Anna Mantere
Aino-Maria Oksanen

An Educational Intervention for Nurses Administering Medications :
Focus on Dysphagia Patients

Helsinki Metropolia University of Applied Sciences
Bachelor of Health Care
Degree Programme in Nursing
Thesis
2.11.2012

Metropolia

Abstract

Author(s) Title Number of Pages Date	Anna Mantere, Aino-Maria Oksanen An Educational Intervention for Nurses Administering Medications: Focus on Dysphagia Patients 23 pages + 3 appendices 2.11.2012
Degree	Bachelor of Health Care
Degree Programme	Degree Programme Nursing
Specialisation option	Nursing
Instructor(s)	Liisa Montin, Senior Lecturer Marianne Pitkäjärvi, Senior Lecturer

The purpose of our final project was to explore the influence of an educational intervention provided by a pharmacist to the knowledge and skills of nurses administering medications to neurological dysphagia patients. Dysphagia increases as the population grows older, and nurses face more and more patients with swallowing difficulties. This may lead to the alteration of medication formulations by crushing in order to ease the swallowing process. Altering medication formulations may cause serious adverse effects. Nurses who work with dysphagia patients need knowledge concerning medication formulations and practical as well as safe pharmacotherapy. Safe pharmacotherapy is an essential part of patient safety.

This final project was done in collaboration with a ward pharmacist of a neurological ward in the Helsinki Metropolitan area. The nurses working on the ward answered a pre-education questionnaire prior to the pharmacist's education. The questionnaire was compiled according to the literature review. The questionnaire also defined the content of the education. After the "Per os lääkitys ja nielemisvaikeudet" –lecture (Per oral medications and swallowing difficulties) the participating nurses had a week to fill in the post-education questionnaire. Number of returned pre-education questionnaires was 17 and the number of post-education questionnaires was 7.

According to our results, the knowledge level of the nurses working on the ward was high, the nurses did not perceive pharmacotherapy to be difficult and most of the nurses thought pharmacotherapy as interesting. Surprisingly, those who perceived pharmacotherapy to be difficult also scored better than those who did not perceive it to be difficult. This may indicate that some of the nurses may have unrealistic ideas concerning their skills and knowledge. According to the nurses' opinions, economic reasons or the time required to solve whether a medication can be crushed do not contribute to crushing the medications. Based on the nurses' answers they knew how to crush medications hygienically. Both the lecture and the flow chart were perceived to be practical and useful.

Based on our results, regular, mandatory additional training concerning pharmacotherapy is pivotal in ensuring safe pharmacotherapy.

Keywords	educational intervention, dysphagia, patient safety, medication

Metropolia

Tiivistelmä

Tekijä(t) Otsikko Sivumäärä Aika	Anna Mantere, Aino-Maria Oksanen Koulutusinterventio lääkehoitoa toteuttaville sairaanhoitajille: Fokus dysfagiapotilaissa. 23 sivua + 3 liitettä 2.11.2012
Tutkinto	Sairaanhoitaja AMK
Koulutusohjelma	Degree Programme in Nursing
Suuntautumisvaihtoehto	Sairaanhoitaja
Ohjaaja(t)	Lehtori, Liisa Montin Lehtori, Marianne Pitkäjärvi

Opinnäytetyömme tutkimustehtävänä oli selvittää osastofarmaseutin pitämän koulutuksen ja siihen yhdistetyn ohjekaavion onnistuneisuutta lääkehoitoa toteuttavien sairaanhoitajien tiedon lisäämisessä dysfagiapotilaan turvallisessa lääkehoidossa. Dysfagia lisääntyy väestön vanhetessa, ja sairaanhoitajat kohtaavat työssään yhä enemmän potilaita, joilla on nielemisvaikeuksia. Tämä voi johtaa lääkevalmisteiden murskaamiseen, jotta nieleminen helpottuisi. Lääkevalmisteiden muuntamisella voi olla vakavia haittavaikutuksia. Sairaanhoitajat, jotka työskentelevät nielemisvaikeuksista kärsivien potilaiden parissa tarvitsevat työssään tietoja lääkemuodoista, käytännön lääkehoidosta sekä turvallisen lääkehoidon toteuttamisesta. Turvallinen lääkehoito on oleellinen osa potilasturvallisuutta.

Opinnäytetyö tehtiin yhteistyössä osastofarmaseutin kanssa Helsingin ja Uudenmaan sairaanhoitopiirin alueella sijaitsevalla neurologisella vuodeosastolla. Osastolla työskentelevät sairaanhoitajat vastasivat ennen osastofarmaseutin pitämää koulutusta kyselylomakkeeseen, jonka tämän opinnäytetyön kirjoittajat olivat laatineet perustuen kirjallisuuskatsaukseen ja jonka perusteella koulutuksen sisältö oli määritelty. ”Per os lääkitys ja nielemisvaikeudet” -koulutuksen jälkeen siihen osallistuneilla sairaanhoitajilla oli viikko aikaa vastata toiseen kyselylomakkeeseen. Ennen koulutusta täytettyjä kyselylomakkeita palautui 17 ja koulutuksen jälkeisiä lomakkeita seitsemän.

Saamiemme tulosten mukaan osaston sairaanhoitajien tietotaso oli korkea, sairaanhoitajat eivät pitäneet lääkehoitoa vaikeana ja suurin osa vastaajista piti lääkehoitoa mielenkiintoisena. Yllättäen lääkehoitoa vaikeana pitäneet sairaanhoitajat saivat parempia tuloksia kuin hoitajat, jotka eivät pitäneet sitä vaikeana. Tämä voi viitata siihen, että osalla sairaanhoitajista voi olla epärealistisia käsityksiä omista tiedoistaan ja taidoistaan. Taloudelliset syyt tai lääkkeen murskaamiskelpoisuuden selvittämiseen kuluva aika eivät kyselyidemme mukaan vaikuta lääkkeiden murskaamiseen. Kyselyihin osallistuneet sairaanhoitajat osasivat vastaustensa perusteella hoitaa murskaamisen hygieenisesti. Koulutusta ja siihen liittyvää ohjekaaviota pidettiin sekä käytännöllisenä että hyödyllisenä.

Tulostemme perusteella säännöllinen ja pakollinen lääkehoitoa koskeva lisäkoulutus on tarpeen turvallisen lääkehoidon takaamiseksi.

Avainsanat	koulutusinterventio, dysfagia, potilasturvallisuus, lääkehoito

Contents

1 Introduction

The proportion of the elderly in the population is growing, and it is estimated that 35-68 % of the elderly have some degree of swallowing dysfunction (Kelly, D'Cruz & Wright 2009a: 49). Therefore, dysphagia is becoming a substantial problem in terms of medicine administration and pharmacotherapy. Dysphagia predisposes patients to various risks related to the inappropriate modification of tablets or capsules. (Jackson et al. 2008: 111.)

