THE RAFAELA SYSTEM IN THE HEALTH CARE FIELD

A Descriptive Literature Review

Abstract

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Abstract

Nurse staffing adequacy is one fundamental issue in the health care system. Along with this are nursing intensity and nurses' workload issues. Different ways, including legislative acts, have been continuously developed to solve issues related to this area. Methods and staffing tools have been studied to improve nurse staffing and nursing intensity in different areas. One of this is the RAFAELA system- a workforce planning tool, nursing intensity and staffing system developed in Finland in 1990s- which has been continuously studied and analyzed and has been extended to other countries. The purpose of this thesis is to increase nurses' understanding about the RAFAELA system in the health care field. The aim is to conduct descriptive literature review by gathering research articles to analyze and review the information about the RAFAELA system. The data analysis used was content analysis. The results yielded 2 main categories; benefits and improvements. The category 'benefits' were further categorized into 2, which are 'nursing and health care field' and 'human resource and management'. Under the category 'improvement' are the sub-categories 'training for nurses', 'components of the system' and 'schedule feasibility'. In conclusion, the system was perceived as an important tool in the health care field. The areas for improvement were perceived to be a good ground for further research and for the improvement of the system's content and method. It was also concluded that with proper trainings and sufficient knowledge about the system, implementation of the RAFAELA system will be easier and more successful.

Abstrakti

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Julkaisun Otsikko

RAFAELA- Hoitoisuusluokitus Terveydenhuollossa

Sairaanhoitaja

Abstrakti

Sairaanhoitohenkilöstön riittävyys on yksi keskeinen kysymys terveydenhuollossa. Tämän lisäksi hoitotyön intensiteetti ja sairaanhoitajien työmäärä ovat ongelmallisia. Tähän alaan liittyvien kysymysten ratkaisemiseksi on kehitetty jatkuvasti erilaisia tapoja, kuten säädöksiä. Menetelmiä ja henkilöstövälineitä on tutkittu sairaanhoitajien ja hoitotyön tehokkuuden parantamiseksi eri alueilla. Yksi niistä on RAFAELA-järjestelmä - Suomessa 1990-luvulla kehitetty työvoiman suunnittelutyökalu, hoitotyön intensiteetti ja henkilöstöjärjestelmä, jota on tutkittu ja analysoitu jatkuvasti ja joita on laajennettu muihin maihin. Opinnäytetyön tarkoituksena on lisätä sairaanhoitajien ymmärrystä RAFAELA-järjestelmästä terveydenhuollon alalla. Tavoitteena oli tehdä kuvaava kirjallisuuskatsaus keräämällä tutkimusartikkeleita RAFAELA-järjestelmää koskevien tietojen analysoimiseksi ja tarkistamiseksi. Käytetty data-analyysi oli sisältöanalyysi. Tulokset tuottivat kaksi pääluokkaa; hyödyt ja parannukset. Luokka "hyödyt" luokiteltiin edelleen kahteen ryhmään, jotka ovat "hoito- ja terveydenhuollon ala" sekä "henkilöstö- ja hallinto". Luokkaan "parannukset" kuuluvat alaryhmät "sairaanhoitajien koulutus", "järjestelmän osat" ja "aikataulun toteutettavuus". Lopuksi, järjestelmää pidettiin tärkeänä välineenä terveydenhuollon alalla. Parannettavia alueita pidettiin hyvänä perustana jatkotutkimukselle ja järjestelmän sisällön ja menetelmän parantamiselle. Lisäksi pääteltiin, että asianmukaisilla koulutuksilla ja riittävällä osaamisella järjestelmään RAFAELA-järjestelmän toteuttaminen on helpompaa ja onnistuneempaa.

Avainsanat

RAFAELA, RAFAELA System, RAFAELA Patient Classification

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1   INTRODUCTION

Issues about nurse staffing have been going on for years in most countries, if not all. This has been a topic of disagreement and conversation. Also, in relation to nurse staffing is nursing intensity. Nursing intensity is defined as the total time and staff mix of nursing personnel resources consumed by an individual patient or client during the duration of their care (Miller-Keane Encyclopedia 2003).

American Nurses Association had been leading multiple initiatives to achieve an appropriate and safe nurse-patient ratio in all health care settings. According to them, the higher rates of patient falls, infections, medication errors and even patient death are linked to inadequate nurse staffing of experienced registered nurses. Fewer nurses work longer working shifts and care for sicker patients as a result of massive budget reduction combined with the challenges presented by a growing nursing shortage. These human resource issues may compromise care and contribute to the nursing shortage by creating an environment that drives nurses from the bedside. (American Nurses Association 2018.)

In 2017, a review to assess relationship between nurse staffing and nurse outcomes was done through meta-analysis. In this review, it was assessed that there was a higher degree of burnout for nurses when the nurse-patient ratio is greater. Increased in one patient per registered nurse ratio is associated with an increase in job dissatisfaction. The results of this meta-analysis revealed that nurses' job dissatisfaction was greater than burnout or intention to leave. The findings demonstrated negative nurse outcomes were related to a greater nurse-to-patient ratio (Shin, Park & Bae 2017).

Efforts for safe staffing are already present in many countries. It is becoming a common priority to solve nursing shortages. In the United States, The Safe Staffing for Nurse and Patient Safety Act of 2018 had been introduced in the U.S. Senate and House of Representatives. "This legislation requires Medicare-participating hospitals to form committees, comprised of at least 55 percent direct care nurse, to create and implement unit specific nurse-to-patient ratio staffing plans. This staffing approach will benefit patients, registered nurses and hospitals by decreasing adverse health events, nurse turnover, and costly hospital readmissions." (S. 2446/2018)

In California, a law required all hospitals a specific nurse-to-patient ratio. A staffing model was implemented in 2004, and since then, California has demonstrated better patient outcome and more satisfied nurses and patients. (Aiken, Sloane, Cimiotti, Clarke, Flynn, Seago, Spetz & Smith 2010.)

In Australia, a national campaign "More Staff for Aged Care" lead by the Australian Nursing and Midwifery Federation (ANMF) is pushing for a legislated staff ratio in aged care. This campaign is meant for safe staffing ratios and ensuring elderly nursing home residents get the care they need and deserve. (Australian Nursing & Midwifery Federation 2018.)

In Japan, nurse staffing standards are introduced in Medical Care Act and they have fee schedules that set nurse staffing standards. This medical care act sets patient-to-nurse ratio depending on the functional category of hospital wards. (Morioka, Tomio, Seto & Kobayashi 2017, 2.)

