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Iveta Strode

POSTOPERATIVE PAIN CARE
IN NURSE PRACTICE
IN LATVIA

Summary of the Doctoral Thesis

Speciality – Health Care

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Faculty of Nursing

Scientific supervisor:

Dr. med., Associate Professor **Inga Millere**, Rīga Stradiņš University
Dr. med., Professor **Ināra Logina**, Rīga Stradiņš University

Official reviewers:

Dr. habil. med., Professor **Indulis Vanags**, Rīga Stradiņš University
Dr. med., **Iveta Golubovska**, University of Latvia
Dr. med., Associate Professor **Kestutis Petrikonis**, Kaunas University

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Secretary of the Promotion Council:

Dr. habil. med., Professor **Līga Aberberga-Augškalne**

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1. INTRODUCTION

According to definition of *International Association of the Study of Pain* „the pain is an unpleasant sensory and emotional experience, associated with actual or potential tissue damage or is described in terms of such damage” (Merskey, 1994; NVD, 2011). Notwithstanding different mechanisms and reasons why the pain is emerging, they always are subjective feelings with multidimensional nature, which is composed by physical, emotional and cognitive component.

Postoperational pain is a typical form of acute pain and connected with a wide variety of tissue traumatization and traumatic edema of operative wound, which becomes a long-term source of nociceptive impulses (Gardovskis, 2001; Turk^a, 2010).

In different countries of the world are made several independent researches about the management of pain in postoperative period, analyzing the effectivity of both medical, and non-medical measures for pain relief. Despite the development of pain management technologies, postoperative pain frequency increases. The research shows that approximately 75% of patients in postoperative period are complaining of moderate postoperative pain, therefore the problem of pain becomes actual in the clinical care (Apfelbaum, 2003; Yuceer, 2011).

In the pain care in postoperative period nurse is an integral and very important member of the team together with anesthetists, surgeons and the rest of the staff in hospital (Brown, 2006; Lewthwaite, 2011). Issues about changes in the attitude of the society and nurse professional education programs, as well as professional competences in the pain care in postoperative period are discussed in scientific literature (Bedard, 2006; Yildirim, 2008; Zhang, 2008; Rejeh, 2009; Abdalrahim, 2011; Voshall, 2012).

Many researches show that nurses have insufficient knowledge about pain and pain care, as well as insufficient skills to evaluate pain (*Watt-Watson, 2001; Gordon, 2002*). In the professional competence of a nurse is included ability to solve the problems of patient's health by analyzing experience and developed theoretical knowledge, supported by professional and legal responsibility.

Nursing professor, J. Travelbee (USA) emphasizes, that patient care is interpersonal process, in which the nurse is helping the person, family or society to prevent or overcome feelings, which are connected with diseases or suffering (*Nelson, 2011*). Nursing theorist B. Neuman in her theory of health care system describes adaptation as a process, with the help of which the organism provides its needs. Base of nurse practice is necessity to help to find for the patient the best reaction of adaptation to the impact of stress (*Neuman, 1990*). The goal of the care is to determine and to maintain person's maximal condition of wellness. That is possible, if one perceives the patient as united physiological, psychological, sociocultural unity and provides a holistic approach to patient's care.

Postoperative pain assessment and management is one of the tasks in the clinical practice, which must be done by health care specialists (*Chung, 2003; MacLellan, 2004; Taylor, 2009; Rognstad, 2012*). Unrelieved postoperative pain still is a common problem in the care of surgical patients, despite significant research and technological achievements in the pain assessment and management (*Richards, 2007*). Insufficient postoperative pain control and relief is a risk factor for development of chronically postoperative pain (*Macrae, 2008; Althaus, 2012*). Chronic postoperative pain development frequency varies from 10% till 50% after different operations (*Kehlet, 2006*). That impacts patient's life quality (*Courtney, 2002; Poobalan, 2003; Kloppner,*

2006; *Gottschalk*, 2009) and increases the necessary medical resources and costs (*Huang*, 2001; *Joshi*, 2005). Therefore, the care must provide absolute control on rational impact and maximal decrease of pains, in which participates all health care staff, including the nurse.

To provide patient's comfort one of the most significant tasks in the postoperative period is to relieve surgical patient's pains. That is a substantiation of a human and ethical nurse practice (*Hunter*, 2000; *Chinn*, 2011), that provides pain relief in postoperative patients.

In Latvia there are very few researches about acute pain impact on the recovery process, course of the disease and prognosis, as well as assessments on pain intensity and quality. In Latvia are not known any nursing researches about postoperative pain care. This substantiates the actuality of the theme.

Goal of Doctoral Thesis:

To clarify and assess responsibilities of nurses and appropriate professional competency in biopsychosocial care of postoperative pains.

Task of Doctoral Thesis:

1. to ascertain and analyse the attitude of postoperative patients about factors affecting postoperative pains and association of pains with the patient's age, gender and form of surgical treatment;
2. to identify and analyse responsibilities and competences of nurses in evaluation of patients with postoperative pains, realization of care and making records about performed activities;
3. to find out utilization of pain assessment methods in clinical nurse practice, their mutual connection with the indicators characterizing nurse's competence;

4. to find out statistically significant difference in nurse's duties in connection with the indicators of nurse professional competence – level of professional education and work experience.

Hypotheses

- Exists connection between the factors affecting postoperative pain and patient's demographics, as well as the form of surgical treatment.
- Exists statistically significant differences between the nurse's duties in postoperative pain care and indicators characterizing professional competence.
- Exists statistically significant differences between the indicators characterizing nurse's professional competence and utilization of pain assessment methods.

The conceptual model of research in doctoral theses

In doctoral theses as a theoretical base of research is used patient care model, which provides a holistic approach in care of patients experiencing pains, including analyse of pain impacting factors in aspect of biopsychological model (Fig.1). The research is made by using cross-sectional design of the study, with many samples – patients, nurses, physicians, which are made in typological random selection principal.

In Doctoral Thesis the main object of research is postoperative patient pain care. The paper investigates nurse's duties in postoperative pain care, their impacting factors in connection with the indicators characterizing professional competence of nurse and factors influencing patients' postoperative pains. Analyze of postoperative pain impacting factors is connected with the indicators characterizing patient's demographic and social situation, their interaction and connection with postoperative period care activities.

Based on research design, the questions follow from research's theoretical considerations and other scientific research results.

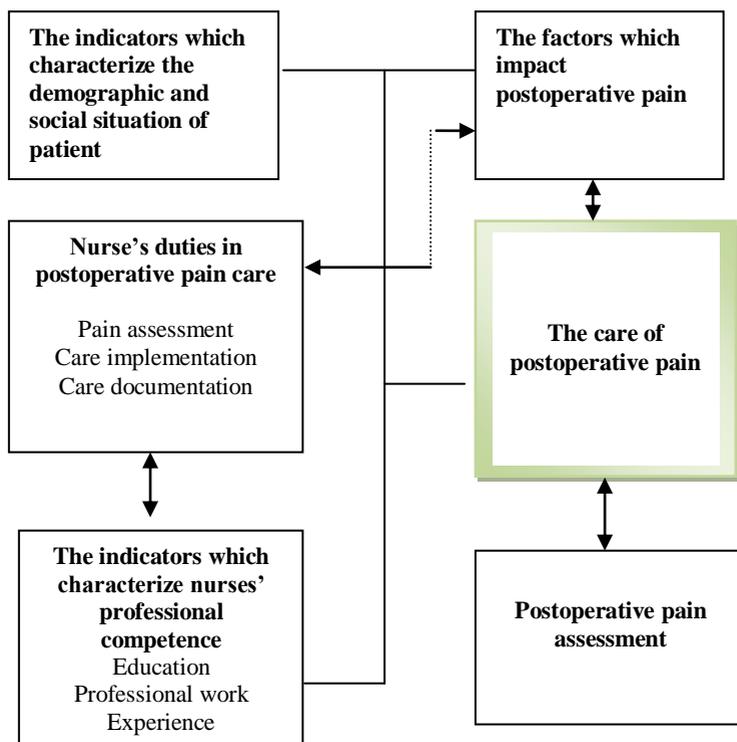


Figure 1.1 The conceptual model of Doctoral Thesis research

Doctoral Thesis scientific novelty and practical significance

In Latvia are comparatively few publicly available researches in nursing. This Doctoral Thesis for the first time provides analyse about acute postoperative pain care model in connection with the nurse responsibilities in pain assessment, realization of care and record making. Study identifies nurse's duties in patient with pain care, connection between duties and indicators

characterizing nurse's professional competence, ascertain factors affecting postoperative pain associated with actions performed by nurse in ensuring needs of the patient with pain.

Results of Doctoral Thesis allow:

1. to develop postoperative pain care model in nursing: to introduce pain care standard and documentation of care work performed by the nurse in connection with the pain assessment, identification and satisfaction of pain patients; to recommend in surgical profile wards to improve utilization of pain objectification instruments (pain assessment scales);
2. to improve the content of curriculum in basic education of nurses according to the level of education, emphasizing necessity of utilization of objective pain evaluation methods;
3. to identify imperfections in postoperative pain patient care and to give proved information suitable for development of nurse further education programs.

Structure and extent of Doctoral Thesis

The Doctoral Thesis is written in Latvian. It consists of abstract, list of abbreviations used in Thesis, introduction with description of scientific novelty and practical significance of the study, references, materials and methods, results of the research, discussion about results, conclusions, suggestions, list of publications and thesis on the theme of the study, references and appendixes. In the Doctoral Thesis are included 40 tables, 14 figures and references to 305 literature sources. The volume of the Doctoral Thesis without appendixes covers 159 pages, appendixes - 14 pages.

2. MATERIALS AND METHODS

2.1. The process of research and the characteristics of the respondents groups

The research was done in two Riga multiprofile and seven regional and local hospitals of Latvia. All together the surveys were made in 36 surgical profile and 11 intensive therapy departments, as well as in six out-patient departments in surgical care&operating rooms.

In Doctoral Thesis are observed ethical principals according to Helsinki declaration and patient right protection law. Research received resolution from the RSU Ethical committee. In research participated 1495 respondents, including patients, nurses and physicians. To reach the goal of the research and fulfill the task were made three research groups.

1. group – surgical profile patients (P); together 602 patients.