In a Norwegian study the phenomenon of crushing tablets or opening capsules was found to be common (Kirkevold & Engedal 2010: 83). A study conducted in the UK states that unlicensed administration of medication took place weekly in at least 80 % of all nursing homes (Wright 2002a: 33). Studies examining the frequency of this phenomenon in Finland are hard to come by.

Crushing tablets or opening capsules can be a seemingly easy solution when the patient can't or won't swallow the medicine whole (Laitinen, Ahonen & Kröger 2010: 830). In a study by Barnes et al. (2006) ensuring that patients get their medications was cited as one of the reasons influencing the crushing of medications: "The central issue that seemed to drive the actions of the nurses was the need to ensure that all medications ordered were administered. Sometimes individual residents either could not or would not swallow tablets." (Barnes et al. 2006: 193.) Patients might be reluctant to take their medications, thus the act of covert medicine administration is common in elderly care and mental health facilities (Kirkevold & Engedal 2005: 22).

Using medicines in an unorthodox way, crushing tablets or opening capsules for example, entails a myriad of potential hazards. Altering the formulation of a medication not only renders its use unlicensed but also affects its pharmacokinetics and therapeutic efficacy, and may cause adverse drug reactions which can, in turn, cause irreversible damage to the patient receiving the altered medication. (Downie, Mackenzie, Williams & Hind 2008: 96-99, 125-132, 154-158.) "To achieve therapeutic benefit for the patient, it is obviously essential to ensure that *the right dose of the right drug is administered at the right time by the right route*" (Downie et al. 2008: 95-96).

The phenomenon of crushing tablets or opening capsules relates to safe pharmacotherapy (Downie et al. 2008; Kelly & Wright 2009; Kelly & Wright 2010; Wright 2002a). Various educational efforts have been made in order to improve medication safety, and many studies highlight the need for ongoing education (Armutlu, Foley, Surette, Belzile & McCusker 2008: 63; Laitinen et al. 2010: 832). The Swallowing Difficulties Protocol developed by Wright (2002b: 43-45) is an excellent example of a practical aide that provides solutions for nurses administering medications to patients with dysphagia. The protocol lists medications that should not be crushed or opened, and it has a flow chart for the management of patients with swallowing difficulties (Wright 2002b: 43-45).

The purpose of this final project was to explore the influence of an educational intervention provided by a pharmacist to the knowledge and skills of nurses administering medications to neurological dysphagia patients. The educational intervention consisted of a brief lecture and a flow chart. The influence of the educational intervention was surveyed with pre- and post-education questionnaires. Besides measuring the knowledge and skill levels, the questionnaires also surveyed the nurses' perceptions about crushing tablet formulated medications. The educational intervention took place in a neurological ward in the Helsinki Metropolitan area, and the participants were the nurses of the ward. The lecture as well as the flow chart was provided by the ward's pharmacist.

2 Definition of key concepts

2.1 Dysphagia

Encyclopedia Britannica (2012) defines dysphagia as "difficulty or pain in swallowing". The prevalence of swallowing difficulties increases with age (Kelly & Wright 2009: 62), and the elderly are more likely to have conditions such as stroke and neuromuscular disorders that can result in dysphagia (Aaltonen, Saarela, Jousimaa, Aherto & Arkkila 2009: 1539). The ageing process itself can have a negative effect on the swallowing process (Kelly & Wright 2009: 61).

2.2 Altered medication formulations

Altering medication formulations – crushing tablets or opening capsules – results in possible changes in the pharmacokinetics, therapeutic efficacy and/or side-effect profile of the drug (Downie et al. 2008: 125-132, 154-158).

2.3 Deviation in preparing the medication for administration

A deviation in preparing a medication for administration is a medication error that includes erroneous diluting, mixing, crushing or other factor relating to preparing medications for administration in the pharmacy or care unit (Potilas- ja lääkehoidon turvallisuussanasto 2006: 9).

2.4 Educational intervention

Nurses are required to possess practical pharmacotherapy skills and knowledge about pharmacology in order to safely prepare and administer medications. The educational intervention used in this final project – a lecture and a flow chart – provided information about these vital topics. The educational intervention was limited to consist only of a brief lecture and a flow chart. Even brief nursing staff education regarding medication formulations and correct administration techniques has been found to increase the safety of pharmacotherapy practices (Laitinen et al. 2010: 832).

3 Previous studies

Background material for this final project was acquired via database and manual search. The databases used were CINAHL, MEDIC, Ovid MEDLINE and PubMed. Inclusion criteria for the research articles were that the articles were published between 2001 and 2012, free full text was available and that the title and abstract were relevant. The found articles were then divided into categories, namely altering medication formulations, medication errors, swallowing difficulties, compliance, nurses' knowledge, ongoing education and practical tools: flow charts.

3.1 Altering medication formulations

Altering the medication formulation of a drug has an effect on the pharmacokinetics and pharmacodynamics of the drug (Downie et al. 2008: 125-132, 154-158). For example, breaking the outer layer of an enteric-coated tablet both exposes the drug to the gastric acids in the stomach and predisposes the mucosa of the stomach to the corrosive effect of the drug (Laitinen, Ahonen & Kröger 2010: 832). The destruction of the drug's protective coat results in the deactivation of the drug and, thus, the patient does not receive the intended therapeutic benefit: "With medicines that are not designed for oral absorption, or those that require a certain acid or alkaline environment to be released, this [altering the medication formulation] can result in patients not receiving the required dose" (Kelly & Wright 2009: 63).

When administering altered medication formulations, tablet formulated analgesics for example, special consideration should be paid to the possibly fatal mistakes with controlled-release opioids (Kelly et al. 2009a: 50). Crushing controlled-release opioid formulations may result in death because of the unexpected rapid release of the drug (Downie et al. 2008: 129-132; Kelly et al. 2009a: 50). Altering medication formulations is not only possibly lethal but it also has an adverse effect on the pain management of the patient:

> Crushing controlled-release formulations such as Morphine (MST), which are designed to be released over a long period of time, can rapidly unleash the full impact of the drug. This can cause the patient to become drowsy and develop respiratory problems and means that they do not receive the prolonged pain control expected from the formulation. (Thomson, Naysmith & Lindsay 2007 cited in Kelly et al. 2009a: 50.)

Sometimes crushing of the medication is the proper way to proceed in administering the medication to the patient. Special attention should be then paid to the safe and hygienic alteration of the medicine formulation. (Paradiso et al. 2002.) In a study by Paradiso et al. (2002) the process of altering dose forms was analyzed, and it was found that "in 61 % of the 408 observations where the medications were administered in an altered form, all of the altered medications were crushed together in the one vessel" (Paradiso et al. 2002: 125). In 77 % of cases the alteration involved a mortar and a pestle, which were shared among the patients, and it was found that in 59 % of the cases the equipment was not cleaned between administrations of the medication to each patient (Paradiso et al. 2002: 126). Medications should be crushed separately to

avoid the possible chemical interaction between the drug molecules, and the mortar and the pestle should be cleaned after each patient to ensure proper hygiene (Paradiso et al. 2002: 126).