Nurse staffing issues does not only exist in hospital settings, these issues are also present in home care. Home care is defined by Merriam-Webster Dictionary (2018) as the "services (as nursing or personal care) provided to a homebound individual (as one who is convalescing, disabled or terminally ill)". As nursing care had been rapidly and drastically developing and evolving, it is already possible to provide health care at the comfort of one's home.

Understaffing is a serious problem in health care settings. This most commonly puts patients' safety at risk and is also a common reason for nurses' burnout. Research had shown and proven that heavy nursing workload have adverse effect to patient safety and have an effect on nurses' job satisfaction. In an article written by Kelly Gooch (2015), she discussed five biggest issues that nurses face today. These issues are nurse compensation, workplace violence, short staffing, long working hours and workplace hazards. It can be noted that one of the issues is about short staffing. If staffing is inadequate, it threatens the safety and health of patients, leads to greater complexity of patient care, and also impacts the health of nurses by increasing rate of injury and fatigue.

In a research conducted about nursing skill mix in European hospitals, it was found out that the higher proportion of professional nurses was associated with significant lower mortality, higher patient ratings for their care and fewer adverse outcomes of care. A specific example is that each 10% increase of proportion of professional nurses is associated with 11% decrease of patients' death after a surgery. On the perspective of reducing skill mix, each 10% reduction in the proportion of professional nurses is associated with 12% increase in the odds of death of patients. Findings from this study suggested that a cau-

tion should be taken when implementing policies of skill mix reduction because of the consequences that can be life-threatening to patients. (Aiken, Sloane, Griffiths, Rafferty, Bruyneel, McHugh, Maier, Moreno-Casbas, Ball, Ausserhofer & Sermeus 2016.)

In Finland, there is a RAFAELA system, which is a nursing intensity and staffing system that produces information about the patient's need for care. This research-based system is aiming to establish an international research network and it is already being introduced and tested in nursing homes and home health care. It will simplify the resourcing of nurse staff and will optimize their work efforts that would therefore result in good care of patients. (Finnish Consulting Group 2018.) This system will be discussed further in this literature review.

This thesis is about the RAFAELA system in the health care field for the past ten years. Its purpose is to increase the understanding of health care workers by conducting a descriptive literature review and analyzing valid research articles. The research articles to be used are the ones published in Finland and other foreign countries. This thesis is limited to the use of articles published only in the English language. What are the experiences of health care workers in relation to the RAFAELA system? What are the benefits of the system and what can be improved in it? These are the questions this thesis aims to answer. In analyzing the research articles, content analysis would be utilized.

2   RAFAELA SYSTEM

2.1   System's Perspectives

The RAFAELA system was first developed for hospital settings in Finland in the late 1990s. Its name was derived from the surnames of its original authors, they are Rainio, Fagerström and Rauhala. Through a multi-center study, the national testing and standardization of the system in Finland was done during 2000-2002, and its systematic benchmarking was done in 2002. The RAFAELA staffing system and nursing intensity is owned by the Association of Finnish Local and Regional Authorities and governed by FCG Consulting Ltd. Over 1000 units in Finland, 90% of all hospitals, use this system. (Kautto 2016, 16-17.)

The theoretical framework of the RAFAELA system is based on two perspectives, the nursing science and human resource perspective. On the nursing science perspective, the holistic view of the people, importance of human needs and complexity of nursing are all taken into consideration. On the other hand, the human resource management perspective is about the importance in top-down approach, belief in staff competence and importance of strategic and engaged leadership. (Fagerström 2014, 7).

In the human resource management, it is important to be evidence-based. The term "evidence-based" was initially coined in the field of medicine during the 1990s. Nowadays, the term and its principles have extended to other fields such as education, public policy, criminology, social work and management.

Evidence-based management is the management decisions based on available evidence in combination with critical thinking. Evidence is the available body of facts or information that indicates whether a belief or proposition is valid or true. Evidence may come from different scientific researches, although nowadays, professional experiences and internal business information may already be considered as evidence. Evidence-based practices help managers to evaluate the applicability and validity of the evidence they have in hand and find the best possible evidence that would help them manage with the help of valid and proven evidence. While it had been common to follow the steps of successful managers and chief-executive-officers, evidence-based management will give a better ground for managers to explain to their employees why a decision was made. With this, conflicts and issues between employers and employees may be lessen. (Barends, Rousseau & Briner 2014, 4-6).

2.2   Components of the RAFAELA System

There are four components in the RAFAELA system. These include patient classification instrument, human resource, quality of good nursing care and workload assessment.

First, the patient classification instruments which measure nursing intensity in five different areas. Nursing intensity is a measure of the number, technical complexity, or attendant risk of provided services. Articles and research evidence have already proven that there is a probability to decrease patients' injury incidents when nurse staffing is optimized based on their workloads. In this review, information about measurement of nursing intensity will be discussed more. (McGraw-Hill Concise Dictionary of Modern Medicine 2002.) Second, the human resource which counts on the daily number of nurses and assistant nurses in providing bed side care.

Third, the quality of good nursing care. Quality care is "the extent to which health care services provided to individuals and patient populations improve desired health outcomes. In order to achieve this, health care must be safe, effective, timely, efficient, equitable and people-centered". Safe health care must have minimal risk and harm, avoiding preventable injuries and reducing medical errors. Effective health care is providing care which is evidence-based and scientifically proven. Timely care is reducing the delays in providing and receiving health care services. Efficient health care is providing services that maximize resources and avoiding wastes. Equitable care is delivering health care services equally and with no discrimination. People-centered care is providing care that takes into account the preferences and rights of individuals and the culture of the community. (World Health Organization 2018.)

Identifying why the patient came in for care is important. Patients are to be assessed holistically, by checking their physical, mental, psychological and social status. With proper patient assessment, individual care may be properly determined. Each person must be seen as a unique individual with unique individual needs.

Lastly, the workload assessment, also referred as professional assessment of optimal care intensity level (PAONCIL) instrument. This instrument supports resourcing and is a professional method that assesses the sufficiency of nursing resources. This method estimates how much care the patient needs in order to be well taken care of during a 24-hour period. (Fagerström 2014, 8.) Nursing workload is the amount of work that needs to be done by the nurse during her shift. In the nursing practice, there is evidence showing that

when there is an increased amount of nurse workload, the quality of care received by the patient is more at risk. (Carayon & Gurses 2008, 205-206.)