In the research participated patients from different surgical profile wards – 154 (25,6%) were from abdominal surgery wards, 21 (3,5%) – neurosurgery wards, 66 (11%) – vascular surgery wards, 40 (6,6%) from cardiac surgery wards, 47 (7,8%) from otolaryngology wards, 90 (15%) – traumatology wards, 17 (2,8%) – lung and chest surgery wards, 20 (3,3%) – urology wards, 72 (12%) from gynecology wards and 75 (12,4%) general surgery wards.

2. group – nurses (N), who work in surgical and intensive therapy wards, as well as out-patient practice with surgical profile patients, together 730 nurses.

3. group – physicians, who treat postoperative patients (Ph.); together 163 physicians.

Respondent selection criteria

There were used following criteria:

1. research group – patients (P) – surgical profile patients, who had a planned or not planned operation, patients, who are elder than 18 years, both sexes and are ready to participate in the research;

2. research group – nurses (N) – nurses, who work in surgical, intensive therapy departments and ambulatory practice with surgical profile patients, nurses with secondary vocational education, first level professional higher education and second level professional higher education and agree to participate in the research;

3. research group – physicians (Ph.) – physicians, who treat patients in the postoperative period – surgeons, anesthetists, reanimatologist, and physicians from different specialities, who participate in care of patients in postoperative period and agree to participate in the research.

Distribution of respondents according to sex and age

In the group of patients were 57,5% women (346/602) and 42,5% men (256/602), in the nurse group were 98,6% women (720 from all the respondents) and 1,4% men (ten from all the respondents), in the physicians group were 60,1% women (98) and 39,9% men (65) from all the respondents.

Average age in nurse group was $42,6 \pm 9,6$ years. Physician's age was from 25 till 70 years, average age for women was $47,1 \pm 11,5$ years, for men – $46,1 \pm 12,5$ years.

The characteristic of respondents' – patients' social situation

43 (7,1%) from patients' had elementary school education, 138 (22,9%) – secondary education, 217 (36%) – vocational education, 204 (34%) – higher education. 361 (60%) patients were employed, 70 (11,6%) were unemployed, students – 48 (8%), but 123 (20,4%) were seniors. 34,3% of

patients in research (207 from all the respondents) were inhabitants of Riga, 18,8% (113 from all the respondents) were from Riga region, 33,4% (201 from all the respondents) were from different other towns in Latvia, but 13,5% (81 from all the respondents) were from country side. The analysis of respondents' families showed that 330 (54,8%) were married, 140 (23,3%) – not married, 71 (11,8%) – divorced, 61 (10,1%) were widowers.

The characteristic of respondents' professional situation –nurses and physicians

Nurse group: 51,8% (378/730) of nurses had secondary special education, 23,4% (171/730) – first level professional higher education, 24,8% (181/730) – second level professional higher education.

Physicians group: all the respondents had second level professional higher education or Physicians degree, 5,5% (9 from all the respondents) from all respondents had Doctor of Medical Science degree.

Nurse group: 78,5% (573/730) of nurses worked in surgical wards, 14,9% (109/730) of nurses were from intensive care, but 6,6% (48/730) from nurses worked with patients in out-patients surgical departments.

In Physicians group: half or 50,3% (82/163) of physicians worked in surgical wards, 23,9% (39/163) physicians worked in intensive care and anaesthesiology departments, 2,5% (4/163) physicians were from emergency departments, 6,7% (11/163) physicians worked in out-patient service, but 16,6% (27/163) from physicians were from other wards. In the research participated 92,6% (151/163) certified physicians and 7,4% (12/163) non-certified physicians, who were continuing postgraduate education.

Average duration of professional experience in profession together in *nurse group* were $20,41 \pm 10,5$ years and in *physicians group* were $20,9 \pm 11,5$ years. 57% (509/893) from the respondents of health care employers worked in

multi-profile hospitals in Riga, 40,4% (361/893) in regional hospitals and only 2,6% (23/893) in out-patient service.

2.2. The methods used in the research

Promotion work is done with quantitative and qualitative research methods. To fulfill the goal and task of research were used four quantitative questionnaires, the analyzes of nursing care documentation and the patients made self-assessment of postoperative pain intensity, by using Numerical analogue scale. Before the survey started was made a pilot research, by interweaving ten respondents in each group – patients, nurses, physicians, according to the random principle.

In questionnaires are questions that compare each other and characterize pain care in nurses' clinical practice. Questionnaires question scale results are tested with Kronbah Alfas coefficient, which proves that the criteria, which will be evaluated are internally coherent.

Patients questionnaire is elaborated in the framework of the scientific research project „Scientific activity development in higher education institution” VSAK -08-3 „Postoperative pain evaluation as one of care process components” in 2008. Patient questionnaire includes closed and partially open questions. Surgical profile patient questionnaire's questions were structured in three parts: (1) demographic information, (2) patient postoperative period subjective feeling and pain impacting factors' assessment, (3) pain care work organization assessment.

In the survey of nurses questionnaire were used two questionnaires: (1) elaborated in the framework of the scientific research project „Scientific

activity development higher education institution” VSAK -08-3 „Postoperative pain evaluation as one of care process components” 2008, (2) authors’ expanded questionnaire about assessment of nurse’s duties in postoperative pain care. Nurses’ survey includes closed, partially open and open questions. The goal of *Nurse I* survey (2008–2009) was to find out nurses’ opinion about postoperative pain assessment, carried out activity regularity and care impacting factors. The goal of *Nurse II* survey (2011–2012) was to find out nurse opinion about postoperative pain assessment and nurse’s duties in pain care.

In physicians survey was used author’s elaborated questionnaire with a goal to evaluate nurse’s duties in postoperative pain patient care, based on the principles of teamwork. The survey of physicians includes closed, partially open and open questions. Physicians survey questionnaire questions are structured in three parts: (1) demographic and professional activity characteristic part, (2) nurses’ activity assessment in pain assessment and work organisation, (3) assessment of nurses’ duties in postoperative pain care.

Assessment of the intensity of patient’s pains in postoperative period and pain impacting factor analyze

For the self-assessment patient’s pain intensity was used Numerical analogue scale, to evaluate the intensity of pain in the first postoperative day. The method of pain self-assessment: patient was asked to try to remember and mark the intensity of pain using 11 point numerical scale, where the intensity of pains corresponds to numbers from 0 to 10, accordingly „0” means that there is no pain, 10 points – maximally strong pain (NVD, 2011). Numerical analogue scale is a method with a proved statistical credibility (Williamson, 2005). Patient evaluated the intensity of pains, circling a certain number of Numerical scale. The interpretation of the results: 0 – no pain, 1–3 points –

weak or mild pain, 4–6 points – moderate strong or moderate pain, 7–10 points – strong or intensive pain.

In order to find out patients' postoperative period subjective feelings and pain impacting factors' assessment, in the survey are included questions, which characterize postoperative period subjective feelings and factors, that impacted patient's postoperative pain. For cross correlation analysis was found out patient's treatment surgical ward profile, surgical treatment type (*planned/not-planned operation*) and the aspect of previous illness experience.

To evaluate patients' postoperative pain impacting factors' was used Likert scale (*Goldstein, 2000*) with four ranks from 1 till 4 (*title importance, irrelevant, quite substantially, very essential*). For the assessment of postoperative pain impacting factors were highlighted fourteen criteria – support of family and friends, the professionalism of a nurse, silence, disturbed sleep, negative attitude from the staff, positive attitude from the staff, light, other patients, bad feeling, difficulty going to the toilet, unusually unpleasant sights and odors, termoregulation interference, difficulty to speak, disturbing things (probes, drains, catheters).

To make the assessment of patient's postoperative period subjective feelings, was used Likert scale with ten ranks from 1 till 10 (*„1”- no; „10”the most*). In the assessment were included fourteen criteria – discomfort, insomnia, fatigue, anxiety and agitation, fear, dissatisfaction with the attitude of the staff, dissatisfaction with the conditions caused by the environment, anger, depression, boredom, sense of isolation, feeling of powerlessness, uncertainty about future activities, lack of information.

The assessment of nurses' activities in postoperative pain care and the impacting factors

To find out the self-assessment of nurses' knowledge about postoperative pain care in the survey were included questions in connection with the assessment of knowledge, according to the acquired education level, its use in the daily care of patients' postoperative pain, both evaluating pain, and work organisation issues.

The assessment of patient's education function implementation in perioperative period in the survey was used Nominal scale with three answer options – „*yes*”, „*partially*”, „*no*”. In the assessment were included six information criteria – about the used analgesic therapy postoperative period, postoperative regime peculiarities, postoperative pain relieving – relaxing methods, about the recovery process, preoperative regime, the possible development of operation and length.

In nurse and physicians research group, to characterize pain assessment methods was used Nominal scale with four choice options – „*never*”, „*rarely*”, „*often*”, „*always*”. For the assessment were chosen five criteria– patient's subjective condition assessment, patient's objective condition assessment, Visual analogue scale, Numeric analogue scale, Verbal pain intensity scale. Likewise, in a comprehensible language for a patient was formulated the question about the use of pain assessment methods and regularity also in patient's questionnaire, in order to evaluate the pain methodic used for a patient.

For the assessment of nurses' duties were identified 23 assessment criteria. Based on the standard of Latvian Nurse profession, in the normative documents determined competences and literature analysis, during the postoperative pain care are identified the following nurse duties: patient's

subjective and objective condition assessment, vital indicator determination, Visual analogue scale, Verbal pain assessment scale and Numeric pain assessment scale use in the assessment of pain, assessment of patient's perception of pain impacting factors, informing patient about the possible pain caused by the manipulations, assessment of physical and psychological symptoms connected with pain, assessment of all these symptoms and care (nausea, vomit, fear, anxiety, etc.), providing the prescribed medical therapy, the assessment of the effectivity of the prescribed medical therapy, informing patients about the adverse reactions of medical therapy, regime of food and activities, analgesic options, recovery process, providing patient's physical and psychological comfort, documentation of nurse's activities, education of patient's relatives, providing non-medical measures for pain care. For the assessment of the criteria in *Nurse II* group and physicians group was used Likert scale (min=1; max=5). In the data analysis, based on professional activity characterizing criteria was made the assessment of nurse duties.

In order to evaluate the responsibilities of nurses in postoperative pain care were analysed and evaluated, with the Nurse Professional Standard of Latvia, two multiprofile and seven regional hospital nurse job descriptions. For analysis were defined the groups of criteria – responsibilities related to provision of medical therapy, information of patient and patient's general care, assessment and care of pain associated symptoms, evaluation of pain intensity and assessment of patient's condition.