3.2 Medication errors

Medication errors increase hospital stays, consume resources and harm patients – even fatally in the worst cases. Safety interventions have been found to be effective and pay for themselves in terms of savings arising from averted harm. (Webster & Anderson 2002: 176-177.) According to current data nearly half of all avoidable harmful incidents have been a result of medication errors. The impairments caused to patients are a heavy burden to the society, and possible cost savings can be made by investing in patient safety. (The Ministry of Social Affairs and Health 2006: 72.)

Promoting safe pharmacotherapy is not only cost effective but it is also a fundamental part of nurses' ethical responsibilities: according to the International Council of Nurses there are four fundamental responsibilities that nurses should respect (The ICN Code of Ethics for Nurses 2005: 1). These responsibilities are: to promote health, to prevent illness, to restore health and to alleviate suffering, and a nurse practicing safe and correct pharmacotherapy is honoring the above-mentioned responsibilities (The ICN Code of Ethics for Nurses 2005: 1).

3.3 Swallowing difficulties

Dysphagia, or difficulty in swallowing, is common among the elderly (Kelly et al. 2009a: 49). The elderly often suffer from deteriorating neuromuscular disorders that can cause dysphagia (Aaltonen et al. 2009: 1539), and the ageing process itself has a negative effect on the swallowing process (Kelly & Wright 2009: 61). Due to these adverse effects on swallowing, patients should always be asked whether they have any difficulties swallowing medications, even in the absence of the official diagnosis of dysphagia. A patient who is unable to swallow might have to resort into chewing the medication before swallowing, and this is no different from crushing the medication. (Kelly & Wright 2009: 63; Kelly & Wright 2010: 61.)

Administering medications to older patients and particularly to those with swallowing difficulties can be perceived to be time consuming, which may lead to nurses trying to speed up the process by mixing several crushed medications together. This is undesirable as the released drugs may chemically interact, resulting in an inactive or toxic product. (Kelly & Wright 2009: 64-65.) Mixing crushed medications together is neither safe pharmacotherapy nor ethically acceptable (Paradiso et al. 2002; The ICN Code of Ethics for Nurses 2005; The Ministry of Social Affairs and Health 2006).

3.4 Compliance

Compliance is a key element in successful pharmacotherapy (Kelly et al. 2009a: 52). Typically the adherence to self-administered prescription medications is low, with people taking less than half of the prescribed doses. If the patient has problems swallowing the tablets, the adherence is likely to be even less. (Kelly et al. 2009a: 49.)

Nurses are obliged to promote health (The ICN Code of Ethics for Nurses 2005: 1) and this includes increasing patient compliance to pharmacotherapy. "Empowering people to feel competent to take their medication is part of the healthcare professional's role" (Kelly, D'Cruz & Wright 2009b: 83).

3.5 Nurses' knowledge

Studies suggest that nurses' pharmacological skills and knowledge are lacking (Jones 2009; Kelly & Wright 2010; Ndosi & Newell 2008). In a recent study by Ndosi and Newell (2008), it was found that nurses' knowledge of the pharmacology behind the drugs they commonly administer is inadequate (Ndosi & Newell 2008: 570). In relation to crushing tablets, in a study by Kelly and Wright (2010) nurses participating in the study expressed concern in their lack of knowledge "regarding which medicines can be crushed, those that can be dispersed, and how doses vary because of altered bioavailability when moving from a solid to a liquid formulation" (Kelly & Wright 2010: 65).

3.6 Ongoing education

The need for ongoing education programs on medication safety for all nurses regardless of years of experience has been identified (Armutlu et al. 2008: 63). Despite this identified need for education, some employees might feel that they do not need revision, and due to the shift work nature of nursing practice some employees are not able to participate in the education.

3.7 Practical tools: flow charts

In her article Jones (2009: 44) suggests using visual reminders in reducing medication administration errors since they have been effective in various education programs. Flow charts are an example of visual reminders, and they have been used successfully in nursing and medical practice – for instance in the form of a resuscitation flow chart. Wright's Swallowing Difficulties Protocol (Wright 2002b: 45) is another example of a flow chart.

A flow chart was included into this final project because its efficacy has been proven (Jones 2009; Wright 2002b). The flow chart included in this final project provides information to those staff members who did not participate in the lectures given by the pharmacist, including temporary workers and new employees.

4 Purpose of the final project and study question

4.1 Purpose of the final project

The purpose of this final project was to explore the influence of an educational intervention provided by a pharmacist to the knowledge and skills of nurses administering medications to neurological dysphagia patients.

4.2 Study question

The study question of this final project was: Will the educational intervention provided by the pharmacist influence the knowledge and skills of nurses administering medications to neurological dysphagia patients?

5 Methodology

5.1 Developing a questionnaire

Questionnaires are desirable research instruments when the purpose is to collect information. These instruments are designed to gather data from individuals about knowledge, attitudes, beliefs and feelings. Questionnaires are inexpensive, allow for complete anonymity, and the fact that no interviewer is present ensures that there will be no interviewer bias. (LoBiondo-Wood & Haber 2006: 325-328.)

Developing a questionnaire requires familiarizing oneself with literature regarding the phenomenon at issue, reflecting on and clarifying the research problem, defining concepts, and selecting a research frame (Heikkilä 2008: 47-48). The writers of this final project familiarized themselves with previous studies about this subject and used the acquired knowledge to develop the questionnaire. The following phases are included in the development of a questionnaire: specifying the subjects researched upon, designing the structure of the questionnaire, phrasing the questions and statements, testing the form, reviewing the form's structure and questions, and constructing the final form. (Heikkilä 2008: 47-48.)

According to Heikkilä (2008: 48) meticulous phrasing of the questions and statements is of utmost importance because the form of the questions is a considerable cause of error. The questions and statements in the questionnaire must be clearly written and they must concern only one subject at a time. The questions and statements must proceed logically in a numerical order, and the directions for replying must be explicit and unambiguous. (Heikkilä 2008: 48.) The first drafts of the questionnaire used in this final project included questions and statements that were close-ended with fixed responses. Fixed-response questions have the advantage of simplifying the

respondent's task and the analysis of the researcher – however, some important information about the subject may be missed (LoBiondo & Haber 2006: 325).

5.2 Testing of the questionnaire

The testing of the form can be done with as few as 5-10 people, as long as they actively aim at finding out the clarity and unambiguousness of the questions and the directions for replying, the functionality of the reply options, the time required for replying, and the burden of filling out the form (Heikkilä 2008: 61).