The PAONCIL method was assessed to be an integral part of the system. This is a method that calculates the personnel resources using Nursing Integrity (NI). This instrument contains an overall assessment of the actual nursing intensity level and has an added list of central non-patient factors that may increase or decrease the nursing workload. Among these non-patient factors are work organization, work schedule planning, staff substitutes, meetings and trainings, nursing students, cooperation with physicians, cooperation with other staff, cooperation within the organization, cooperation with own group, own work capacity, mental stress and other factors (Fagerström & Vainikainen, 2014).

In addition, in a study conducted about organization of nursing care in three Nordic countries (Sweden, Finland and Norway), there is a relationship between nurses' workload, level of involvement in direct patient care, job satisfaction and nurses' intention to leave the job. The greater the patient workload, the lesser the job satisfaction, which will then push nurses to leave. This had been the case even when total number of nursing staff is considered. Job satisfaction was found to be related to nurses' involvement in direct patient care. Nurses that work with direct patient care are found to be more satisfied than nurses with non-direct patient care. One implication of these findings is that when making efforts to improve staff retention, policy makers and management should also consider the roles of nurses in patient care. (Lindqvist, Alenius, Runnesdotter, Ensio, Jylhä, Kinnunen, Sjetne, Tvedt, Tjonnfjord & Tishelman 2014.)

2.3   Classification Instruments

There are different classification instruments under the RAFAELA system. These include the Oulu Patient Classification (OPCq), Pitkäniemi Patient Classification, Polikliinisen Hoitoisuusluokitus qualisan (POLIHOIq), Perioperatiivinen Hoitoisuus qualisan (PERIHOIq) and Sädehoito Hoitoisuus qualisan (SÄDEHOIq). The health care field consists of different areas specific to the care need of each patient. These classification instruments are particular and specific to different units in the health care field.

First is the Oulu Patient Classification System (OPCq). This classification system was developed in the early 1990s at Oulu University Hospital and was further developed at Vasa Central Hospital during the year 1995-2000. In this classification system, there are six ar-

eas of nursing care to be assessed. These areas include planning and coordinating nursing care; respiration, circulation and symptoms of illness; nutrition and medication; hygiene and secretion; activity, sleeping and rest; and lastly, teaching and supervision of treatment follow-up and emotional support.

This classification instrument uses point system. Each area of nursing care mentioned will be assessed and will be given points where in A=1 point, B=2 points, C=3 points and D=4 points. Patients will then be classified according to the total number of points, 24 being the highest. Table 1 shows five nursing intensity classes where patients are classified. Patients in class 1 will be given the minimal need of care, while patients in class 5 get to be prioritized and will be given intensive need of care. (Kautto 2016, 9-12.)

Table 1. Nursing Intensity Classes (Kautto 2016, 9-12.)

Nursing Intensity Class	Number of Points	Need of Care
Class 1	6-8 points	Minimum need of care
Class 2	9-12 points	Medium need of care
Class 3	13-15 points	High need of care
Class 4	16-20 points	Maximum need of care
Class 5	21-24 points	Intensive need of care

The Oulu Patient Classification instrument is mainly used in wards on specialized and primary health care. It is based on the Roper-Logan-Tierney Model of Living, which is a nursing care theory based on activities of daily living. This is an assessment used throughout patient's care, it attempts to define what living means. The activities listed in this theory include maintaining a safe environment, communication, breathing, eating and drinking, elimination, washing and dressing, controlling temperature, mobilization, working and playing, and lastly, sleeping. (Nursing Theory 2016.)

Another classification instrument is the Pitkäniemi Patient Classification, which is meant for psychiatric wards. This classification instrument collects comprehensive information of a single patient's caretaking and provides information about patients' nursing intensity per nurse.

Next is the Polikliinisen Hoitoisuusluokitus qualisan (POLIHOIq), which is an instrument for outpatient departments and emergency rooms. This has been part of the RAFAELA system since 2004. Then the Perioperatiivinen Hoitoisuus qualisan (PERIHOIq), which is a classification instrument developed by 15 hospital districts in Finland and is based on humanistic and holistic values of caretaking. It is used for operating rooms, emergency rooms and out-patient surgery units. The guidelines of this instrument is used in all the perioperative units using the RAFAELA system in Finland.

Lastly, the Sädehoito Hoitoisuus qualisan (SÄDEHOIq), which is a classification instrument used for radiation therapy. It collects comprehensive information about the radiation therapy received by the patient and information about the amount of nursing staff taking part in the radiation therapy. (Finnish Consulting Group 2018.)

2.4   Implications to the Health Care Field

With the help of the RAFAELA system, there would be improvement in person-centered care for he patients, workforce planning and decreased personnel costs will improve, there will be improvement in quality and risks will be managed better, there will be an increase in nurses' job satisfaction and the patient documentation quality will be enhanced. (Fagerström 2014, 19.)

According to the Finnish Consulting Group (2018), the system will provide support for analyzing the quality, productivity, and costs of operating processes. Management, planning and decision making will be based on transparent and well-measured information. Information and support when assessing and developing a multifunctional working community may be provided by the system. The nurses may take part in the decision making through their own work. Workload of nurses will be optimized, and will support the nurses' work welfare and motivation. Fair division of labor may be outlined by the system. Lastly, this system will be a self-leadership tool for individual nurses.

2.5   Implementation Process

On the implementation of the RAFAELA system, the system will be first introduced into the unit. The OPCq classification will be done for the duration of two to three months. Everyday assessment is done by classifying the patients need of care using the OPCq instru-

ment. Then the reliability testing of the OPCq instrument is done through parallel classifi-cations. Parallel classification is used to assess consistency of results of two tests con-structed in the same way from the same content domain.

To ensure and maintain its reliability, the instrument is tested annually. After the reliability testing, PAONCIL method is applied. Using this method, an optimal nursing intensity level will be determined for each unit on the basis of nurses' professional assessments for a pe-riod of at least three to four weeks. Each nurse will be making an overall assessment every end of the shift on a daily basis, whether nursing resources have been enough in relation to patients' need of care.