In connection with nurse activities in postoperative pain care, nurse and physician respondent groups were asked questions about pain assessment work organisation (*is planned; happens spontaneously; is documented, is not planned and documented*), factors, which impact pain care work organisation (*nurses' insufficient knowledge in pain relief, lack of time, lack of motivation,*

care model imperfections, lack of scales for the assessment of pain), about cooperation aspects of nurses and physicians in realization of medical therapy, there were analysed opinions of physicians, nurses and patients about the readiness of patients to cooperate in the assessment of pains together with a nurse.

The analysis of nursing care documentation

In order to evaluate the care documentation in postoperative period, was made the analysis of two Latvia's multiprofile, seven regional and local hospital approved care documentation and the Republic of Latvia normative document analyses, including the Cabinet of Ministers regulations Nr. 265 „*Medical document record-keeping procedures*” analysis of attachment. There was analysed the patient care documentation in surgical wards and intensive care, where nurses provide records about patient's condition and care activities. There were chosen criteria groups for analysis – the used pain assessment methods and documentation, the assessment of patients subjective and objective conditions, postoperative patient care and pain care activity documentation, confirmation of nurse responsibilities about performed care activities.

2.3. The statistical processing methods

Data processing was performed using computer programs *Microsoft Excel* and *SPSS v.17.0*. To characterize the parameters of the respondents (patients, nurses and physicians) were used general describing statistic methods – summary tables with histograms. Respondents' stratification in nurse group allowed analysis of answers, both in connection with nurse's professional education, professional work experience, specialization and work place.

Patients' research group respondent stratification allowed to evaluate survey answers in connection with respondents' sex, age and treatment profile.

There were evaluated random arithmetic scores and dissipation rates – standard deviation (SD) and standard error (SE). To assess the reliability of the average of the differences between two independent groups' was used independent selection t-test analysis. In the calculation results was selected 95% credibility confidence interval (CI).

Making the statistic analysis of data it was taken into account, that in all cases data are not divided normally, as well as data are characterized by ordinal scale. Therefore was used non-parametric test – *Mann–Whitney U test* to compare two selections or *Kruskal–Wallis H test* to compare three and more selections, *Wilcoxon signed rank test*, which is used to compare two variable ranks in independent selections. In the paper it is accepted, that results are statistically important, if the value – p is less than 0.05 ($p < 0.05$) (Teibe, 2007). *Mann–Whitney U criteria test* was used, to find out the indicators of statistical credibility in connection with postoperative pain and patients' social demographic indicators mutual link, to determine connection of postoperative period feeling with pain care activities, as well as the assessment of nurse's duties in postoperative pain care in comparison to nurse group professional status characterizing indicators.

Comparing research group data according to determined criteria or symptom, was used Pearson's Chi- squared (χ^2) or Fisher's exact criteria for 2x2 tables. Based on the value of χ^2 and freedom degree number (df), was determined value of p . Pearson *Chi-squared test* was used, to check coherence between postoperative pain impacting factors and patient's age, sex, surgical treatment way, as well as to assess opinion of nurses in connection with pain assessment method effectivity and regularity.

To determine coherence between nurse's duties in postoperative pain care and professional competence creating factors, as well as patients' postoperative period feelings in connection with pain intensity indicators, was used *Spearman's rank correlation coefficient*. In paper was used following correlation coefficient interpretation (for absolute values): 0 – correlation does not exist; 0–0.2 – very weak correlation; 0.2–0.5 – weak correlation; 0.5–0.7 – medium correlation; 0.7–0.9 – high correlation; 0.9–1.0 – very high correlation. For Spearman rank correlation coefficient was calculated also *p*-value. In the paper it was assumed that correlation coefficient is statistically significant, if $p < 0.05$, more trustful are coefficient values with $p < 0.01$ (Gauthier, 2001).

For the analysis of nurse duties in postoperative pain care *Nurses II* subgroup and physicians group was used factor analysis (Geske, 2006). *Exploratory factor analysis* was used to create from many numerical variables (measure according to interval scale) a smaller number of new variable set (factor).

The analysis of factors is made according this scheme:

1. selection was tested by using *Kaiser-Meyer-Olkin Measure of Sampling Adequacy*. The great values (between 0.5 and 1) are an index that factor analysis could have been done for the selection. Values under 0.5 is an index that factor analysis would not be appropriate;
2. *Bartlett's Test of Sphericity* was made. This test shows, either we can consider that correlation matrix for all given variables is unity matrix (all variables are not correlated between). In the paper it was assumed, that *p*-value is under 0.05;

3. based on the table and graph with eigenvalues, are chosen factor models. There was used Kaiser criteria, which selects only factors with eigenvalues >1 , and Kettela criteria, according to which are chosen factors;
4. based on correlation matrix was selected a rotation type. In paper the absolute values correlation were higher than 0.2, factors are correlated and is used neortogonal rotation *Promax*;
5. for each factor were related variables with factorial load >0.4 , which is a correlation coefficient between variables and factors (*Chang, 2008; DiStefano, 2009*). The indicator of load allows to keep sense of the importance of assessment, as it was in questionnaire;
6. to check the changing attribution for the given factor and inner harmony, was used *Cronbach's alpha* coefficient.

To verify factors and nurses' professional competence indicators' statistical credibility were used Kruskal–Wallis and Mann–Whitney U criteria tests.

To evaluate the aspects of pain care work organizations, nurses' duties and postoperative pain intensity assessment indicator connection with patient's postoperative feelings, was calculated the arithmetic mean from patients' postoperative period feeling assessments in scale from 1 to 10. To determine statistical difference was used two-sided non-parametric Kruskal–Wallis test and for different pairs was used two-sided non-parametric Mann–Whitney U criteria test.

3. THE RESULTS OF THE RESEARCH

3.1. Patient's postoperative pain self-assessment according to Numerical analogue scale

Pain self-assessment according to Numerical analogue scale (NRS) (0–10) on the first postoperative day 137 (22,7%) patients evaluated pain as mild (0–3 points), 196 (32,6%) as moderate (4–6 points), 269 (44,7%) as strong and intensive (7–10 points) (Fig. 3.1). The medium pain assessment on the first postoperation day by using Numerical analogue scale was $4,99 \pm 3,2$.

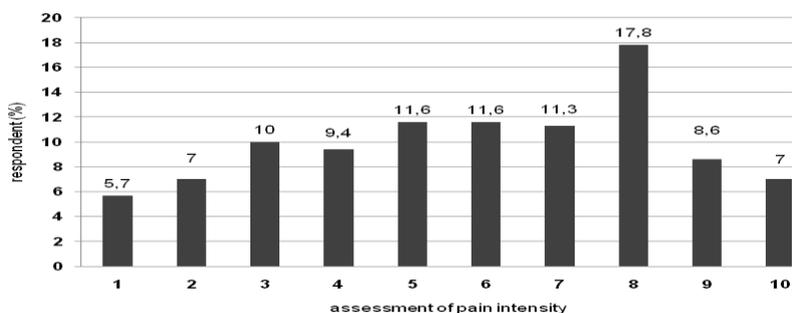


Figure 3.1 The self-assessment of pain intensity on the first postoperative day according to Numerical analogue scale ($n=602$)

In the research group the highest medium pain intensity pain assessment interval was for patients from general surgery (5,0–6,8), cardio surgery (4,9–6,7), neurosurgery (4,2–6,2), urology (4,6–5,8) departments in comparison to other profile departments. Using the non-parametric Mann–Whitney U criterion test, were not found statistically credible differences between pains, what patients felt on the first postoperative day, and sex

($p=0.332$). Average pain intensity assessment for women was 5,93 ($SD=2.55$) and men 5,71 ($SD=2.62$). Likewise, using Kruskal–Wallis test were not found statistically credible differences between pains on the first postoperative day and patients' age ($p=0.305$).

3.2. The analysis of patients' postoperative pain impacting factors

For 64,3% (387/602) of patients' hospitalization and operation was a planned order, but for 35,7% (215/602) it was not planned hospitalization and operation. In the research 210 (34,9%) patients note „*first hospitalization and surgical treatment*”, 166 (27,6%) – „*multiple hospitalization, but first surgical treatment*”, 226 (37,5%) – „*multiple hospitalization and more than one surgical treatment*”.

As the most significant postoperative pain impacting factors, patients note professionalism of nurse and positive personal attitude (Fig. 3.2).

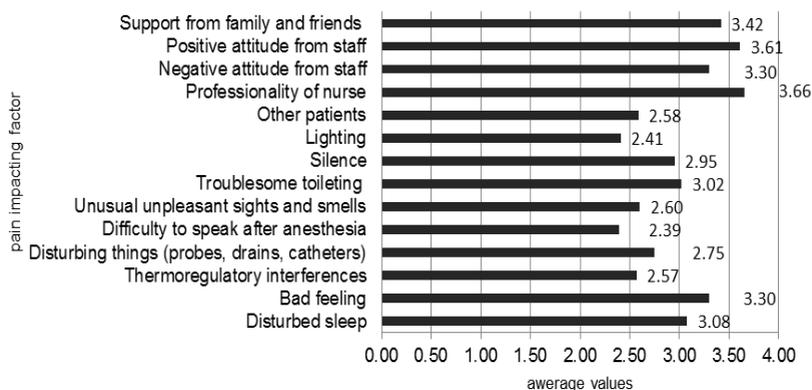


Figure 3.2 Pain impacting factor comparative assessment (according to Likert scale 1 – not significant; 4 – very significant) ($n=602$)

3.2.1. The interconnectedness of postoperative pain impacting factors with age, sex and type of operation

The interconnectedness of pain impacting factors with age, sex and operation type determination was used Pearson's *Chi-squared test*.

Evaluating the relationship between sex and pain impacting factors, women named as significant following factors impact in postoperative period: disturbed sleep ($p=0.004$), light ($p=0.026$), bad feeling ($p=0.021$), difficulty to go to the toilet ($p=0.006$), difficulty to speak after anesthesia ($p=0.049$) and thermoregulatory interferences ($p=0.030$).

Comparing patients' age and connection of different factors that impact pains exist statistically significant connection with the age and two set criteria. Patients in the age group from 51 to 61 years and older as very significant factors name – professionalism of the nurse ($\chi^2=34.190$, $p=0.001$) and positive attitude from staff ($\chi^2=23.633$, $p=0.023$).