The questionnaire was tested with (n=18) 3rd-year nursing students. Initially the questionnaire had 15 fixed-response questions but during and after the testing it became evident that the questionnaire was too time-consuming and the questions were difficult and confusing. The questionnaire was radically modified as a result of the feedback the nursing students provided.

The multiple choice-type questions were changed into dichotomous questions that have only two possible responses, namely "yes" or "no". The questions were divided into three groups, each describing a particular dimension - drug forms (questions 1-11), practical pharmacotherapy (questions 12-22) and perception of pharmacotherapy (questions 23-28). The questions regarding drug forms and practical pharmacotherapy were verified by the pharmacist giving the nursing education. The questionnaire was also reviewed by a statistics teacher and a Finnish teacher.

The pre- and post-education questionnaires (Appendix 2.) were virtually the same, consisting of the 28 questions mentioned above but the post-education questionnaire had 10 additional questions that surveyed the nurses' perceptions about the flow chart and the nursing education provided by the pharmacist (questions 29-38). The scale in questions 1-22 was yes=1 and no=0, and the maximum score was 22. The scale in questions 23-38 was yes=1 and no=2. There was no maximum score in questions 23-38 since they measured perceptions.

A covering letter (Appendix 1.) was distributed with the questionnaires. The covering letter described briefly the purpose of the final project and provided clear directions for replying. The replying directions were repeated in the questionnaires as well.

5.3 Data collection

The survey took place in a neurological ward in the Helsinki Metropolitan area. There were 26 nurses working on the ward. The questionnaires were distributed to the ward in two phases: the pre-education questionnaire was given a week before the educational intervention and the post-education questionnaire was given immediately after the lectures but was collected a week later. The inclusion criterion for questionnaire 1 was that the participants worked on the ward as nurses. The inclusion criteria for questionnaire 2 required that the nurses had participated in either one of the lectures provided by the ward's pharmacist. The data was collected using a questionnaire developed specifically for that educational intervention. The questionnaires were in Finnish, thus the participants were required to understand Finnish.

Permission to carry out the survey was applied from the head nurse in charge at Helsinki University Central Hospital (HUCH). The standard HUCH permission for research form was filled out and sent alongside a description of the study to one of the heads of the HUCH profit centers. When the permission was granted the writers of this final project set a date for the data collection with the pharmacist and the head nurse of the neurological ward. The writers of the final project visited the ward themselves and explained briefly about the final project to the participants before distributing the covering letter and the pre-education questionnaire. A return box for the questionnaires was left at the ward.

The writers of this final project attended the lectures given by the pharmacist and collected the pre-education questionnaires before the first lecture. The post-education questionnaires were distributed after the first lecture to present nurses. The pharmacist distributed the post-education questionnaires to those present at the second lecture. The post-education questionnaires were collected by the writers of this final project a week after the second lecture.

5.4 Description of the educational intervention

The ward's pharmacist held two lectures. Approximately 25 nursing staff members participated in the education, and this included practical nurses as well. The lectures and the accompanying flow chart were provided by the ward's pharmacist. The content of the lectures was based on the questionnaires developed by the writers of this final project.

All of the questions asked in the questionnaires were answered in the lectures and the following concepts were approached: The different forms of oral medication and their absorption rates, special features of both enteric-coated and depot tablets as well as capsules and how to recognize them, how crushing tablets affects absorption time and therapeutic range, how to crush tablets safely and correctly, available alternative oral formulations for patients with dysphagia, and instructions how to administer medications through a nasogastric tube. A patient case which described a fatal mistake made with opioids was used as an example of the seriousness of this matter; the patient case portrayed vividly how even tiny alterations can have catastrophic consequences.

The flow chart (Appendix 3.) was introduced at the end of both lectures and was used in recapitulating the information given earlier in the lectures. At the end of both lectures the pharmacist explained where the flow chart would be placed and how the nurses could use it in their work. The duration of each lecture was approximately 40 minutes.

5.5 Data analysis

According to Burns and Grove (2005: 43) data analysis is conducted to reduce, organize and give meaning to the data. In this final project the data analysis was initiated by numbering the questionnaires in order to ease the analysis process. The questionnaires were then checked against a questionnaire filled out by the pharmacist

providing the educational intervention. The score from questions 1-22 was counted manually.

The data was then entered to the Windows SPSS PASW Statistics –program. Descriptive statistics, such as frequency distributions and measures of central tendency, were used to describe the data. "Descriptive statistics allow the researcher to organize the data in ways that give meaning and facilitate insight and to examine a phenomenon from a variety of angles" (Burns & Grove 2005: 461).

6 Findings

The focus population of this final project was nurses administering medications to neurological dysphagia patients. There were 26 nurses working on the neurological ward, thus 26 pre- and post-education questionnaires were distributed. The sample size was (n=17) in the pre-education questionnaires and (n=7) in the post-education questionnaires. None of the filled out questionnaires were rejected but some of the forms had unanswered questions.

6.1 Medication formulations and practical pharmacotherapy

The mean score of pre-education questionnaires (n=17) was 17,7 and the median 17 (SD 1,404) which suggests that the nurses' knowledge level was good since the maximum score of questions 1-22 was 22 points. The mean score of post-education questionnaires (n=7) was 19,6 and the median 20 (SD 1,512).

TABLE 1. Descriptive statistics (questions 1-22) concerning medication formulations and practical pharmacotherapy (min=0, max=22)

SCORE	**PRE-EDUCATION** n=17	**POST-EDUCATION** n=7
Mean	17,7	19,6
Median	17	20
SD	1,404	1,512
Minimum	15	17
Maximum	21	21

6.2 Nurses' answers concerning medication formulations

TABLE 2. Description of nurses' answers concerning medication formulations

STATEMENTS		PRE-EDUCATION n=17		POST-EDUCATION n=7	
		CORRECT fr (%)	INCORRECT fr (%)	CORRECT fr (%)	INCORRECT fr (%)
1	An analgesic tablet that is scored can be crushed.	n=9 (53)	n=8 (47)	n=6 (86)	n=1 (14)
2	Depot preparations are designed so that the active ingredient is released slowly, e.g. Oxycontin®	n=17 (100)	n=0 (0)	n=7 (100)	n=0 (0)
3	Ingredients released from a crushed tablet can irritate the digestive system.	n=17 (100)	n=0 (0)	n=7 (100)	n=0 (0)
4	If a patient cannot swallow the medications it is essential that the medications are given even as crushed.	n=9 (53)	n=8 (47)	n=6 (86)	n=1 (14)
5	Some soft capsules can be emptied using a needle, allowing only the active ingredient to be taken.	n=4 (23)	n=13 (77)	n=7 (100)	n=0 (0)
6	The granules contained by some capsules can be crushed.	n=12 (70)	n=5 (30)	n=7 (100)	n=0 (0)
7	A drug contained in an enteric coated capsule is released not until the capsule reaches the small intestine.	n=14 (82)	n=3 (18)	n=7 (100)	n=0 (0)
8	A drug contained in a sublingual preparation is released rapidly under the tongue, e.g. Nitro®	n=17 (100)	n=0 (0)	n=7 (100)	n=0 (0)
9	An enteric coated tablet should not be halved, crushed or chewed.	n=15 (88)	n=2 (12)	n=5 (71)	n=2 (29)
10	A preparation that releases slowly the active ingredient can be called a retard preparation.	n=17 (100)	n=0 (0)	n=7 (100)	n=0 (0)
11	Crushing a depot tablet affects the release of its active ingredient.	n=17 (100)	n=0 (0)	n=7 (100)	n=0 (0)

The figures in TABLE 2. show that in the pre-education questionnaires the questions with most wrong answers concerned crushing scored tablets, emptying soft capsules and the necessity of administering patient's medications even as crushed when the patient cannot swallow.