It is recommended that when using PAONCIL method, a study should be repeated every two to three years or when there is a big organizational or extensive staff changes to en-sure its reliability. By analyzing these, the optimal OPC points per care giver per unit can be determined and nurse managers can also determine what's affecting nursing staff or ease the overall work situation. (Fagerström, Lonning & Andersen 2014, 32.) Figure 1 il-lustrates this implementation process.
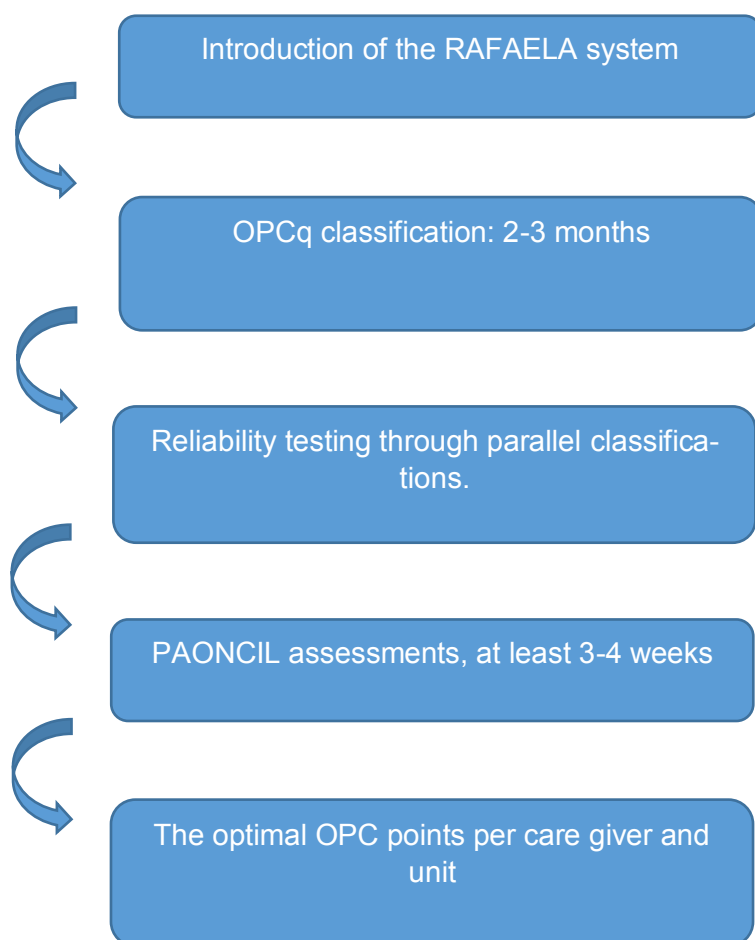
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┌─────────────────────────────────────────────┐
│        Introduction of the RAFAELA system     │
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│          OPCq classification: 2-3 months      │
└─────────────────────────────────────────────┘

┌─────────────────────────────────────────────┐
│  Reliability testing through parallel classifica-│
│                    tions.                      │
└─────────────────────────────────────────────┘

┌─────────────────────────────────────────────┐
│      PAONCIL assessments, at least 3-4 weeks  │
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┌─────────────────────────────────────────────┐
│     The optimal OPC points per care giver and │
│                    unit                        │
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Figure 1. Implementation process of the RAFAELA system. (Fagerström, Lonning & Andersen 2014, 32.)

3   PURPOSE, AIM AND THESIS QUESTIONS

Nurse staffing issues had been the topic of interest. After undertaking an initial and broad literature search about the topic, the ideas were narrowed down and specific thesis questions were formulated. The purpose of this thesis is to increase nurses' understanding about the RAFAELA system in the health care field. The aim is to conduct descriptive literature review by gathering research articles to analyze and review the information about the system.

The thesis questions are:

    a.   What are the experiences related to RAFAELA system in the health care field?

    b.   What are the benefits of the system in the nursing practice and what can be improved in the system?

4   METHODOLOGY

4.1   Method and Process

In the nursing and health care field, there is a vast amount of increasing researches and literature, which are all important in developing the health care practice. In general, literature review aids in gathering and synthesizing that information. The importance of literature review is related to its purpose. Its purpose is to draw and analyze previous studies in a precise and analytical manner. It is neither about the views and opinions of the researcher, nor a lengthy description of other people's work. It is also important that the researcher is familiar with the topic and should demonstrate a thorough grasp of background knowledge. The steps in doing a literature review include selecting a topic and searching for literature, reading and organizing these literature, analysis and synthesis and lastly, writing up the final review. (Coughlan, Cronin & Ryan 2013, 2-7.)

This thesis will be conducting a descriptive literature review. A descriptive literature review aims to identify, assess, analyze and interpret a body of knowledge about the certain topic. Prior to emergence of systematic reviews, descriptive review had been the primary means of presenting the literature of a given topic. (Coughlan et. Al 2013, 14-15.)

After identifying the purpose and aim of the study, an inclusion and exclusion criteria had been drawn up. A comprehensive search for literature was then done using electronic databases. The search made was from year 2009 to 2019 to provide an overview of the latest development of the topic being reviewed. The keywords used were 'RAFAELA', 'RAFAELA system' and 'RAFAELA patient classification system' in the research databases utilized. The keywords used were specific to limit the search and gather only specific results to be used in this thesis. The databases utilized were CINAHL (Cumulative Index to Nursing and Allied Health Literature), PUBMED and SCIRP (Scientific Research Publisher).

Study selection was done in two stages; it involves initial screening followed by screening of the full papers (Coughlan et. Al 2013, 40). During the initial screening, checking of titles and abstract of the research articles against the set inclusion criteria was done. Those that didn't match the criteria were immediately removed. Then during the second screening, there was detailed reading of the research articles against the set inclusion criteria.

Table 2 presents the total number of research articles searched using the keywords. There were a total of 610 results from three databases. All the titles of each research articles were scanned first to sort if the article is relevant to the topic. After going through the titles, each articles were read thoroughly then duplicated articles were removed and further sorted out using the inclusion and exclusion criteria. Finally, there were a total of 14 relevant research articles that qualified to be included in this literature review.

Table 2. Research database summary

Research Database	Initial number of research articles from the keyword used	Final number of research articles after using inclusion and exclusion criteria and after removing duplicated articles
PUBMED	564	6
CINAHL	17	5
SCIRP	29	3
Total No.	610	14

These research articles were then analyzed, organized, criticized, synthesized, then summarized. A literature review may consist of a large number of studies, therefore, organized for the benefit of the reader.

The data analysis method chosen was content analysis. Content Analysis is an important research technique, that is reliable and requires systematic reading for making replicable and valid inferences from texts to the content of their use (Krippendorff 2004, 18). Research ethics was upheld during the whole process of this thesis. After the review, conclusions were formulated and limitations were determined.

4.2   Inclusion and Exclusion Criteria

According to the Clinical Research Institute (2018), the inclusion and exclusion criteria is a vital aspect of a clinical research. It helps the researcher to take unbiased and precise decisions, that will eventually have an impact on the analysis and result interpretation of the research. These criteria will constitute the search strategy and will define the parameters of the review.