Analysing the way of operation (planned /not planned) and the impact of different factors, in case of planned operation patients as the most important noted professionalism of nurse ($\chi^2=16.559$, $p=0.001$), silence ($\chi^2=19.169$, $p=0.000$), disturbed sleep ($\chi^2=19.427$, $p=0.000$), positive personal attitude ($\chi^2=11.329$, $p=0.010$).

3.2.2. The assessment of patient's postoperative period subjective feelings

The assessment of patient's postoperative period subjective feelings was done after 10 point scale (min=1; max=10). In the research patient's postoperative feeling assessment's average value in range from 4.5 till 5.5 were for following assessment criteria: discomfort ($SEM=0.124$), fatigue

($SEM=0.115$), insomnia ($SEM=0.122$), anxiety ($SEM=0.121$), boredom ($SEM=0.13$), powerlessness ($SEM =0.128$) (Fig. 3.3).

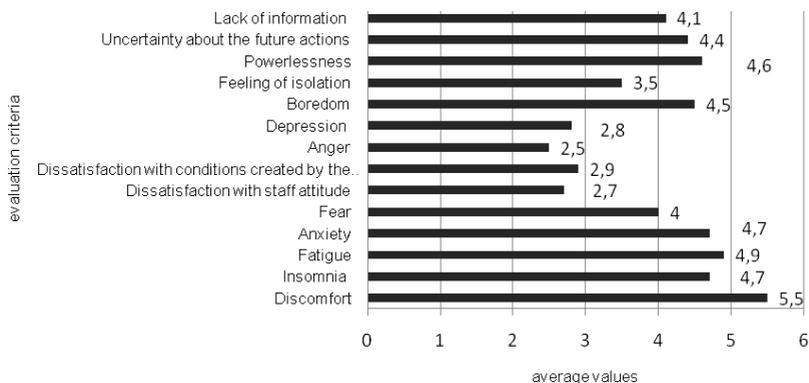


Figure 3.3 Patient's postoperative period subjective feeling assessment ($min=1$; $max=10$; $n=602$)

Analysing connection between postoperative patient's subjective feeling assessment and patient's treatment profile, using Mann–Whitney U criterion test was found, that abdominal surgery ward patients noted feeling of depression ($p=0.000$) higher than other profile ward patients. Neurosurgical ward patients feel more anxiety ($p=0.008$). Patients of traumatology ward higher than patients from other wards evaluate feeling of discomfort ($p=0.019$), insomnia ($p=0.008$), feeling of powerlessness ($p=0.023$) and uncertainty about the future actions ($p=0.016$). But otolaryngology ward patients in comparison with other ward patients feel less powerlessness ($p=0.020$) and fear ($p=0.033$). Vascular surgery ward patients evaluate lower discomfort ($p=0.000$), insomnia ($p=0.001$), fatigue ($p=0.000$), anxiety ($p=0.000$), depression ($p=0.001$), feeling of isolation ($p=0.003$) and cardiac surgery ward patients in comparison feel less anger ($p=0.017$).

Using the test of Kruskal–Wallis, to determine statistical credibility and comparing patients' with strong (7–10 points) and moderate or light pain, first or patients with strong pain noted more such feelings as discomfort ($p<0.001$), insomnia ($p<0.001$), fatigue ($p<0.001$), anxiety ($p<0.001$), fear ($p=0.026$), anger ($p<0.001$), lack of information ($p=0.027$), dissatisfaction with staff attitude ($p<0.001$) and dissatisfaction with conditions created by the environment ($p<0.001$).

Patients with medium (4–6 points) pain syndrome felt more intensively discomfort ($p<0.001$), insomnia ($p<0.001$), fatigue ($p<0.001$), a sense of powerlessness ($p=0.003$), dissatisfaction with staff attitude ($p=0.002$) and dissatisfaction with environmental conditions ($p=0.019$). Differences in postoperative feeling assessment were not found, evaluating depression ($p=0.124$), boredom ($p=0.615$) feelings and uncertainty about the future activities ($p=0.222$).

In the assessment of patient postoperative period feelings exists a significant correlation between anxiety and patient's fear ($r=0.721$) and lack of information ($r=0.545$), as well as between such subjective indicators as dissatisfaction with staff attitude and dissatisfaction with environmental conditions ($r=0.786$). Patient's anger credibly correlates with dissatisfaction with staff attitude ($r=0.620$) and dissatisfaction with environmental conditions ($r=0.617$). High correlation is between lack of information and uncertainty about the future activities ($r=0.796$) (Table 3.1).

Table 3.1**Postoperative period feeling seven changing inter-correlation matrix ($n=602$)**

Patient's postoperative period feelings	Anxiety	Fear	Dissatisfaction with staff attitude	Dissatisfaction with conditions	Anger	Uncertainty about activities	Lack of information
Anxiety		0.721	0.459	0.412	0.425	0.491	0.545
Fear	0.721		0.456	0.403	0.505	0.468	0.502
Dissatisfaction with staff attitudes	0.459	0.456		0.786	0.620	0.486	0.546
Dissatisfaction with environmental conditions	0.412	0.403	0.786		0.617	0.478	0.502
Anger	0.425	0.505	0.620	0.617		0.409	0.445
Uncertainty about the future activities	0.491	0.468	0.486	0.478	0.409		0.796
Lack of information	0.545	0.502	0.546	0.502	0.445	0.796	

Correlation is reliable to $p<0.01$.

3.3. The use of postoperative pain assessment methods in clinical practice

Research data confirm, that pain assessment as a competence of nurse acknowledge 84,7% (510/602) patients, 88,3% (144/163) physicians and 93,8% (685/730) nurses. Whereas, assessing respondents' point of view about the patients' readiness to co-operate in pain assessment with nurse, only a little bit more than a half of respondents admit necessity of collaboration (Table 3.2).

Table 3.2

The analysis of the opinion about participation of the patient in the assessment of the pain

Answers	Answer to question: Are the patients ready to cooperate with nurse in the assessment of pain					
	Patients (n=602)		Nurses (n=730)		Physicians (n=163)	
	n	%	n	%	n	%
<i>Yes, definitely</i>	327	54,3	364	49,9	70	42,9
<i>No, they want only doctor to do it</i>	59	9,8	56	7,7	11	6,8
<i>Partially, because they want both nurse and doctor to do it</i>	183	30,4	294	40,3	76	46,6
<i>No</i>	33	5,5	16	2,1	6	3,7

Analysing patient’s opinion about the regularity of pain assessment, 70,6% (425 from the surveyed patient number) noted it with „yes” and 29,4% (177 from the surveyed patient number) with „no”. Based on Mann–Whitney U criteria test, postoperative patient subjective feeling assessment average indicators are higher in cases, when the assessment of postoperative pain has been done, except for assessment criteria – boredom ($p=0.591$), fear ($p=0.185$) and feeling of isolation ($p=0.810$).

The describing statistical indicators confirm, that for 11% (66/602) of patients the pain in postoperative period was evaluated by using Verbal pain assessment scale, 9% (54/602) – Numeric analogue scale, 6,6% (40/602) – Visual analogue scale and for 51,5% (310/602) of patients – subjective condition assessment, asking question about pain (Fig. 3.4).

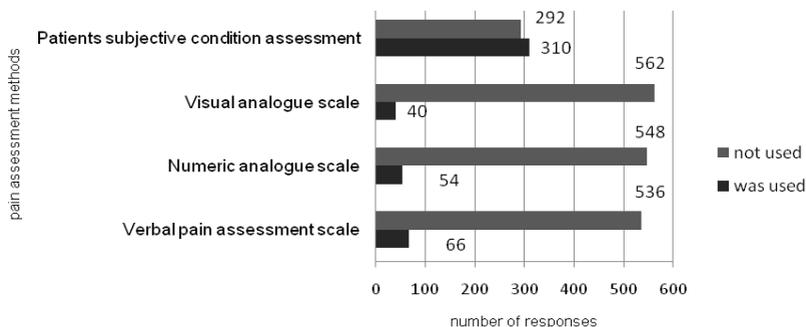


Figure 3.4 The use of postoperative pain assessment methods from patients' point of view ($n=602$)

More often in the clinical practice to evaluate postoperative pain nurses use patient's subjective condition assessment (58,4%) and objective condition assessment (62,9%) (Fig.3.5).

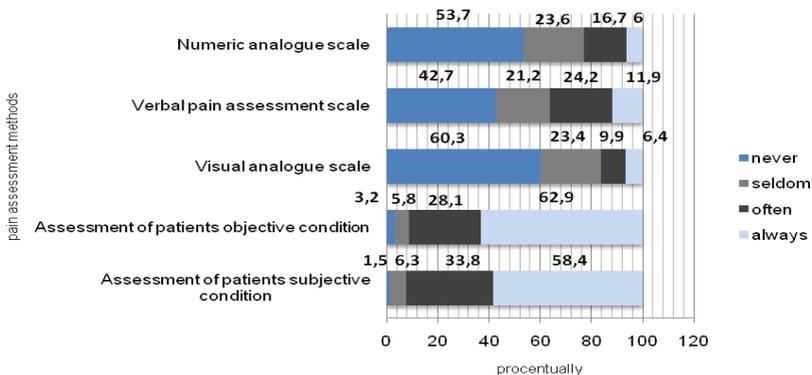


Figure 3.5 The use of pain assessment methods in clinical practice in the nurse research group ($n=730$)

Analyzing the opinion of physicians about the effectivity of the used methods, 50,3% (82/163) note as effective patient's subjective condition assessment, 68,1% (111/163) –assessment of patient's objective condition. The effectivity of the scales for pain intensity and quality determination is evaluated as follows – VAS as the most effective is noted by 60 (36,8%) physicians, VRS as effective is recognized by 52 (31,9%) physicians and NRS 54 or 33,1% of surveyed physicians.

Nurses more often in the clinical practice in comparison to physicians assessment use the assessment of subjective condition of the patient ($p<0.001$) and patient's objective condition ($p<0.001$), VAS ($p=0.023$), NRS ($p=0.002$).

The assessment of subjective condition of the patient in practice more often is done by nurses with second level professional higher education in comparison to nurses with secondary professional education ($p=0.002$) and first level professional higher education ($p=0.001$). The objective condition of the patient is more often evaluated by the nurse with second level professional higher education in comparison to secondary professional education ($p=0.018$) and first level professional higher education ($p=0.001$).