6.3 Nurses' answers concerning practical pharmacotherapy

TABLE 3. Description of nurses' answers concerning practical pharmacotherapy

STATEMENTS		**PRE-EDUCATION** n=17		**POST-EDUCATION** n=7	
		CORRECT fr (%)	**INCORRECT** fr (%)	**CORRECT** fr (%)	**INCORRECT** fr (%)
12	It's more economical to crush an analgesic tablet than to use a liquid formulation.	n=13 (77)	n=4 (23)	n=5 (71)	n=2 (29)
13	A patient's medications can all be crushed with the same mortar and pestle without rinsing them in between.	n=17 (100)	n=0 (0)	n=7 (100)	n=0 (0)
14	Medications are dissolved as soon as they are distributed on the medication tray.	n=17 (100)	n=0 (0)	n=7 (100)	n=0 (0)
15	Medications are dissolved when they are taken to a patient.	n=9 (53)	n=8 (47)	n=7 (100)	n=0 (0)
16	A nasogastric tube is rinsed after all medications have been given.	n=15 (88)	n=2 (12)	n=7 (100)	n=0 (0)
17	A nasogastric tube is rinsed after each medication.	n=15 (88)	n=2 (12)	n=7 (100)	n=0 (0)
18	A depot tablet can be dissolved.	n=15 (88)	n=2 (12)	n=7 (100)	n=0 (0)
19	An enteric coated tablet can be dissolved.	n=6 (35)	n=11 (65)	n=3 (43)	n=4 (57)
20	A patient's medications can all be crushed in the same medication cup.	n=16 (94)	n=1 (6)	n=6 (86)	n=1 (14)
21	A patient's medications are all crushed separately in different medication cups.	n=17 (100)	n=0 (0)	n=6 (86)	n=1 (14)
22	Depot tablets contain a higher dose of an active ingredient than normal tablets.	n=5 (30)	n=12 (70)	n=2 (29)	n=5 (71)

The figures in TABLE 3. show that in the pre-education questionnaires nurses answered incorrectly in questions concerning enteric-coated tablets and depot tablets, which suggests that nurses' knowledge concerning medication formulations is lacking. A similar observation can be made from the figures describing post-education questionnaires.

6.4 Nurses' opinions about pharmacotherapy

TABLE 4. Description of nurses' opinions about pharmacotherapy

STATEMENTS		PRE-EDUCATION n=17		POST-EDUCATION n=7	
		YES fr (%)	**NO** fr (%)	**YES** fr (%)	**NO** fr (%)
23	Pharmacotherapy is difficult.	n=3 (21)	n=11 (79)	n=2 (33)	n=4 (67)
24	Pharmacotherapy is interesting.	n=15 (94)	n=1 (6)	n=7 (100)	n=0 (0)
25	Crushing a medication is a medication error which should be reported to the HaiPro-system.	n=1 (6)	n=16 (94)	n=0 (0)	n=7 (100)
26	It takes too much time to find out whether a medication can be crushed or not.	n=6 (35)	n=11 (65)	n=1 (17)	n=5 (83)
27	It is important to regularly test one's pharmacotherapy skills.	n=17 (100)	n=0 (0)	n=7 (100)	n=0 (0)
28	In order to maintain one's pharmacotherapy skills, it is important to get regular additional training.	n=17 (100)	n=0 (0)	n=7 (100)	n=0 (0)

The figures in TABLE 4. show that in pre-education questionnaires 21 % (n=3) of the nurses answered that pharmacotherapy is difficult. The figures also show that majority of the nurses in pre-education questionnaires did not perceive crushing medications as a medication error that should be reported to the HaiPro-system. The majority of the nurses in both questionnaires were also of the opinion that it does not take too much time to solve whether a medication can be crushed or not.

6.5 Nurses' opinions about the educational intervention

TABLE 5. Description of nurses' opinions about the flow chart and the lecture

STATEMENTS		POST-EDUCATION n=7	
		YES fr (%)	**NO** fr (%)
29	I have used the flow chart as an aide while distributing medications.	n=5 (71)	n=2 (29)
30	The flow chart is practical.	n=7 (100)	n=0 (0)
31	The flow chart is useful.	n=7 (100)	n=0 (0)
32	The flow chart is clear.	n=7 (100)	n=0 (0)
33	The flow chart is necessary.	n=6 (86)	n=1 (14)
34	I would like to continue using the flow chart.	n=7 (100)	n=0 (0)
35	The lecture was useful.	n=7	n=0

		(100)	(0)
36	The lecture was practical.	n=7 (100)	n=0 (0)
37	The lecture was necessary.	n=6 (100)	n=0 (0)
38	The lecture increased my pharmacotherapy skills.	n=6 (100)	n=0 (0)

The figures in TABLE 5. show that all of the nurses who answered the post-education questionnaire (n=7) perceived the flow chart as practical, useful and clear. All of the nurses would like to continue to utilize the flow chart. The lecture was perceived as useful and practical by all of the nurses.

7 Ethical considerations and trustworthiness

Burns and Grove (2005: 203) state that "the goal of research is to generate sound scientific knowledge, which is possible only through the honest conduct, reporting, and publication of studies." Thus, for a study to be ethically acceptable and trustworthy, a good scientific conduct is required, and honesty, integrity and diligence must be maintained throughout the research process. An ethically sound study also requires that the data collection as well as the research and evaluation methods adhere to scientific criteria and that research misconduct including fabrication, falsification and plagiarism are avoided. (Burns & Grove 2005: 203-207.)

The articles utilized in this final project were retrieved through reliable databases such as CINAHL, which is the world's most comprehensive nursing and allied health research database, and Ovid MEDLINE, which covers a wide range of current medical information. An article was considered valid when it was found through a reliable database and it was published in a renowned journal; the article also had to abide by the inclusion criteria. The writers of this final project chose the usable research articles together. The authors of the articles were quoted accurately and without plagiarizing.