The inclusion and exclusion criteria are determined before beginning the search of litera-ture. This is based on the view that if decisions are made in advance, then the reviewer will not be influenced or swayed by the findings of the studies. This is done to ensure the overall validity of the findings. (Coughlan et. Al. 2013, 38.) Table 3 presents the following inclusion and exclusion criteria. These inclusion and exclusion criteria will help answer the focus questions of this thesis.

Table 3 Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Studies published from year 2009-2019	Studies published in other languages aside from English
Included studies must be research papers, which report aims, methods and results of the original study.	Studies where the RAFAELA system is only used as a reference and not the main point of the article or study.
Included studies must be research papers, which report aims, methods and results of the original study.	Studies published more than 10 years ago.
Studies that focused mainly on utilizing the RAFAELA system in health care practice.	Research articles, that does not report original research of its own.
Studies published in the English language.	
The aim and/or objective of the studies must be related to the feasibility, reliability and validity of RAFAELA system in health care field.	

4.3 Qualified Research Articles

There were a total of 14 research articles qualified to be included in this thesis. Nine stud-ies have stated similar aims and/or objectives which, in general, is "to assess, investigate, illustrate, study and test the RAFAELA system's feasibility, reliability and validity". The other five studies' aim were in general, to "explore, study, describe, clarify the experi-

ences, perceptions, views of the managers'/ department managers', personnel's and registered nurses' use of the RAFAELA- patient classification system. All the aims of these studies were focused on answering the main questions of this thesis.

The RAFAELA patient classification system, as mentioned, has instruments for measuring nursing intensity and determining optimal nursing care intensity level. Two of these instruments- Oulu Patient Classification (OPCq) and Professional Assessment of Optimal Nursing Care Intensity Level (PAONCIL) instrument- were studied in the research evidences being reviewed. A total of nine research articles have utilized the classification instruments in their studies. Seven studies were about OPCq and two studies about the PAONCIL method. The remaining five studies were about testing the RAFAELA system as a whole by assessing the feasibility and validity, and experiences and perceptions of the study subjects about the patient classification system.

From the research articles, four studies were done in Norway. In the study conducted in Norway, most results are positive, however, it was observed that the system is time consuming. Another study in Norway provided evidence showing that the Oulu Patient Classification system is reliable and valid at a satisfactory level, it also demonstrated that the system has an international relevance in nursing. Another study for home health care in Norway showed that OPCq using a multiple parallel classification method based on oral case presentations is not feasible. Other countries, which are also already studying this system, include Iceland, Norway, Sweden and Vietnam (Andersen, Lonning & Fagerström 2014).

Three research articles revealed results that the use of the RAFAELA system is time-consuming. According to the process of the system, also as seen in Figure 1, it would take two to three months for the classification, then at least three to four weeks for the assessment using PAONCIL method.

After reading and assessing the research articles, they were summarized and presented in a table in Appendix 1. The table presents the title of the research articles, their authors, the aim of studies and their results and conclusions.

4.4   Analysis

Content analysis was used to analyze the research articles for this thesis. It is context sensitive and therefore would allow to process data texts that are significant, informative, meaningful and representational to the readers. It is a research method that makes replicable and valid inferences to attain a condensed and broad description of the phenomenon and the outcomes of this analysis are concepts and categories that describe the phenomenon. (Elo & Kyngäs 2007, 108.)

It is important to constantly compare the findings with the heading. Headings are based on the outcomes and findings of the studies, so studies should be compared and contrasted in relation to these. (Coughlan et al 2013, 70 & 96.)

All the research articles in this thesis were read through several times to make sense out of the data. Meaningful data were generated and an overall impression was made. The aims of these research articles have been related to the research questions. While reading these articles, texts and phrases that share similar meanings were noted and written down for open coding. Then these texts and phrases were grouped and categorized. Also, these categories were related to the thesis questions. This list of categories was then grouped to broader higher categories or main categories.

Two main categories were derived from the research articles. These are "benefits" and "improvements." The RAFAELA system was perceived to be applicable and useful both in the nursing and health care field and in human resource management; so the main category "benefit" was further categorized into two sub-categories, which are "nursing & health care field" and "human resource management."

The second main category was also further categorized into three sub-categories, which are "training for nurses", "components of the system" and "schedule feasibility."

Table 5 illustrates how the first main category was formed from all the significant and meaningful data from the research articles analyzed. This category presents the benefits of the RAFAELA system in the nursing and health care field and in human resource management.

Table 5 Category: Benefits

Open Coding	Sub-categories	Main Categories
Applicable and user-friendly Visibility of nursing care Active nurse-participation Nursing workload determination Focused care-need Mortality predictability	Nursing and health care field	Benefits
Good foundation for human resource Enhanced evidence & scientific based working Provide nursing perspective Basis for nursing intensity Nursing intensity for quality care Nursing resource & allocation awareness	Human resource and management	

Table 6 illustrates how the second main category was derived after analyzing the research articles. This category presents what can be improved and developed in the RAFAELA system.

Table 6 Category: Improvements

Open Coding	Sub-categories	Main Categories
Nurses' readiness and awareness Need for precise nursing documentation Nurses' level of competence	Trainings for nurses	Improvement
OPC & PAONCIL sub-areas development More detailed description of the components Simplicity, efficiency and applicability improvement	Components of the system	
Time to understand the nature of the system High amount of follow-up Lack of time for individual patients	Schedule feasibility	

The next chapter will be the results, where the two main categories are presented. Under these main categories are the sub-categories, which will be separately explained and will be written in bold letters.

5   RESULTS

5.1   Benefits

As mentioned earlier, the RAFAELA system is based on two perspectives, the nursing science and the human resource perspectives. After thoroughly reading and analyzing the research articles, these two perspectives of the RAFAELA system had been evident. The categories were, therefore, based on these analyses.

The first main category is 'benefits'. This main category was divided into two sub-categories, these are 'nursing and health care field' and 'human resource management'.

Nursing and Health Care Field: The RAFAELA system was experienced to be useful as a common language in nursing, this aided in focusing on the nursing essentials and developing the profession. The system also improved the communication about quality of nursing care and patients' needs. It was experienced to be applicable and user-friendly (Ostveen, Ubbink, Mens, Pompe & Vermeulen 2015). The process of the system in documenting nursing intensity and discussing optimal nursing intensity had increased awareness, gave reflection and engaged nurses in the nursing intensity issues. (Lillehol, Lonning & Andersen 2017). This study is supported by another study stating that the system represented a common reference frame within nursing and across units, also, the system provides useful information about nursing activities and patients' care needs (Hustad, Helleso & Andersen 2015).