The pain intensity assessment scales are more often used by nurses with first and second level professional higher education. Statistically credibly it was found out that, that VAS more often is used by nurses with first level professional higher education ($p=0.002$) in comparison to nurses with secondary professional education, but nurses with second level professional higher education use it more rarely than nurses with different educational level.

Nurses with secondary professional education use less VRS in comparison to first level professional higher education ($p=0.032$) and second level professional higher education ($p=0.017$) nurses. A similar assessment is connected also with NRS use (Table 3.3).

Table 3.3

Use of pain assessment methods and statistical indicators of level of nurses' professional education

Pain assessment methods	Secondary professional education <i>n= 378</i>		1 st level of higher professional education <i>N= 171</i>		2 nd level of higher professional education <i>n= 181</i>		Mann- Whitney U criteria
	A		B		C		
	M	SD	M	SD	M	SD	
Subjective evaluation of patient's condition	3.47	0.68	3.41	0.71	3.63	0.62	C>A,B <i>p=0.002, p=0.001</i>
Assessment of patient's objective condition	3.52	0.70	3.37	0.84	3.62	0.73	C>A,B <i>p=0.018, p<0.001</i>
Scale of visual analogue (VAS)	1.62	0.90	1.88	1.0	1.39	0.75	B>A <i>p=0.002; A,B>C <i>p=0.001, p<0.001</i></i>
Verbal pain assessment scale (VRS)	1.96	1.08	2.16	1.09	2.14	0.02	B,C>A <i>p=0.032, p=0.031</i>
Scale of numeric analogue (NRS)	1.65	0.91	1.89	0.98	1.83	0.94	B,C>A <i>p=0.003, p=0.017</i>

*M – choice average arithmetic value; SD – standard divergence; *p<0.05.*

Within the researched group physicians 104 (63,8%) of surveyed physicians note pain assessment as unplanned, spontaneous and undocumented, whereas only 59 (36,2%) physicians note it as a planned and documented activity.

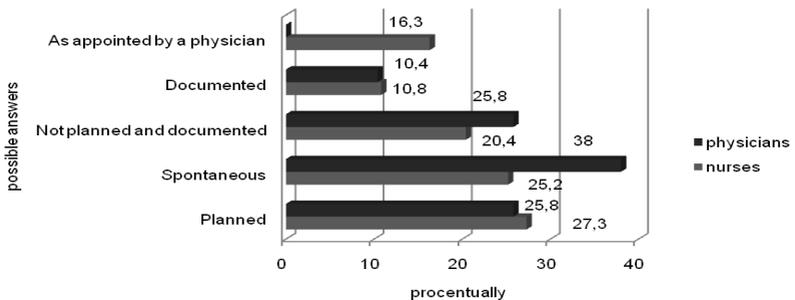


Figure 3.6 Comparison of nurses' and physicians' opinion as to organization of pain assessment work (%; nurses n=730; physicians n=163)

In nurse group action was recognized as organized and planned by 397 or 54,4% of surveyed nurses. 333 or 45,6% of nurses note unorganized pain assessment activities in patient care (Fig. 3.6).

Using Mann – Whitney U criteria test nurses, which noted pain assessment as a planned activity in patient care mostly accentuated use of VAS ($p=0.003$), VRS ($p=0.000$) and NRS ($p=0.001$) in post operative pain assessment. Whereas nurses, who noted spontaneous pain assessment rarely use VRS ($p=0.018$) in assessment of pain intensity. Nurses who noted unplanned pain assessment infrequently use pain intensity assessment scales – VAS ($p=0.007$), VRS ($p=0.005$), NRS ($p=0.000$) in clinical practice. Nurses, who noted that pain assessment was determined by a physician rely more on objective assessment of patients' condition ($p=0.020$).

3.4. Assessment of nurses' duties in post operative pain care

Research states that a nurse has 4 – 60 patients within one shift, average being 21.08 ($SEM=0.454$).

3.4.1. Analysis of nurses' duties in assessment of patients' post operative pain and planning and realisation of patient care

When assessing data acquired about nurses' duties in patients' post operative pain care, the average indicators are determined to lie within interval from 3.03 to 4.41. In physicians' group said indicators are 2.89 to 4.61 (Table 3.4).

Table 3.4

Statistical indicators of researched nurses' and physicians' groups in assessment of nurses' duties in post operative pain care

(1 – least important, 5 – most important)

Nurses' duties in post operative pain care	Physicians (n=163) (A)		Nurses (n=420) (B)		Mann-Whitney U criteria
	M	SD	M	SD	
Provision of designated medical therapy	4.61	0.75	4.41	0.95	A>B 0.025*
Documentation of performed nursing duties	4.29	0.90	4.07	1.12	0.083
Provision of patient's psychological comfort	4.24	0.94	4.08	1.02	0.080
Provision of patient's physical comfort	4.21	0.93	4.07	0.99	0.107
Assessment of vital indicators	4.19	0.89	4.09	1.00	0.385
Informing the patient of possible manipulations	4.19	1.01	4.11	1.01	0.286
Assessment of pain symptoms	4.14	0.84	4.16	0.99	0.309
Assessment of pain affiliated psychological symptoms	4.08	0.96	4.05	1.02	0.964
Assessment of pain affiliated physical symptoms	4.07	0.92	4.09	0.97	0.658
Assessment of patient's objective condition	4.06	1.01	4.25	0.93	B>A 0.033*
Aversion and care of symptoms affiliated with pain	4.06	0.92	4.11	0.97	0.338
Assessment of patient's subjective condition	3.99	0.90	4.01	1.04	0.454
Informing the patient of diet and activity requirements	3.98	1.05	3.97	0.99	0.826
Assessment of efficiency of designated medical therapy	3.93	1.14	4.14	1.00	0.059
Provision of non-drug measures in pain care	3.93	1.09	3.92	1.07	0.945
Informing the patient of available pain control possibilities	3.92	1.13	4.12	0.98	0.085
Education of patient's relatives	3.80	1.08	3.74	1.08	0.510
Informing the patient of possible side effects of drug therapy	3.75	1.12	3.91	1.07	0.115
Informing the patient as to course of recuperation process	3.74	1.22	4.07	0.98	B>A 0.008*
Assessment of factors influencing patients' pain perception	3.58	1.10	3.64	1.12	0.435
Use of VRS in pain assessment	3.23	1.21	3.41	1.18	0.088
Use of VAS in pain assessment	2.98	1.24	3.13	1.19	0.155
Use of NRS in pain assessment	2.89	1.18	3.03	1.22	

M – choice average arithmetic value; SD – standard divergence; *p<0.05.

Analysis of nurses' post operative pain care duties within nurses' and physicians' research group was performed by using factor analysis. Samples were verified with Kaiser–Mayer–Olkin sample suitability criteria, which was 0.933 in nurses' research group and 0.853 in physicians' research group. By using Bartlett test p-values were determined – $p < 0.001$ in nurses' research group and $p < 0.001$ in physicians' group, which confirmed use of factor analysis in said selection. Factor models were picked based on 23 variables and diagram of eigenvalues in nurses' post operative pain care. Kaiser criteria was used in picking only factors with eigenvalues of >1 and Kettel criteria in picking of analysable factors. Based on Kaiser criteria values and diagram of SPSS program „*Scree Plot*” a five factor model within nurses' group and a six factor model – within physicians' research group was created. Factors included only variables with loading larger than 0.4.

From results in post operative pain care in nurses' group such factors should be noted – F1M provision of designated medical therapy, F2M informing of patient and general care, F3M, assessment and care of symptoms associated with pain, F4M assessment of pain intensity, F5M assessment of patient's condition (Table 3.5).

In physicians' research group such factors should be noted - F1A provision of designated medical therapy, F2A general care of patient, F3A assessment and care of symptoms associated with pain, F4A assessment of pain intensity, F5A informing of patient, F6A assessment of patient's condition.

Comparison of physicians' and nurses' results, factors of physicians' selection are relatively similar. Nurses' selection factor F1M in analyses of physicians' factors was split, thus creating two factors – F1A and F5A.

Factors **F1M** and **F1A** substantiate nurses' duty to successfully ensure designated medical therapy.

Factors **F2M** and **F2A**, **F5A** include matters of information and general care of patients. Division of loading variables in factors of both research groups is similar, although in nurses' group a larger association with said factor includes matters connected with ensuring of patient's physical comfort ($l=0.814$) and fulfillment of patient and relatives' need for information ($l=0.867$). In physicians' research group a higher factor stress is put on nurses' duties connected with ensuring of patient's psychological ($l=0.882$) and physical comfort ($l=0.788$).

Factors **F3M** and **F3A** combine matters connected with assessment and care of pain symptoms. Both nurses' and physicians' groups assess nurses' duties linked to assessment and care of psychological symptoms of pain with equal factor loading. A larger absolute value of variable loading in nurses' group was assessment of pain connected psychological symptoms ($l=0.923$), assessment of symptoms connected with pain (nausea, discomfort, etc.) ($l=0.858$) and assessment and care ($l=0.842$). Physicians' put a higher factor loading on nurses' activities in aversion and care of symptoms connected with pain ($l=0.834$).

Factors **F4M** and **F4A** are assessment factors of pain quality and intensity. This includes nurses' duties connected to assessment of pain quality and intensity methods in clinical practice. In factor F4M a larger association is put on respondents' assessment connected to Visual analogue scale in pain assessment ($l=0.830$). Similar results were determined also in factor F4A ($l=0.984$).

Factors **F5M** and **F6A** includes questions connected with assessment of patients' condition. Divisions of loading variables in both groups are similar. Assessment of patients' objective and subjective conditions is of utmost value in post operative pain care.

In nurses' group average values of factors (min=1; max=5) were as follows: F1M provision of designated medical therapy 4.41 ($SD=0.95$), F2M informing of patient and general care 4.0 ($SD=0.78$), F3M assessment and care of symptoms directly connected to pain 4.11 ($SD=0.85$), F4M assessment of pain intensity 3.25 ($SD=0.96$), F5M assessment of patients' condition 4.13 ($SD=0.83$).