According to Burns and Grove (2005: 207), conducting ethically acceptable research requires protection of the human rights of the subjects, and "the rights of research subjects can be protected by balancing benefits and risks of a study, securing informed

consent, and submitting the research for institutional review" (Burns & Grove 2005: 207).

"Informed consent requires the researcher to disclose specific information to each prospective subject" (Burns & Grove 2005: 193). The writers of this final project distributed a covering letter (Appendix 1.) with the questionnaires. The covering letter described the purpose of the study and the progression of the study. The anonymity of the participants and the fact that the answers could not be traced to any respondent was stressed. It was also explained that the collected information would be used only in this final project. The writers of this final project offered to answer any questions raised by the participants via email. Permission to carry out the survey was applied from the head nurse in charge at Helsinki University Central Hospital (HUCH).

According to Burns and Grove (2005: 194) "a noncoercive disclaimer is a statement that participation is voluntary and refusal to participate will involve no penalty or loss of benefits to which the subject is entitled." The covering letter distributed alongside the questionnaires did not include "a noncoercive disclaimer" but when the writers of this final project visited the ward they stressed that participation is voluntary and withdrawal from the study at any time is allowed.

8 Discussion

8.1 The methodology of the study

According to Burns and Grove (2005: 376-377, 398-400) developing an instrument and defining its validity requires expertise and years of work. The writers of this final project developed the questionnaire used in this study under a tight timetable, thus the questionnaire was pilot tested only once; Burns and Grove (2005: 331) state that multiple pilot tests are needed in order to refine and examine reliability, validity and usability of a measurement instrument. In retrospect, the questionnaire should have been tested once more after it was refined since it became evident that some of the questions remained ambiguous (questions 16 and 17). This may have affected the reliability of the answers.

The writers of this final project wanted to keep the questionnaire as simple as possible. Therefore, no background information about the participants was asked. The anonymity of the participants was considered to be pivotal, thus neither the pre-education nor the post-education questionnaires were numbered. Due to this, comparisons between the pre- and post-education questionnaires cannot be made.

The writers of this final project suggest that in future questionnaires similar to this study should be developed using more time and expertise. The questions should be refined more accurately in order to avoid ambiguousness. It would be beneficial to develop a way in which participants could be bind to answer the both pre- and post-education questionnaires without compromising their anonymity and autonomy, since "the response rate to questionnaires is generally lower than that with other forms of self-reporting" (Burns & Grove 2005: 401).

Since this is a final project with a tight timetable and limited resources, the educational intervention was agreed to concern only one ward with 26 nurses. This limited the amount of possible participants in the educational intervention and thus, had an effect on the results of this study.

8.2 The results of the study

The mean and median of the pre- and post-education questionnaires indicated that the knowledge level of the nurses working on the ward was high. The ward is specialized in treating neurological patients, thus the nurses are familiar with dysphagia patients. There is also a full-time pharmacist working on the ward able to guide and educate the nurses.

According to the results the nurses did not perceive pharmacotherapy as difficult and most of the nurses thought pharmacotherapy as interesting. Surprisingly, those who perceived pharmacotherapy to be difficult scored better than those who did not perceive it to be difficult. This could imply that the nurses who do not perceive pharmacotherapy to be difficult are not actually aware about all the factors contributing to safe pharmacotherapy, and might have unrealistic conceptions about their own abilities. The nurses that might benefit the most from the education might be

unaware of their need for education and therefore not participate. Thus, mandatory additional training concerning pharmacotherapy should be encouraged.

Contrary to previous study findings, the nurses that participated in our study were of the opinion that economic reasons or the time required to solve whether a medication can be crushed do not contribute to crushing medications. However, the nurses that participated in our study strongly felt that if a patient cannot swallow the medications it is essential that the medications are given even as crushed. This is in line with the findings of Barnes et al. (2006: 193-194) where the nurses provided the need to ensure that the medications are administered as one of the reasons for crushing tablets, even if they were not totally confident whether crushing was the right decision.

Based on the nurses' answers they knew how to crush medications hygienically. In this respect, the situation in this particular ward is better than the one described by Paradiso et al. (2002) where compromised hygiene created potential hazards for the patients.

The questionnaires surveyed the nurses' perceptions concerning whether or not crushing a medication is a medication error that needs to be reported in the HaiPro-system. The majority of the participants did not consider crushing a medication to be a medication error. Prevailing practices relating to the HaiPro-system vary from ward to ward.

The nurses perceived the education and the accompanying flow chart to be practical and useful. The flow chart was received enthusiastically and it was considered to be practical, useful, clear and necessary. All of the respondents (n=7) would like to continue using the flow chart in their work. Due to the tight timetable of this final project, the writers did not have the change to survey the nurses' opinions about the flow chart after longer use. The lecture was also thought to be necessary by most of the nurses that also considered that it increased their pharmacotherapy skills.

8.3 The educational intervention

The study question of this final project was: Will the educational intervention provided by a pharmacist influence the knowledge and skills of nurses administering medications to neurological dysphagia patients? Although the writers of this final project were unable to answer their study question, new information about the nurses' pharmacotherapy practices in the neurological ward was acquired.

8.4 Limitations and validity

There were several limitations with this study. The relatively small sample size in the post-education questionnaires rendered comparison between the pre- and post-education questionnaires virtually futile. In addition, the writers of this final project had no knowledge of who had answered in the pre-education questionnaire and who had answered in the post-education questionnaire – no link between the pre-education and post-education participants was established. Due to the small sample size in both pre- and post-education questionnaires, the results of this study cannot be generalized.

There was some inconsistency in the way the post-education questionnaires were distributed since the pharmacist did not distribute all of the questionnaires at the same time. Moreover, neither the writers of this final project nor the pharmacist supervised the completion of the questionnaires; it is not known whether the intended individuals filled out the questionnaires. Inconsistency in the distribution of the questionnaires and the possible response bias threaten the validity of this study.

To establish content validity, the initial questionnaire was reviewed by the pharmacist, one of the supervisors of this final project, a statistics teacher and a Finnish teacher. The questionnaire was also discussed and tested during the final project seminars. The finished questionnaire was reviewed once more by the pharmacist.

9 Conclusion

Due to the limitations of this study, the correlation between the educational intervention and the nurses' knowledge and skill levels are virtually non-existent. However, the results show a trend which suggests that an educational intervention

influences the skills and knowledge of nurses administering medications to dysphagia patients. The trend is parallel with the results from previous studies (Armutlu et al. 2008). Thus, regular and mandatory additional training concerning pharmacotherapy should be encouraged. Additionally, the use of practical tools - the flow chart for example - should be urged since their efficacy has been proven in previous studies as well (Jones 2009). Further studies regarding the influence of an educational intervention on the knowledge and skill levels of nurses administering medications are needed.

References

Aaltonen, L-M., Saarela, M., Jousimaa, J. Aherto, A. and Arkkila, P. (2009) Dysfagia – moniammatillinen haaste. *Duodecim* 125, 1535-1544.