This system had been studied in various clinical settings, including the home care setting. It was also stated that it is useful in measuring nursing intensity within the care of elderly people. It may not provide a complete overview of patient's care needs, but it provides daily information about the situation and may serve as a guideline for long-term strategic planning. (Frilund & Fagerström 2009.)

Hospital mortality can be predicted by the RAFAELA system (Junttila, Koivu, Fagerström, Haatainen & Nykänen 2016.) There was a proven relationship between nursing workload and patient incident and mortality. It was found out that if the nursing workload is above the optimal level, there are odds that patient safety incidents are 10-30% higher while patient mortality will be 40% higher. If the nursing workload per nurse is lower the assumed optimal level, there will be a decrease of approximately 25% of patient safety incidents and mortality. It means that if nurses have more time for caring and attending to patients'

needs, the risk for adverse events may be reduced and will therefore, prevent patients' health condition from deteriorating. (Fagerström 2018.)

The RAFAELA system helped the nurses to become more aware of their professional roles and their own nursing tasks performed during their shifts. The system was able to define the patients' needs and helped the nurses to assess their own work more thoroughly and helped them appreciate the value of their work. (Hustad et. Al 2015.)

A study conducted in Norway indicated that the Norwegian version of the RAFAELA instrument provided reliable information. When adapting instruments to another country, it is important that the culture of the two countries correspond to a certain extent. (Andersen 2014.)

Human Resource and Management: RAFAELA system provided daily documentation of nursing intensity of wards, so it was considered to be an important management tool for nurse managers for balancing the appropriate number of nursing staff to the need of each patients. The reports about daily documentation of nursing intensity help the nursing management to plan better working shifts and document if there is a need for a new position. As a consequence, to the reports of a study, nursing resources were allocated more appropriately. A good nursing resource allocation was perceived to have the potential of strengthening the relationship between leaders and collaborators. (Lillehol et. Al 2017).

Data from systematic use of the RAFAELA system offer objective facts for evidence-based decision making for the human resource management. This will therefore enhance the scientific and evidence-based way of thinking of nurse leaders and will provide a rational, systematic and objective foundation for evidence-based human resource management (Fagerström 2009). This will also assist nurse leaders by highlighting the key areas in the nursing unit and thus contributes to make the nursing activities more visible. Resource allocation was clearly improved.

5.2   Improvements

The second main category is 'improvements'. After the analyses, areas for improvement in the RAFAELA system had been determined. These include trainings for nurses, improvement in the components of the system and schedule feasibility. These areas for improvement make the sub-categories.

Trainings for nurses: Although the system was accepted to be applicable and user-friendly, nurses' performance in using the RAFAELA system does not warranty the system's implementation. Nurse managers may need to focus on improving and widening the readiness and awareness of nurses regarding the implementation of a workforce planning system. (Oostveen et. al 2015.) Also, trainings and seminars about proper documentation would be essential, because precise nursing documentation can promote a more reliable result from the system (Liljamo et. al 2017).

The need for dedicated training personnel and the importance of being well prepared for the implementation process was expressed. In one research article, nurse managers have expressed that one-to-one training will be needed for managers to enable them to use the system in a comprehensive way. (Hustad et. al 2015.)

Components of the system: The Oulu Patient Classification, which is a part of the RAFAELA system, had been developed to assess nurse managers in proper nursing allocation. In some studies, there were detectable differences between areas of 'planning and coordination of nursing care' and 'guiding of care and emotional support'. It was perceived that there is a need to develop the descriptions of these subareas and to clarify its related contents. Clear description may help nurses evaluate and conduct proper documentation. (Liljamo et. Al 2017.) Simplicity, efficiency and applicability of this instrument will greatly help nurses to understand the system (Junttila et. Al 2016).

As discussed earlier in this thesis, the Oulu Patient Classification has six areas of nursing care to be assessed. These areas include planning and coordinating nursing care; respiration, circulation and symptoms of illness; nutrition and medication; hygiene and secretion; activity, sleeping and rest; and lastly, teaching and supervision of treatment follow-up and emotional support. Development of these areas may be improved to better correspond to certain health care settings such as home health care. (Flo, Landmark, Hatlevik & Fagerström 2018.)

In the RAFAELA system, the professional assessment of optimal nursing care intensity level (PAONCIL) instrument is used to assess optimal nursing intensity level per unit. This instrument includes non-patient factors, which include the main categories organization of work, working conditions, self-control and cooperation. This list of non-patient factors of the PAONCIL instrument are reasonably relevant, though the list should be further improved. The categories 'working conditions' and 'self-control' appeared to have not been sufficiently explored in the nursing research. Study results showed that there was a need

for other factors related to a modern view of the category 'working conditions' and all the other dimensions of the category 'self-control' be renewed. (Fagerström et. al 2014.)

Schedule feasibility: The RAFAELA system also had negative experiences about the system, these include the high amount of follow-up of classifications needed to be done. Also, it required time to thoroughly understand the nature of the system. (Lillehol et. Al 2017.) Though it requires time to understand the system, it may help if the nurses have proper training and knowledge before the implementation of this system in any health care field.

The implementation of the RAFAELA system required a systematic education and training for a long period of time. One study conducted provided a detailed insight about implementing new tools in a busy hospital setting. The tests are time consuming and implementing the system is scheduled to take approximately 3-6 months per unit, therefore, individual web-based introduction programs were proposed. Also, a web-based training programs for managers about using and interpreting RAFAELA reports would be helpful for a faster conduction of the process. (Hustad et. al 2015.)

6   DISCUSSION

6.1   Results

After the analyses of the research articles, the questions of this thesis were answered. The first question was 'What are the experiences related to RAFAELA system in the health care field?' There are different experiences about the system. Some experiences revealed positive outlook, while some experiences were related to the areas of improvement of the system.

The second question was related to the first question, 'What are the benefits of the system in the nursing practice and what can be improved in the system? The RAFAELA system in the nursing and health care field had been perceived to be, in general, helpful and useful. It provides visibility of the nursing care, lets nurses focus on patients' care needs and promotes active participation of nurses in the health care setting and also in nursing allocation process. It helps determine the nursing workload and hospital mortality and patient safety incidents.

The system was also perceived to be of great help in human resource management by providing good foundation and enhancing evidence-based and scientific way of working. It provides the nurse managers with important information about nursing intensity.