Table 3.5

Division of factors of nurses' duties within nurses' group ($n=420$; l – loading quotient)

Nurse's duties with loading indicators		Factors
Provision of designated drug therapy	$l=1.000$	F1M Provision of designated drug therapy
Education of relatives	$l=0.867$	F2M Information of patient and general care
Ensuring of patient's physical comfort	$l=0.814$	
Informing of patient of diet and activity requirements	$l=0.783$	
Informing of patient as to course of recuperation process	$l=0.732$	
Ensuring of patient's psychological comfort	$l=0.709$	
Provision of non-medical measures in pain care	$l=0.707$	
Documentation of duties performed	$l=0.640$	
Informing of patient as to pain relieving possibilities	$l=0.613$	
Assessment of efficacy of designated drug therapy	$l=0.499$	
Informing of patient of possible side effects of drug therapy	$l=0.453$	
Assessment of psychological symptoms connected to pain	$l=0.923$	
Assessment of symptoms connected to pain	$l=0.858$	
Aversion and care of symptoms connected to pain	$l=0.842$	
Aversion and care of psychological symptoms connected to pain	$l=0.737$	
Informing of patient as to possible pain caused by manipulations	$l=0.710$	F4M Assessment of pain intensity
Use of visual analogue scale in pain assessment	$l=0.830$	
Use of numeric pain assessment scale	$l=0.768$	
Use of verbal pain assessment scale	$l=0.702$	
Assessment of factors influencing patient's pain perception	$l=0.408$	F5M Assessment of patient's condition
Assessment of patient's objective condition	$l=0.916$	
Assessment of patient's subjective condition	$l=0.706$	
Assessment of vital indicators	$l=0.525$	

Research evaluates approved surgical nurse job descriptions from nine hospitals in Latvia, including two multiprofile hospitals in Riga and seven regional hospitals.

In all surgical nurse job descriptions are prescribed responsibilities associated with prescribed medical therapy, securing of patient's physical and psychological comfort, whereas, responsibilities connected with the assessment of patient's pain is reflected in general.

When analysing evaluation of subjective competency about pain relieving possibilities of post-operative period in pre-operative patients it was determined that almost a half of patients admit insufficient level of knowledge. 37,7% of patients (227/602) note lack of information, 41,4% (249/602) – attest to having sufficient information, 13,6% (82/602) – agree with statement „*I know everything*” and 7,3% (44/602) – note the reply „*I do not want to know*”.

Comparing the opinions of nurses and physicians as to patients' knowledge of pain relief possibilities in post operative period –57,8% (422 of respondents) in nurses research group note that patients „*are informed*”, 30,4% (222 of respondents) – „*partially informed*”, 10% (73 of respondents) – „*insufficiently informed*” – 1,8% (13 of respondents) – „*are not informed*”. 29,4% (48/163) in physicians' research group note that patients „*are informed*”, 43,6% (71/163) – „*partially informed*”, 24,5% (40/163) – „*insufficiently informed*” – 2,5% (4/163) – „*not informed*”.

During pre-operation period patients receive more information about peculiarities of pre-operation (57,8%) and post-operation (53,3%) conditions. (Fig. 3.7)

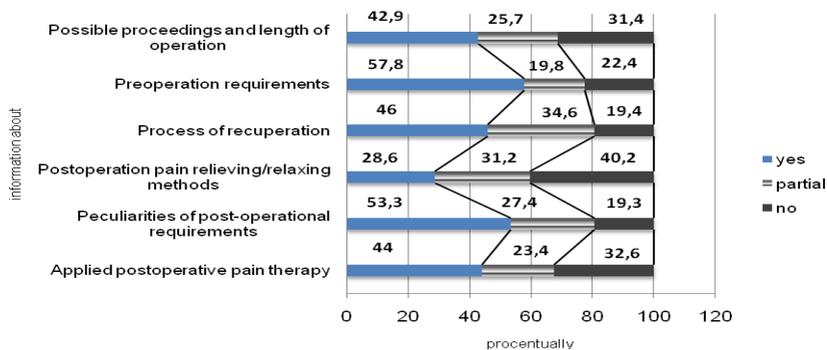


Figure 3.7 Assessment of patients' pre-operation knowledge (n=602)

Patients receive partial information about process of recuperation, possible proceedings and length of operation and possible pain relief therapy during post-operational period. Patients receive insufficient information about post-operation pain relieving/relaxing methods.

When analysing link between knowledge of patients and mode of operation (planned/not planned) it was concluded that in cases of planned operations patients are more informed about pain relief therapy used in post-operation period ($p=0.000$), peculiarities of post-operation requirements ($p=0.000$), pre-operation requirements ($p=0.000$), possible proceedings and length of operation ($p=0.000$).

When using Mann–Whitney U criteria test, statistical analyses stated, that patients who lack information about possible pain relief therapy in post-operation period showed higher average indicators in all post-operation sense evaluation criteria. Whereas patients who did not wish to receive additional information as to pain relief possibilities statistically showed a higher feeling of isolation ($p=0.016$) and boredom ($p=0.022$) in comparison with patients who noted a full knowledge about pain relief possibilities.

3.4.2. Self-evaluation analysis of nurses' knowledge about post-operative pain care

Self-evaluation of nurses' knowledge about pain care was performed in accordance to 10 point system by analysing two basic criteria – evaluation of knowledge in accordance to level of education after graduation from educational establishment and practical use of knowledge in clinical praxis.

Self-evaluation of acquired knowledge after graduation and use of knowledge in praxis statistically does not differ within level of education. Average indicators are higher in comparison with acquired level of education. To establish average difference in evaluation between groups a non-parametric Wilcoxon t-test for conditional sampling was used.

Nurses with 1st level professional higher education statistically show a substantially higher self-evaluation of knowledge ($p=0.002$) than nurses with secondary professional education about post-operative pain care. Nurses with secondary professional education and 2nd level professional higher education ($p<0.001$) show similar results. Nurses with 2nd level professional higher education show a higher self-assessment of knowledge than nurses with 1st level professional higher education, which is confirmed by statistically substantial difference ($p=0.024$).

When assessing adequacy of self-evaluation as regards level of education in correlation with provision of pain relief therapy, 36% (263) of respondents among nurses substantiate acquisition of knowledge with education, 54,5% (398) of respondents among nurses describe their knowledge as regards pain relief therapy as sufficient due to lengthy work experience, 7,6% (55) of respondents among nurses describe their knowledge as insufficient to ensure wholesome medical care, 1,9% (14) of respondents

among nurses believe that medical care of patients in pain is not nurses' competency.

Results of Spearman correlation analysis between self-evaluation of nurses' knowledge and pain relief methods are summarized in table 3.6. There is believable correlation between nurses' self-evaluation after secondary professional education and assessment of patients' objective condition ($r=0.158, p=0.004$), as well as self-evaluation of knowledge in nurses after receiving 2nd level higher professional education and assessment of patient's objective condition ($r=0.260, p=0.015$), use of Verbal pain assessment scale ($r=0.395, p=0.000$).

Table 3.6

Results of correlation analysis between self-assessment of nurses' knowledge and pain assessment methods (n=420)

Pain assessment methods	Self-assessment of nurses					
	Knowledge after medical school (n=324)		Knowledge after college (n=136)		Knowledge after higher educational establishment (n=87)	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Assessment of patient's subjective condition	0.099	0.076	0.033	0.705	0.121	0.263
Assessment of patient's objective condition	0.158**	0.004	0.004	0.960	0.260*	0.015
Scale of visual analogue	0.083	0.135	0.028	0.750	0.036	0.742
Verbal pain assessment scale	0.077	0.169	0.011	0.894	0.395**	0.000
Scale of numeric analogue	0.053	0.338	0.045	0.602	-0.064	0.557

r – coefficient of Spearman range correlation; ** coefficient of correlation is essential in level $p<0.01$; * coefficient of correlation is essential in level $p<0.05$.

When performing Spearman correlation analysis between self-assessment of nurses' knowledge and factors of researched nurses' group it was determined that self-assessment of nurses' knowledge after graduation from medical school believably correlates with factor F3M – assessment and care of symptoms directly connected to pain ($r=0.136, p=0.014$) and factor F4M –

assessment of pain intensity ($r=0.122$, $p=0.029$). Similar correlation was discovered in connection with self-evaluation of knowledge after graduation from college – factor F3M ($r=0.195$, $p=0.023$) and factor F4M ($r=0.173$, $p=0.044$).

Correlation analysis in nurses who have acquired 2nd level of higher professional education revealed, that self-evaluation of knowledge correlates with four factors – factor F1M ($r=0.350$, $p=0.001$), factor F2M ($r=0.328$, $p=0.002$), factor F3M ($r=0.293$, $p=0.006$), factor F5M ($r=0.241$, $p=0.024$). Correlation analysis did not show believable ($p=0.243$) correlation with factor F4M.

Evaluating nurses' ($n=420$) activity in attending of informal educational activities regarding matters of care for surgical patients, 202 (48,1%) of nurses take part in conferences and seminars at their work stations, 160 (38,1%) – in conferences and seminars outside of their work places, 278 (66,2%) of nurses attend qualification promotion courses, but 27 (6,4%) of nurses noted they did not continue their education.

When analysing self-evaluation of knowledge and use of said knowledge acquired in activities of further education, 49% (206/420) of respondents noted that they use knowledge acquired in said activities, 32,6% (137/420) of respondents chose the answer „yes, but not always” and 18,4% (77/420) evaluated use of said knowledge as partial or rare.

Analysis of research showed that nurses using knowledge acquired in activities of further education evaluate their duties in post-operative patient care statistically believably higher. Whereas nurses who sometimes use said knowledge - statistically believably higher in comparison to nurses who do not use the knowledge acquired evaluate F2M – *informing of patient and general care* ($p=0.018$) and F3M – *assessment and care of symptoms directly*

connected to pain ($p=0.030$) in factors including importance of nurses' duties in post-operative patient care.

3.4.3. Correlation of nurse's duties in post-operative pain care with education, specialization, work place and professional experience

When evaluating correlation of results acquired in factor analysis with nurses' work place and professional work experience statistically believable differences were discovered.

In comparison with nurses' evaluation of Riga multi-profile hospital, nurses of regional hospitals put higher value on nurses' duties in post-operative pain care of factor F2M – *informing of patient and general care* ($p=0.017$). Nurses of surgical and intensive therapy units in regional hospitals put higher value on nurses' duties in following criteria – provision of non-drug measures in pain care ($p=0.010$), information of patients about possible side effects of drug therapy ($p=0.008$), information of patients as to influence of recuperation process ($p=0.004$), documenting of nurses' duties performed ($p=0.028$).