Armutlu, M., Foley, M-L., Surette, J., Belzile, E. and McCusker, J. (2008) Survey of Nursing Perceptions of Medication Administration Practices, Perceived Sources of Errors and Reporting Behaviours. *Healthcare Quarterly* 11, 58-65.

Barnes, L., Cheek, J., Nation, R., Gilbert, A., Paradiso, L. and Ballantyne, A. (2006) Making sure the residents get their tablets: medication administration in care homes for older people. *Journal of Advanced Nursing* 56(2), 190–199.

Burns, N. and Grove, S. K. (2005) *The Practice of Nursing Research: Conduct, Critique and Utilization.* 5th ed. St.Luis: Elsevier.

Downie, G., Mackenzie, J., Williams, A., and Hind, C. (2008) *Pharmacology and Medicines Management for Nurses*. 4th ed. London: Churchill Livingstone.

Encyclopædia Britannica (2012) *Dysphagia*. Internet document. Updated 5.10.2012. <http://www.britannica.com/EBchecked/topic/175302/dysphagia> Read 5.10.2012.

Heikkilä, T. (2008) *Tilastollinen tutkimus*. 7th ed. Helsinki: Edita.

International Council of Nurses (2005) *The ICN Code of Ethics for Nurses*. Geneva: Imprimerie Fornara.

Jackson, L., Little, J., Kung, E., Williams, E., Siemiatkowska, K. and Plowman, S. (2008) Safe medication Swallowing in Dysphagia: A Collaborative Improvement Project. *Healthcare Quarterly Special issue* 11, 110-116.

Jones, S.W. (2009) Reducing medication administration errors in nursing practice. *Nursing Standard* 23 (50), 40-46.

Kelly, J. and Wright, D. (2009) Administering medication to adult patients with dysphagia. *Nursing Standard* 23 (29), 61-68.

Kelly, J. and Wright, D. (2010) Administering medication to adult patients with dysphagia: part two. *Nursing Standard* 24 (26), 61-68.

Kelly, J., D'Cruz, G. and Wright, D. (2009a) A Qualitative Study of the Problems Surrounding Medicine Administration to Patients with Dysphagia. *Dysphagia* 24, 49-56.

Kelly, J., D`Cruz, G. and Wright, D. (2009b) Patients with dysphagia: experiences of taking medication. Journal of Advanced Nursing 66 (1), 82-91.

Kirkevold, Ø. and Engedal, K. (2010) What is the matter with crushing pills and opening capsules? *International Journal of Nursing Practice* 16, 81–85.

Kirkevold, Ø. and Engedal, K. (2005) Concealment of drugs and food in beverages in nursing homes: cross sectional study. *BMJ* 330 (1), 20-22.

Laitinen, K., Ahonen, J. and Kröger, P. (2010) Voiko tabletin murskata tai lääkekapselin tyhjentää? *Suomen Lääkärilehti* 65 (9), 830-832.

LoBiondo-Wood, G. and Haber, J. (2006) *Nursing Research: Methods and Critical Appraisal for Evidence-based Practice*. 6th ed. St.Luis: Elsevier Mosby.

Ndosi, M. and Newell, R. (2007) Nurses' knowledge of pharmacology behind drugs they commonly administer*. Journal of Clinical Nursing* 18, 570-580.

Paradiso, L. M., Roughead, E. E., Gilbert, A. L., Cosh, D., Nation, R. L., Barnes, L., Cheek, J. and Batlaniyne, A. (2002) Crushing or altering medications: what's happening in residential aged-care facilities? *Australasian Journal on Ageing* 21 (3), 123-127.

Stakes (2006) *Potilas- ja lääkehoidon turvallisuussanasto*. Työpapereita 28/2006. Helsinki: Stakes.

The Ministry of Social Affairs and Health (2006) *Turvallinen lääkehoito - Valtakunnallinen opas lääkehoidon toteuttamisesta sosiaali- ja terveydenhuollossa* 2006.

Webster, C. and Anderson, D. (2002) A practical guide to the implementation of an effective incident reporting scheme to reduce medication error on the hospital ward. *International Journal of Nursing Practice* 8, 176-183.

Wright, D. (2002a) Medication administration in nursing homes. *Nursing Standard* 16 (42), 33-38.

Wright, D. (2002b) Swallowing difficulties protocol: medication administration. *Nursing Standard* 17, 43-45.

Covering letter

METROPOLIA AMMATTIKORKEAKOULU SAATE
Degree Programme in Nursing 19.9.2012

Hyvä sairaanhoitaja

Olemme sairaanhoitajaopiskelijoita Metropolia Ammattikorkeakoulusta ja opinnäytetyömme tutkimustehtävänä on selvittää osastofarmaseuttinne pitämän koulutuksen ja siihen yhdistetyn ohjekaavion onnistuneisuutta dysfagiapotilaan tablettimuotoisessa kipulääkehoidossa (Description of How NESD Influences the Skills and Knowledge of Nurses Administering Analgesic Tablets to Neurological Dysphagia Patients). Opinnäytetyömme tehdään osastollanne osastonne tarpeesta.

Projektimme koostuu kahdesta erillisestä kyselylomakkeesta, joista ensimmäisen täytätte tämän viikon aikana. Kysely on lyhyt ja siihen vastaamiseen kuluu aikaa noin 10 minuuttia. Osastofarmaseutti pitää koulutuksensa aiheeseen liittyen ensi viikolla. Koulutuksen jälkeen tuomme uudet kyselylomakkeet ja palautuslaatikon osastollenne. Teillä on koulutuksen jälkeen viikko aikaa täyttää lomakkeet.

Vastaaminen kyselylomakkeisiin tapahtuu nimettömänä eikä vastaajia voida tunnistaa. Vastauksia ei käytetä muihin tarkoituksiin kuin tähän opinnäytetyöhön.

Toivomme, että vastaatte parhaan kykynne mukaan kyselyihin ja olemme kiitollisia tärkeästä panoksestanne projektiimme!

Vastaamme mielellämme kysymyksiinne sähköpostitse!

Ystävällisin terveisin,

Anna Mantere
anna.mantere@metropolia.fi
Aino-Maria Oksanen
aino-maria.oksanen@metropolia.fi

Questionnaires 1 and 2

LOMAKE 1

Hyvä sairaanhoitaja, ohessa on 28 väittämää liittyen lääkemuotoihin sekä käytännön lääkehoitoon. Haluamme myös tietää mielipiteenne lääkehoidosta. Tutkimuksemme onnistumiselle on tärkeää, että pyrkisitte vastaamaan kaikkiin väittämiin mahdollisimman huolellisesti. Osa väittämistä on tarkoituksellisesti vääriä. Vastatkaa väittämiin laittamalla rasti ruutuun kohtaan **KYLLÄ** tai **EI**.