Trainings for nurses will improve the readiness and awareness before the implementation process of the RAFAELA system. There is also a need for proper documentation during the process to ascertain the reliability of results. The nurses' level of competence needs improvement for the success of the implementation of the system's process.

It was also perceived that there was a need to improve the components of the system, some of which are the OPC and PAONCIL instruments. The sub-areas of these instruments may be modified or improved to have more adaptability to the health care setting being studied. A clear description of this components and sub-areas may also help the nurses, even nurse managers, understand the system better.

Health care professionals subjected and included in the studies about the RAFAELA system have experienced that the system takes a lot of time and that it requires a lot of follow-up of classifications. Also, in busy health care settings, there will be a lack of time to be given to individual patients, making thorough assessment difficult.

6.2 Ethical Considerations

There are principles in research integrity. These include (1) reliability in ensuring research quality, this will reflect in the design, methodology, analysis and use of resources in the research. (2) honesty and being transparent in writing and conducting the research in an unbiased way. (3) respect for research colleagues, participants, society, environment, etc. It is also important to respect the authors of the studies or evidence to be used in writing the research. (4) being accountable for the research. (The European Code of Conduct for Research Integrity, 2017, 3.)

Research integrity and honesty were present in the entire research process. Collecting, analyzing and presenting the research evidence were done objectively. The findings and summary were presented as accurately as possible without subjective opinions.

It is important to conduct a research responsibly. Research misconduct is a violation. It includes fabrication, falsification and misinterpretation, plagiarism and misappropriation. Violations of the responsible conduct of research is unethical, that may invalidate research results (Guidelines of the Finnish Advisory Board on Research Integrity 2012, 32-33.)

No fabrication, falsification, plagiarism and misappropriation were done in this thesis. Due accreditation and proper citing were present in this review. It is important to acknowledge the work of other authors who are directly quoted or whose works were mentioned in this review. Sources in this review were thoroughly analyzed and the credibility of each source used was strictly analyzed. The inclusion and exclusion criteria were accurately drawn to remove bias in selecting research articles that will just give positive or negative results.

6.3 Reliability and Validity

Reliability and validity were ensured in the whole process of the review. The research evidence answered the focus questions, covered and addressed the issues in this topic. (Garrard 2014, 58-60.)

The drawn inclusion and exclusion criteria were strictly followed when searching for research articles to remove biases. The research articles were thoroughly assessed and made sure that these were written by the original authors. Ethical considerations in conducting a literature review were upheld.

The analysis process was described in details to promote clear understanding to the readers. Trustworthiness of the research can be presented through a reliable analysis process. To have successful content analysis, data must be simplified and analyzed and that the categories reflect the subject of the study in a reliable manner. (Elo et. al 2007, 112.) Analysis was done solely based on the results and conclusions provided by the qualified research articles. Conclusion of this review was drawn from the analyses revealed by the research articles. Individual point of view and personal judgement are not included in this review.

6.4   Conclusion

The purpose of this review was to generally assess the understanding of the RAFAELA system in the health care field in the past 10 years. In conclusion, based on the analyzed research articles, there is a clear foundation that the system had continually been improving and perceived as an important tool in the health care field and in human resource management, therefore, can be perceived to have a good integration in the health care field, though there will always be a space for improvement.

Based on the reviewed research articles, some professionals in the health care field have demonstrated knowledge and understanding about the system, while others found it difficult to understand it. The RAFAELA system has provided useful information about the care and needs of patients and also information about different nursing activities.

Nurse staffing issues may be addressed by this system, since this system also provides useful information about nursing intensity and daily situation in the health field, and such information is useful for nurse managers in human resourcing.

With regards to the negative results presented by other research articles, these results may be used to further improve the content and method of the RAFAELA system. The health care field is such a diverse area, the system had taken this into consideration as it addresses different areas and specialty areas such as general wards, emergency room, units for people with disability, etc. From the analysis made, it can also be concluded that more trainings and education about the whole system is a sensible idea to be provided to nurses and nurse managers, because with sufficient knowledge about the system it will be easier to implement it.

It will also be important to assess each classification system under the RAFAELA system. Moreover, it will be worthwhile adding research evidence published in the Swedish and Finnish language, to further evaluate the RAFAELA system in health care inside and outside Finland.

6.5   Limitations

There is limited research evidence gathered about the validity of the system outside Finland, so the RAFAELA system outside Finland cannot be completely assessed. This review was also limited by not including other evidence, which is published in other languages aside from English, putting them out by the inclusion and exclusion criteria.

Gathering and assessing all the possible timely research evidence would give this review a more valid ground. There were limited studies done about each classification instrument. These instruments are vital for assessing the validity of the RAFAELA system holistically.

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APPENDICES

APPENDIX 1

1.
Title:
Pre-implementation studies of a workforce planning tool for nurse staffing and human resource management in university hospitals.

Author/s & Publication Date:
Oostveen, C., Ubbink, D., Mens, M., Pompe, E. & Vermeulen, H. 2015

Aim of the study:
Investigate the reliability, feasibility and validity of RAFAELA (including Oulu Patient Classification), before implementation in Dutch hospitals.

Summary of Results and Conclusions:
Majority of the respondents was positive about the applicability and user-friendliness of the system. However, the RAFAELA was not accepted as useful workforce planning system. The performance of nurses did not warrant the implementation of the system.

2.
Title:
Quality of nursing intensity data: inter-rater reliability of the patient classification after two decades in clinical use.

Author/s & Publication Date:
Liljamo, P., Kinnunen, U-M., Ohtonen, P., & Saranto, K. 2017

Aim of the study:
Measure the inter-rater reliability of the Oulu Patient Classification System.
Discuss existing methods of reliability testing.

Summary of Results and Conclusions:
Development of the descriptions of the subareas and clarification of related concepts must be done.

3.
Title:
Evidence-based human resource management: a study of nurse leaders' resource allocation.

Author/s & Publication Date:
Fagerström, L. 2009

Aim of the study:
Illustrate how the RAFAELA system can be used to facilitate evidence-based human resource management.

Summary of Results and Conclusions:
A rational, systematic and objective foundation for evidence-based human resource management is provided by the system.
Objective facts and motives for evidence decision making in human resource management are offered by using the system systematically, which will therefore enhance the evidence and scientific based way of thinking of nurse leaders.

4.
Title:
A Qualitative Study of Manager Experiences Using the RAFAELA System

Author/s & Publication Date:
Hustad, N., Helleso, R., & Andersen, M. 2015

Aim of the study:
Explore the managers' experiences using the RAFAELA system.