Substantial differences are connected to nurses' professional work experience. Nurses with professional experience of six and more years put higher value on nurses' duties included in factor F1M – *provision of designated medical therapy* ($p=0.026$), factor F3M – *assessment and care of symptoms connected directly to pain* ($p=0.014$), factor F4M – *assessment of pain intensity* ($p=0.021$), factor F5M – *assessment of patient's condition* ($p=0.031$). Nurses with professional experience of six and more years showed higher statistically believable average indicators in comparison to nurses with work experience of less than six years in following nurses' post-operative pain care activities – objective assessment of patient's condition ($p=0.003$), use of numeric pain

assessment scale ($p=0.042$), assessment of pain influencing factors in patients ($p=0.029$), information of patients as to possible pain caused by manipulations ($p=0.020$), evaluation of symptoms connected to pain ($p=0.014$), evaluation of psychological symptoms connected to pain ($p=0.049$), aversion and care of symptoms connected to pain ($p=0.028$), aversion of psychological symptoms connected to pain ($p=0.014$), provision of designated medical therapy ($p=0.030$), information of patients as to progress of recuperation process ($p=0.020$), provision of non-drug activities in pain care ($p=0.015$).

Analysis of factors did not show statistically believable correlation between level of nurses' professional education and nurses' specialization. When performing a detailed statistical analysis of nurses' duties by using Mann – Whitney U criteria test statistically believable differences were discovered.

Nurses of intensive therapy units in comparison to nurses from surgical units put more stress on following duties in post-operative pain patient care – evaluation of vital indicators ($p=0.005$), information of patient as to possible pain caused by manipulations ($p=0.043$), information of patient about possible side effects of drug therapy ($p=0.047$).

When analysing evaluation of nurses' duties in correlation with education, nurses with 2nd level higher professional education put higher value on necessity of assessment of vital indicators than nurses with secondary professional education ($p=0.004$) and 1st level higher professional education ($p=0.009$). Evaluation of nurses' involvement in efficacy of drug therapy showed similar results – nurses with secondary professional ($p=0.002$) and 1st level higher professional education ($p=0.013$). Statistically important differences are also found in correlation with ensuring patients' physical ($p=0.011$) and psychological ($p=0.015$) comfort between nurses with 2nd level professional higher education and 1st level professional higher education.

3.5. Evaluation of post-operative pain care work organization

Evaluation results of factors influencing organization of post-operative pain care in nurses' and physicians' research groups showed, that statistically believable differences are related to lack of motivation ($p<0.001$) and faults in organizing ($p<0.001$) (Table 3.7). Based on data of descriptive statistics, physicians' group sees the problem in lack of time (45%) and problems with work organization (51%). Nurses' group believe the problem is in lack of time (47%).

Table 3.7

Evaluation of factors influencing organization of post-operative pain care in nurses and physicians' research groups

Evaluation criteria	Nurses (n=420)		Physicians (n=163)		Fisher exact test 2x2 table $p < 0.05$
	N	%	N	%	
Insufficient knowledge in pain relief	130	31	56	34	$p=0.430$
Lack of time	198	47	74	45	$p=0.713$
Lack of motivation	63	15	46	28	$p<0.001^*$
Problems with work organization	115	27	83	51	$p<0.001^*$
Lack of facilities necessary for pain evaluation	129	31	44	27	$p=0.419$

*N – number of answers in selection; * $p<0.05$.*

The results acquired from research state that nurses, who noted lack of motivation as one of influencing factors in pain care, put lower evaluation marks in factors F1M ($p=0.043$), F2M ($p=0.037$), F4M ($p=0.001$), F5M ($p=0.005$) as regards importance in post-operative patient pain care.

3.6. Analysis of nursing care documentation

Research evaluated surgical and intensive care unit care documentation of nine Latvian hospitals, including two multi-profile hospitals in Riga and affirmed care documentation of seven regional hospitals. Care documentation of all hospitals analysed foresees documentation of vital indicators both in surgical and intensive therapy units, as required by LR MK regulations Nr. 265. Provision of medical therapy is documented documentation of units of both profiles and only surgical units of two hospitals and four intensive therapy units out of nine hospitals have nurses' document side effects of administered drugs. Documented affirmation of pain intensity assessment is not stipulated by LR MK regulations Nr. 265 „Record keeping of medical documents”. Out of analysed documentation of nine hospitals, only five surgical units and six intensive therapy units' document pain assessment. When analysing regularity of pain assessment hospitals do not have a unified opinion. Out of care documentation of five surgical units analyzed, only two document pain assessment regularly and three assess and document pain „*when needed*”. Documentation of six of the analysed intensive care therapy units show a similar coherence and only a half have regular pain assessment. Evaluation of pain influencing factors was documented only in two hospitals out of nine. Nurses' responsibilities as regards pain care activities have been stated only in three hospitals – in documentation of both surgical and intensive therapy units.

4. DISCUSSION

Post-operative pain care includes assessment of patient's pains, identifying care problems connected with pain, realization of care and assessment and documentation of care activities performed.

According to results acquired from our research 32,6% of post-operative patients felt moderate pain and 44,7% intensive pain. These results correlate with results of other similar research about intensity of post-operative pain on the first day post operation (*Apfelbaum, 2003; Sommer, 2008*). Results of the research confirm that highest average pain assessment in comparison was found in patients of general surgery, cardio-surgery, neurosurgery and urology units. Similar confirmations were found in other publications (*Kalkman, 2003; Lorentzen, 2012*).

As confirmed by analysis of sources of scientific literature, post-operative pains are influenced by different factors – physical and psychological, those created by environment, as well as inter-personal and patient's inter-personal factors (*Turk^b, 2010*). Our research confirms, that, in accordance with evaluation of average indicators patients most value inter-personal factors – support of family and friends, interaction with health care personnel and professionalism of nurses, as well as physical factors – lack of sense of wellbeing and influence of insomnia during period of suffering from post-operative pains.

Data analysis of research will reveal correlations between pain influencing factors and patients' sex, age and mode of surgical treatment. Women are more aware of influence of physical and environmental factors during post-operative pain period. This is confirmed by other clinical and epidemiological research (*Wiesenfeld–Hallin, 2005; Jawaid, 2009; Bernardes,*

2008). Research reveals differences in importance as regards nurses' professionalism and attitude of medical professionals based on patients' age group. Younger patients consider this criterion among the most important. It was not possible to find research analysing questions of nurses' professionalism as regards acute pain care of patients of different age groups.

Data acquired in result analysis indicate correlation between analysed post-operative pain influencing factors and mode of surgical treatment – planned or acute operation. In cases of planned surgery patients gave more credit to nurses' professionalism and communicative skills, as well as criteria connected with physical wellbeing, such as silence and sleep. This can be substantiated by a longer pre-operation period and possible psychological preparation for the surgery (*Wilkinson, 2011*).

Average values of patient's subjective feelings during post-operative period were relatively high, ranging from 4.0 to 5.5 (min=1; max=10) as regards discomfort, fatigue, insomnia, restlessness, boredom, helplessness, uncertainty of following activities, lack of information and fear.

Research proves that evaluation of post-operative sensations differ also in correlation with treatment profile. Trauma unit patients noted discomfort, insomnia, feeling of helplessness and uncertainty of following activities, whereas patients from neurosurgery units noted restlessness as the dominating feeling of post-operative period. Patients of abdominal cavity surgery units of this research noted domination of low spirits.

Our research proves, that there is high correlation between patient's restlessness and fear ($r=0.721$), dissatisfaction with the treatment of personnel and environment ($r=0.786$). Patients' anger is in believable correlation with dissatisfaction with the treatment of personnel ($r=0.620$) and environment ($r=0.617$). There is a high correlation between lack of information and

uncertainty of following activities ($r=0.796$). As confirmed by literary sources and research, it is important to create an environment in which the patient will feel psychological comfort and depend on the nurse for necessary psychological support and methodical help (*Wilkinson, 2011; Malinski, 2011; Leegaard, 2011*).

Data of research confirms correlation of patients' post-operative sensations with evaluation of pain intensity. An increase in post-operative pain intensity will make patients more aware of pain influencing factors – discomfort, restlessness, fatigue, fear, dissatisfaction with environment and treatment of personnel. This confirms that pain intensity in post-operative period influences patient's physical and psychological wellbeing. Explicit pain causes heightened levels of fear and anxiety, which results in weakening of united pain management (*Manias, 2005*).

Research reveals an important fact – use of pain evaluation methods in praxis produced a similar evaluation in all groups of respondents. Clinical praxis is dominated by evaluation of patient's subjective and objective condition. Out of pain intensity and quality scales most widely used is that of Verbal pain intensity scale. As confirmed by sources of scientific literature and research, nurses in other countries evaluate pain of surgical patients using Visual analogue scale (*Averbuch, 2004; Williamson, 2005*), intensive therapy units also use Verbal pain intensity scale (*Herr, 2006; Muralski, 2010; Lindberg, 2011*).

Evaluating use of pain intensity evaluation scales, these are mostly used in praxis by nurses with 1st and 2nd level professional higher education, whereas nurses with secondary professional education show a lower statistically believable use of objective pain assessment instruments.

Correlation analysis showed that self-evaluation of nurses' knowledge after graduation correlates with use of VRS in praxis.

Evaluating nurses' opinion as to most effective evaluation methods, nurses with 3rd level of qualification, based on lengthy work experience, chose subjective evaluation of patient's condition. Other research also proves that experienced nurses prefer holistic pain evaluation, by listening to patients and evaluating expression of subjective sensations connected with pain (*Richards, 2007*).

Data acquired in research in both nurses' and physicians' research groups confirm that pain evaluation in clinical praxis is more spontaneous and is not documented regularly. Patient poll shows that 29,4% of patients noted irregular pain assessment. Research shows that work organization matters in pain management are urgent in other countries as well (*Manias, 2005*).

Pain evaluation is correlated with patients' physical and psychological comfort. Research done in Hong Kong notes, that regular pain assessment provides for high patient satisfaction levels (*Chung, 2003*). Promotion research proves that patients who experienced regular pain assessment, showed a lower post-operative subjective sensation evaluation than patients with irregular pain assessment.