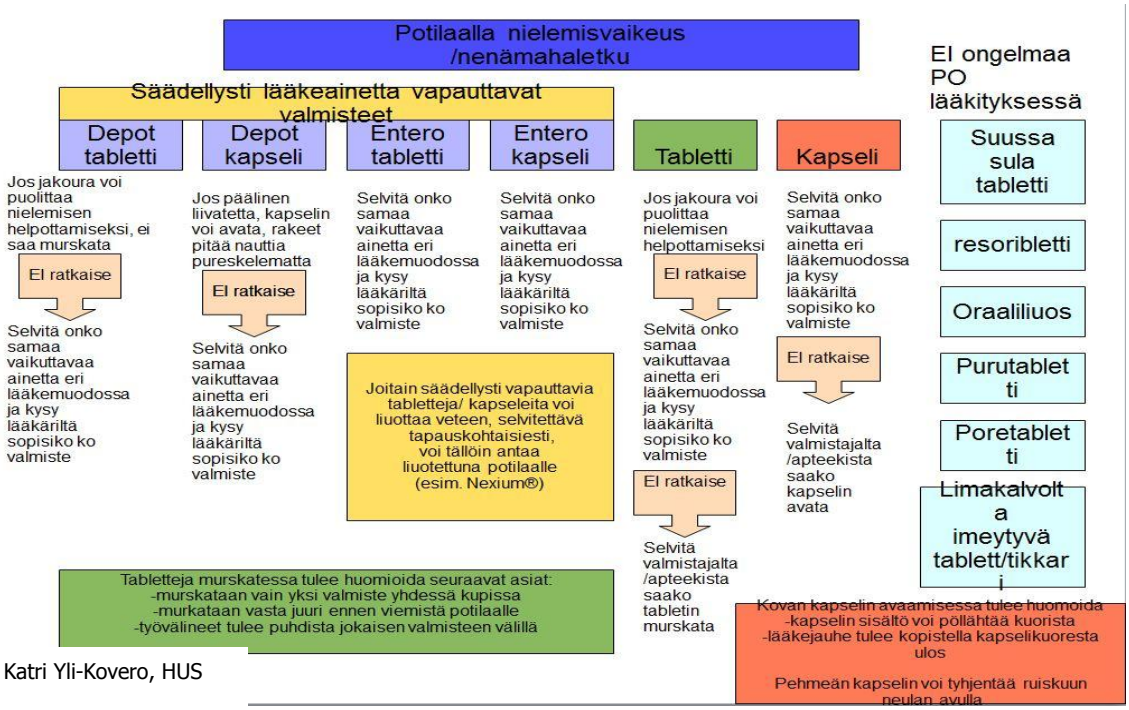
Kiitos osallistumisestanne!

	LÄÄKEMUODOT	**KYLLÄ**	**EI**
1	Kipulääketabletissa on jakouurre, joten tabletti voidaan murskata.		
2	Depot-valmisteet on suunniteltu siten, että vaikuttava aine vapautuu valmisteesta hitaasti, esim. OxyContin®		
3	Murskatusta tabletista vapautuvat aineet voivat ärsyttää ruoansulatuselimistöä.		
4	Tärkeintä on, että potilas saa lääkkeensä vaikka murskeena, jos lääkkeen nieleminen ei onnistu.		
5	Jotkin pehmeät kapselit voidaan tyhjentää neulalla, jolloin vain niiden sisältämä lääkeaine nautitaan.		
6	Joidenkin kapseleiden sisältämät kovat rakeet voidaan murskata.		
7	Enterokapselista lääkeaine vapautuu vasta ohutsuolessa.		
8	Sublinguaalisesta resorbletista lääkeaine vapautuu nopeasti kielen alle, esim. Nitro®		
9	Enterokalvolla päällystettyä tablettia ei saa halkaista, murskata tai pureskella.		
10	Hitaasti lääkeainetta vapauttavaa valmistetta voidaan kutsua myös retard-valmisteeksi.		
11	Depottabletin murskaaminen vaikuttaa lääkeaineen vapautumiseen.		

	KÄYTÄNNÖN LÄÄKEHOITO	KYLLÄ	EI
12	On taloudellisempaa murskata kipulääketabletti kuin käyttää nestemäistä lääkemuotoa.		
13	Potilaan kaikki lääkkeet voidaan murskata samalla murskaimella puhdistamatta sitä välillä.		
14	Lääkkeet lietetään heti, kun ne on jaettu tarjottimelle.		
15	Lääkkeet lietetään, kun ne viedään potilaalle.		
16	Nenämahaletku huuhdotaan, kun kaikki lääkkeet on annettu.		
17	Nenämahaletku huuhdotaan jokaisen lääkkeen jälkeen.		
18	Depotabletin voi liuottaa.		
19	Enterotabletin voi liuottaa.		
20	Potilaan kaikki lääkkeet voidaan murskata samaan lääkelasiin.		
21	Potilaan kaikki lääkkeet murskataan jokainen lääke erikseen erillisiin lääkelaseihin.		
22	Depottabletit sisältävät suuremman määrän vaikuttavaa ainetta kuin tavalliset tabletit.		
	MIELIPIDE LÄÄKEHOIDOSTA	**KYLLÄ**	**EI**
23	Lääkehoito on vaikeaa.		
24	Lääkehoito on mielenkiintoista.		
25	Lääkkeen murskaaminen on lääkityspoikkeama, joka tulisi raportoida HaiPro-järjestelmään.		
26	Yksittäisen lääkkeen murskaamiskelpoisuuden selvittämiseen kuluu liian paljon aikaa.		
27	Lääkehoidon osaamisen säännöllinen testaaminen on tärkeää.		
28	Lääkehoidon osaamisen ylläpidossa on tärkeää saada säännöllistä lisäkoulutusta.		

(Only in questionnaire 2)

Osastollanne on ollut kokeilussa seuraavanlainen ohjekaavio.



Seuraavassa kysymme mielipidettäsi ohjekaaviosta ja farmaseutin pitämästä koulutuksesta.

	MIELIPIDE OHJEKAAVIOSTA JA KOULUTUKSESTA	KYLLÄ	EI
29	Olen käyttänyt ohjekaaviota apuna työssäni lääkkeitä jakaessani.		
30	Ohjekaavio on mielestäni käytännöllinen.		
31	Ohjekaavio on mielestäni hyödyllinen.		
32	Ohjekaavio on mielestäni selkeä.		
33	Ohjekaavio on mielestäni tarpeellinen.		
34	Haluaisin jatkossakin käyttää ohjekaaviota.		
35	Koulutus oli mielestäni hyödyllinen.		
36	Koulutus oli mielestäni käytännöllinen.		
37	Koulutus oli mielestäni tarpeellinen.		
38	Koulutus lisäsi lääkehoidon työskentelytaitojani.		

Educational intervention – the flow chart