Summary of Results and Conclusions:
The study indicated that the patient classification system provided useful information about patients' care needs and nursing activities.
A common reference frame for discussing nursing, staffing and allocation was provided by the system. The managers considered the system as time-consuming in the implementation phase, though they considered the system as a very important tool.

5.
Title:
Testing Reliability and Validity of the Oulu Patient Classification Instrument—The First Step in Evaluating the RAFAELA System in Norway

Author/s & Publication Date:
Andersen, M., Lonning, K. & Fagerström, L. 2014

Aim of the study:
Study and reliability and validity of the Finnish Oulu Patient Classification system in Norway.

Summary of Results and Conclusions:
This study provided evidence of Oulu Patient Classification system to be reliable and valid at a satisfactory level. The study demonstrated that the system has an international relevance in nursing, as the study was done outside Finland.

6.
Title:
Nursing workload, patient safety incidents and mortality: an observational study from Finland.

Author/s & Publication Date:
Fagerström, L., Kinnunen, M. & Saarela, J. 2018

Aim of the study:
Investigate whether the daily workload per nurse (OPCq/nurse), as measured by the RAFAELA system, correlates with different types of patient incidents and mortality. Compare the results with regressions, based on the standard patients-nurse ratio.

Summary of Results and Conclusions:
Although the difference was not very large, models estimated on the basis of the RAFAELA system -compared with the standard patients-nurse ratio- provided larger effect sizes, greater statistical power and better model fit.
Net benefits as calculated on the basis of decision analysis did not provide any clear evidence on which measure to prefer.
Association between daily workload per nurse and patients' safety incidents and mortality have been demonstrated.

7.
Title:
Exploring nurse managers' perception of using the RAFAELA system as a management tool in a Norwegian hospital setting.

Author/s & Publication Date:
Lillehol, B., Lonning, K. & Andersen, M. 2017

Aim of the study:
Explore the nurse managers' perception of the RAFAELA system as a management tool in a Norwegian hospital setting.

Summary of Results and Conclusions:
The system was experienced to be a useful basis for a precise and common language in nursing. It also aided to focus on nursing essentials and develop the profession. The system improved communication about patients' needs and quality of nursing care in the wards. It provided daily documentation of nursing intensity, thus considered an important management tool for balancing patient needs with appropriate staffing.
The system, though, was considered time-consuming.

8.
Title:
Hospital mortality and optimality of nursing workload: A study on the predictive validity of the RAFAELA Nursing Intensity and Staffing system.

Author/s & Publication Date:
Junttila, J., Koivu, A., Fagerström, L., Haatainen, K. & Nykänen, P. 2016

Aim of the study:
Test the predictive validity of the RAFAELA system by examining whether hospital mortality can be predicted by the optimality of the nursing workload.

Summary of Results and Conclusions:
The RAFAELA system can predict hospital mortality. Additional confirmation for the predictive validity of RAFAELA system was rendered by this study.

9.
Title:
Managing the optimal workload by the PAONCIL method- a challenge for nursing leadership in care of older people.

Author/s & Publication Date:
Fagerström, L., Frilund, M. 2009

Aim of the study:
Test the ability of the PAONCIL method to establish the optimal nursing intensity per care giver within the care of older people by testing whether the method's prerequisites for hospital settings can be fulfilled within the care of older people as well.

Summary of Results and Conclusions:
The prerequisites for the PAONCIL method were fulfilled and that the nursing intensity level could be determined. The system is useful for measuring nursing intensity within care of older people, but additional research is needed in this area. It provided information about the daily situation, as well as it gives guideline for long-term strategic planning.

10.
Title:
Using a new interrater reliability method to test the modified Oulu Patient Classification Instrument in home health care

Author/s & Publication Date:
Flo, J., Landmark, B., Hatlevik, O., Fagerström, L. 2018

Aim of the study:
Test the interrater reliability of the modified Oulu Patint Classification system, using a multiple parallel classification method based on oral case presentations in home health care in Norway.

Summary of Results and Conclusions:
This study assessed that this multiple parallel classification method that is based on oral case presentation is not feasible in home health care.

11.
Title:
Nurse Experiences' of Nonpatient Factors that Affects Nursing Workload: A Study of the PAONCIL Instrument's Nonpatient Factors

Author/s & Publication Date:
Fagerström, L., Vainikainen, P. 2014

Aim of the study:
Assess and determine which nonpatient factors affect nurses' experiences of their total nursing workload in both outpatient settings and hospital, as captured by the PAONCIL instrument.

Summary of Results and Conclusions:
The actual list of nonpatient factors in the PAONCIL instrument is reasonably relevant, but the list should be improved or renewed to include nurses' actual working conditions and self-control.

12.
Title:
Benchmarking by the RAFAELA Patient Classification System- a Descriptive Study of the Optimal Nursing Intensity Levels

Author/s & Publication Date:
Fagerström, L. 2009

Aim of the study:
Describe the structure of benchmarking with the RAFAELA system and present comparisons of optimal nursing intensity levels in Finnish hospitals using data from RAFAELA benchmarking reports in 2001.

Summary of Results and Conclusions:
This study further proved that an imbalance between nursing intensity and personnel resources clearly affects the quality of care.
Benchmarking with the RAFAELA system provides many opportunities for nurse managers in their decisions in human resource management.

13.
Title:
Validity and Reliability Testing of the Oulu Patient Classificaition: instrument within primary health care for the older people

Author/s & Publication Date:
Fagerström, L., Frilund, M. 2009

Aim of the study:
Evaluate the reliability and validity of the OPC instrument to see whether it valid and useful within primary health care for older people.

Summary of Results and Conclusions:
The instrument provides good overview of the patients' care needs and is a reliable instrument within primary health care for the elderlies. The OPC manual is seen to be adequate but improvement in certain parts could be developed to better correspond the care needs of older people, especially those suffering from dementia.

14.
Title:
Testing the content validity of a Modified OPCq instrument – A Pilot study in Norwegian Home Health Care

Author/s & Publication Date:
Flo, J., Landmark, B., Hatlevik, O., Tonnessen, S. & Fagerström, L. 2016

Aim of the study:
Test the content validity of the modified Oulu Patient Classification instrument in home health care in Norway.

Summary of Results and Conclusions:
The modified OPCq instrument seems to fulfill the requirements for validity in home health care setting. The manual, however, should be improved and some aspects changed to better correspond to specific needs in home health care.
Staff training and guidance with the use of the new patient classification system would be important.