the act of caregiving. As expressed by Cuesta,[43] the conditions and the context indicate the problematic nature of the experience surrounding caregiving; consider it as that set of events and occurrences that create situations, themes, or problems and the responses individuals undertake to solve it. In this sense, Romero[44] states that the "characteristics of caregiving within the current Colombian context is of adversity and defines it as the expropriation of the subject from the act of caring and the loss of the nurse-patient inter-subjective relationship.

The periodic analysis of nursing personnel, required in healthcare institutions, social organizations, and programs with groups, must be supported by an opportune and valid information system founded on the nursing diagnosis[45] as basis for the calculation and implementation of taxonomies, which identifies the actions by each of the members of the nursing team according to the categories regulated in the country. The combination of nursing personnel based on advanced training, an adequate incentives plan, and a patient-centered nursing management model improves quality and increases the satisfaction of all the players involved in the caregiving processes. At the same time, it must be the foundation for the legislation of the nurse-patient coefficient.[46,47]

References

1. Consejo Internacional de Enfermeras CIE. Personal fiable vidas salvadas. Carpeta de herramientas de información y de acción. [Internet]. Ginebra:CIE; 2006 [cited 2006 May 13]. Available from: http://www.icn.ch/indkit2006sp.pdf.
2. Consejo Internacional de Enfermeras. Directrices para la planificación de recursos humanos de enfermería. Ginebra: CIE; 2009.
3. Minnick AF, Mion LC. Nurse labor data: the collection and interpretation of nurse-to-patient ratios. J Nurs Adm. 2009; 39(9):377-81.
4. McHugh MD, Kelly LA, Sloane DM, Aiken LH. Contradicting fears, California's nurse-to-patient mandate did not reduce the skill level of the nursing workforce in hospitals. Health Aff (Millwood). 2011; 30(7):1299-306.
5. Kutney-Lee A, McHugh MD, Sloane DM, Cimiotti JP, Flynn L, Neff DF, et al. Nursing: a key to patient satisfaction. 2009;28(4):w669-77.
6. Miranda DR, de Rijk A, Schaufeli W. Simplified Therapeutic Intervention Scoring System: the TISS-28 items--results from a multicenter study. Crit Care Med. 1996; 24(1):64-73.
7. Gonçalves LA GP, Toffoleto MC, Telles SCR, Padilha KG. Necessidades de cuidados de enfermagem em terapia intensiva: evolução diária dos pacientes segundo o Nursing Activities Score (NAS). Rev Bras Enferm. 2006;59(1):56-60.
8. Miranda NR, Rijk A, Schaufeli W, Iapichino G. Nursing activities score. Crit Care Med. 2003; Crit Care Med. 2003; 31(2):374-82.
9. Grillo Padilhaa k, Ferreira Queijoa A, Reis Miranda D. Nursing Activities Score in the intensive care unit: analysis of the related factors. Intensive Crit Care Nurs. 2008; 24(3):197-204.

10. Conishi GR. Nursing Activities Score (NAS) como instrumento para medir carga de trabalho de enfermagem em UTI adulto. Rev Esc Enferm USP. 2007; 41(3):346-354.

11. Gaviria Noreña DL. La evaluación del cuidado de enfermeria un compromiso. Invest Educ Enferm 2009; 27(1):24-33.

12. Ortiz AC, Gaviria DL. La participación del acompañante en el cuidado del paciente hospitalizado. Invest Educ Enferm. 2002; 20(2):12-29.

13. Colliere M. Promover la vida. España: McGraw-Hill/Interamericana; 1993.

14. Organizacion Panamericana de la Salud. Calidad de los servicios de salud en America Latina y el Caribe: desafíos para la enfermería. Ginebra: OPS; 2001.

15. Rovere M. Planificación estratégica del recurso humano en salud.Washington D.C.: OPS-OMS; 1993.

16. Giraldo CI. Las necesidades del cuidado de enfermería: criterios para definir requerimientos de personal de enfermería. Invest Educ Enferm. 2000;28(1) 49-68.

17. McGillis Hall L, Lalonde L, Tomblin Murphy G, O'Brien-Pallas L, Spence Laschinger HK, Tourangeau A, et al. Decision making for nurse staffing: Canadian perspectives. Policy Polit Nurs Pract. 2006;7(4):261-9.

18. Centro Internacional para los Recursos Humanos de Enfermería. Adopción de decisiones sobre la combinación de capacidades para la enfermería. In: McGillis Hall L, editor. Ginebra: Concejo Internacional de Enfermeras; 2009.

19. Duffield C, Roche M, O'Brien-Pallas L, Catling-Paull C, King M. Staff satisfaction and retention and the role of the nursing unit manager. Collegian. 2009; 16(1):11-7.

20. Hogan P, Moxham L, Dwyer T. Human resource management strategies for the retention of nurses in acute care settings in hospitals in Australia. Contemp Nurse. 2007; 24(2):189-99.

21. Hurst K. Selecting and applying methods for estimating the size and mix of nursing teams. a systematic review of the literature commissioned by the Department of Health. Great Britain; 2003.