Our research identified 23 nurses' duties in post-operative pain care. Indicators of descriptive statistics show differences in comparison of evaluation of nurses' duties in post-operative patient care in nurses' and physicians' research group. Groups showed a statistically believable difference in nurses' duties as regards provision of designated medical therapy ($p=0.025$), which was regarded by physicians as most important. Sufficient pain relief therapy during post-operative period is one of basic duties (*Rognstad, 2012*). When evaluating duties in post-operative pain care, nurses gave higher evaluation to

assessment of patient's objective condition ($p=0.033$) and informing of patient as regards process of recuperation ($p=0.008$). As regards evaluation of pain intensity 62,9% of nurses always use evaluation of patients' objective condition.

Based on use of factor analysis method, nurses' and physicians' research group identified correlated groups of nurses' duties. Five basic categories of nurses' duties were determined – assurance of designated drug therapy, information of patients and general care, evaluation and care of symptoms directly connected to pain, evaluation of pain intensity and patients' condition.

Comparison of factor analysis models and determining indicators of nurses' professional competence allows to draw a conclusion, that substantial differences are connected to nurses professional work experience and work environment. Nurses of regional and local hospitals put more stress on duties connected to information of patients and general care, whereas nurses with professional experience of six and more years state the importance of four factors (assurance of designated drug therapy, evaluation and care of symptoms connected directly to pain, evaluation of pain intensity, evaluation of patient's condition) in comparison to nurses with less work experience.

Surgical nurse job description analyse confirm that questions related to pain patient care in prescribed documentation are reflected in a much generalized way. Conversely the professional standard of nurse and descriptions of competences establish responsibilities of nurse in accordance with the care of patients with acute pain.

Nurses' professional work experience as a competency influencing aspect has been analysed both in scientific literature (*Benner, 1984; Carr,*

2010), and other research, indicating its influence on ensuring the quality of post-operative pain care (*Chinn, 2011; Rognstad, 2012*).

Level of professional education in nurses is one determinative criteria of nurses' competency. Research work proves that there are differences in evaluation of post-operative pain care duties in correlation with nurses' professional education.

When evaluating nurses' duties in post-operative pain care, nurses with 2nd level professional higher education mention assessment of vital indicators, assurance of patient's physical and psychological comfort and assessment of efficacy of the designated drug therapy. Other criteria of research did not show differences.

Factor analysis, performed within research, did not show differences in correlation with unit specialization, whereas analysis of nurses' duties determined that intensive therapy nurses put more stress on assessment of vital indicators, informing of patients as regards possible pain caused by manipulations and side effects of drug therapy.

One of components of care process is documentation of performed activities. This is confirmed by numerous researches (*Idvall, 2002; Ene^b, 2008; Samuels, 2009; Bounds, 2010*). Data acquired from research confirmed that documentation of performed duties received higher evaluation from nurses of regional and local hospitals. Analysis of care documentation confirmed that documentation regarding care of surgical patients developed and affirmed by hospitals shows only partial post-operative pain patient care activities. Similar cognition has been reached in other research (*Chanvej, 2004; Abdalrahim, 2008*).

Informing of patients is an integral part of surgical process, which lessens patients' uneasiness and promotes healing after surgery (*Kalkman, 2003*

Niemi-Murola, 2007). Data acquired from our research demonstrates, that pre-operative patients were more informed regarding peculiarities of pre-operative (57,8%) and post-operative (53,3%) period. The fact that 37,7% of patients felt lack of information as regards pain relief possibilities is food for thought.

Pain care management requires a connection between knowledge and acquisition of skills (*Carr, 2010*). Correlation analysis confirmed that knowledge after higher educational facility correlates with all factors, pain intensity evaluation excepted. This allows drawing a conclusion that 2nd level professional higher education programs put more stress on matters regarding implementation of drug therapy, general care and evaluation of patients' general condition.

Improvement of professional knowledge and skills is one of duties of further education of medical personnel, which will ensure sustainable development of this field. This is confirmed by numerous researches (*Rond, 2000; Guardini, 2008; Abdalrahim, 2011*). Data acquired in our research confirmed that 86,2% ($n=420$) of nurses take part in conferences, seminars and other qualification raising activities regarding care for surgical patients. 48,1% of nurses noted activities in their work place. This allows us maintain, that employers are interested in rising of level of professional knowledge of personnel involved in health care. When evaluating self-evaluation of use of knowledge acquired in further education activities we must point out that nurses, who use acquired knowledge appreciate the importance of nurses' duties in post-operative patient care more.

Nurses, who use knowledge attained in activities of further education, are more aware of nurses' duties in post-operative pain care, especially regarding provision of designated drug therapy and evaluation of patient's general condition. Nurses' duties regarding pain intensity assessment have

received the lowest estimation, which allows us to declare that further education programs fail to activate matters concerning pain assessment.

Scientific research attests, that lack of time and personnel, heightened work load and inadequate level of knowledge among nurses is an obstructive factor in providing of quality pain care (*Schafheutle, 2001; Dihle, 2006; Rejeh, 2009*). Research work shows statistically believable material, that the main factor influencing pain care is connected with lack of motivation in nurses. Results acquired in factor analysis also confirmed that nurses with less motivation show a lower appreciation in nurses' duties in post-operative pain care.

5. CONCLUSIONS

1. Research performed in medical institutions of Latvia showed that 44,7% of patients after surgery experience severe and intensive pain in the first post-operative day.
2. Factors, affecting postoperative pain, are clarified, as well as their influence on postoperative pain perception. In period of postoperative pain women are more sensitive to physical and surrounding environmental factors. Elderly patients mention questions about the professionalism of nurse and attitude of health care staff. In case of planned operation patients as major factors recognize the professionalism of nurse, communicative skills and factors associated with the physical comfort.
3. Identified twenty three nurse responsibilities in postoperative pain patient care. In postoperative patient care are secured discharge of duties associated with medical therapy, provision of patient's physical

and psychological comfort, however, lower assessment is for care activities connected with the evaluation of patient's pain and associated symptoms. Only partial documentation about the assessment of pain patient condition exists in nursing practice.

4. Patients are only partially informed about pain relief possibilities in postoperative period (44%) and the lack of information substantially heightens their subjective feeling.
5. In postoperative pain care organization nurses as one of the main influencing factor mention the lack of time (47%) and insufficient knowledge about pain relief (31%), however, physicians existing care imperfection statistically credibly relate with the lack of motivation.
6. Postoperative pain assessment as organized and planned action mention 54,4% of nurses. More often in practice is used evaluation of patient's subjective (58,4%) and objective (62,9%) condition. However, only 11,9% of nurses always utilize Verbal pain assessment scale, 6% - Numerical analogue scale and 6,4% - Visual analogue scale. Pain assessment instruments in practice are more frequently utilized by nurses with 1st and 2nd level higher professional education.
7. The regularity of pain assessment influences the physical and psychological comfort of postoperative patients. In the case of irregular pain assessment patients feel worse.
8. Established coherence between the nurse responsibilities and indicators forming professional competence. With the length of the work experience increases significance of nurse duties associated with ensuring of medical therapy, evaluation and care of pain related symptoms, assessment of pain intensity and patient's condition. Nurses with 2nd level professional higher education more relevantly

put forward responsibilities associated with determination of patient's vital indicators and evaluation of efficiency of medical therapy.

9. Nurses attending further education activities evaluate more importantly their responsibilities in postoperative pain care, especially in relation with provision of administered medical therapy and evaluation of patient's general condition.

6. SUGGESTIONS

Based on research results are proposed following suggestions:

1. to improve pain care process (pain assessment, identification of patient's needs, care planning and realization, evaluation of performed activities and documentation) it is necessary to activate questions about raising of nurse competence in both, professional basic education programs as well as in planning and realization of further education programs;
2. to introduce with the obtained results Association of Surgical Nurses and Latvian Association for the Study of Pain, to recommend to introduce in standard documents for surgical nurses responsibility associated with ensuring care for pain patients and to elaborate postoperative pain care standard;
3. in order to provide more effective postoperative pain care and to improve patient's physical and psychological discomfort, it is necessary to improve documentation of nursing by stating responsibility of nurse in pain assessment and in evaluation of pain associated symptom assessment and prevention.

APPROBATION OF DOCTORAL THESIS

Approbation of doctoral thesis „ Post-operative pain care in nurses’ practice in Latvia” was carried out in united session of RSU Nursing academic school and Neurology and Neurosurgery department on august 29, 2012.

There are 17 publications, including 7 scientific articles and 10 published research thesis regarding theme chosen for doctoral thesis. Results of the research were presented in 8 international and 6 national conferences and congresses.

Publications on the theme chosen for Doctoral Thesis

1. **Strode I.**, Logina I. Assessment of Postoperative Pain in Nursing // *Acta Chirurgica Latviensis*, 2009; (9): 77-80.
2. **Strode I.**, Krūmiņa A., Millere I., Logina I. Pēcoperācijas sāpju novērtēšanas klīniskās aprūpes aspekti (*Aspects of Clinical Care in Post-operative Pain Assessment*) // *RSU Zinātniskie raksti*, 2009: 316-322.
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3. **Strode I.**, Dupure I., Millere I., Logina I. Akūtu sāpju aprūpi ietekmējošie faktori (*Influencing Factors on Acute Pain Care*). 2010. gada Zinātniskās konferences tēzes, RSU 2010, 340.
4. **Strode I.** Assessment of Acute Pain in Nursing of Latvia. 6th Warsaw International Medical Congress for Young Scientists, 7.05.-9.05.2010., Polija; Abstracts book – Arch Med Sci 2010; 1: S90.
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1. **Strode I.**, Dupure I., Krūmiņa A., Zarāne L. *Pēcoperācijas sāpju novērtēšana kā viens no aprūpes procesa komponentiem (Assessment of Post-operative Pains as one of the Nursing Components)*. Sarkanā Krusta medicīnas koledžas konference

- „Zinātniskās darbības attīstība koledžās”, mutiska darba prezentācija (*oral presentation*), 12.02.2009.
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 3. **Strode I.** *Sāpju novērtēšanas iespējas Latvijā (Possibilities of Pain Assessment in Latvia)*. Latvijas Māsu asociācijas Ķirurģiskās aprūpes māsu apvienības starptautiskā konference „Kvalitatīvas pacientu aprūpes nodrošināšanas iespējas ķirurģijā”, mutiska darba prezentācija (*oral presentation*), 3.03.2010.
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