22. Greenberg PB. Nurse-to-patient ratios: what do we know? Policy Polit Nurs Pract. 2006; 7(1):14-6.

23. Ministerio de Salud, Facultad Nacional de Salud Pública. Programa de Apoyo a la Reforma. Modelo de oferta y demanda de recursos humanos en salud para Colombia. Medellín: Facultad Nacional de Salud Pública; 2002.

24. Malvarez SM, Castrillón-Agudelo MC. Panaroma de la fuerza de trabajo de enfermeria en America Latina. Washington D.C: Organización Panamericana de la Salud; 2005. 76.

25. Suárez BC. Avances en el Registro Unico Nacional de Enfermería -RUN. Bogota: Asociacion Nacional de Enfermras de Colombia; 2010.

26. Kerouac PJ, Ducharme F, Duquete A, Major F. El pensamiento Enfermero. Badajoz: Masson; 1996.

27. Bauman A. El efecto de la rotación del personal y el beneficio de la estabilidad en los recursos humanos de enfermería. Ginebra: International Council of Nurses; 2010.

28. Bruyneel L, Van den Heede K, Diya L, Aiken L, Sermeus W. Predictive validity of the International Hospital Outcomes Study questionnaire: an RN4CAST pilot study. J Nurs Scholarsh. 2009; 41(2): 202-10.

29. Hanrahan NP, Kumar A, Aiken LH. Adverse events associated with organizational factors of general hospital inpatient psychiatric care environments. Psychiatr Serv. 2010; 61(6):569-74.

30. Neff DF, Cimiotti JP, Heusinger AS, Aiken LH. Nurse reports from the frontlines: analysis of a statewide nurse survey. Nurs Forum. 2011; 46(1):4-10.

31. Flynn L, Liang Y, Dickson GL, Aiken LH. Effects of nursing practice environments on quality outcomes in nursing homes. J Am Geriatr Soc. 2010; 58(12):2401-6.

32. Shimokura G, Chai F, Weber DJ, Samsa GP, Xia G-l, Nainan OV, et al. Patient-Care practices associated with an increased prevalence of hepatitis C virus infection among chronic hemodialysis patients . Infect Control Hosp Epidemiol. 2011; 32(5):415-24.

33. Spetz J. California's minimum nurse-to-patient ratios: the first few months. J Nurs Adm. 2004; 34(12):571-8.

34. Coffman JM, Seago JA, Spetz J. Minimum nurse-to-patient ratios in acute care hospitals in California. Health Aff. 2002; 21(5):53-64.

35. Buchan J, Ball J. Evaluating the impact of a new pay system on nurses in the UK. J Clin Nurs. 2011; 20(1-2):50-9.

36. Buchan J. Reviewing the benefits of health workforce stability. Hum Resour Health. 2010; 8:29.
37. Rothberg MB, Abraham I, Lindenauer PK, Rose DN. Improving Nurse-to-patient staffing ratios as a cost-effective safety intervention. Med Care. 2005; 43(8):785-91.
38. Thorsell KB, Nordstrom B, Nyberg P, Sivberg BV. Measuring care of the elderly: psychometric testing and modification of the Time in Care instrument for measurement of care needs in nursing homes. BMC Geriatr. 2008; 8: 1-8.
39. Riu Camps M, Villares Garcia J, Castells Oliveres X, Gili Ripoll P. Nursing achievement. Measurement of nursing time. Rev Enferm. 1996; 19(220):22-7.
40. Kaestner R. Nurse-to-patient ratios. Health Aff. 2006;25(3):882-3.
41. ACOFAEN. Estudio Multicéntrico: ejercicio laboral y condiciones generales de trabajo de los profesionales de enfermería egresados entre 1995 y 2004 en Colombia en el contexto del Sistema General de Seguridad Social en Salud. Bogotá: ACOFAEN; 2008.
42. Cortés R, Ramírez AL, Restrepo MP, Vargas BC. Declaración del Consejo Técnico Nacional de Enfermería "sobre el deterioro de las condiciones laborales del profesional de enfermería en Colombia". Actual Enferm. 2010; 13(3):27-35.
43. De la Cuesta C. Cuidado artesanal - La invención ante la adversidad. Medellín: Editorial Universidad de Antioquia, Facultad de Enfermería; 2004.
44. Romero MN. El cuidado de enfermería en la adversidad, cuatro compromisos desde la docencia. In: Memorias del XVI Congreso Nacional de Enfermería: paradigmas conceptuales compromiso social y gremial. Julio 27-30. Medellín: Asociación Nacional de enfermeras Colombia ANEC; 2005.
45. North American Nursing Diagnosis A. NANDA-I diagnósticos enfermeros: definiciones y clasificación, 2007-2008. Madrid: Elsevier; 2008.
46. Crandall M. Nurse-to-patient ratios. Addressing concerns in legislation. AWHONN Lifelines. 2000;4(2):21.
47. Patterson J .The effects of nurse to patient ratios. Nurs Times. 2011; 107(2):22-5.