

The impact on nurse digestive system caused by working the night shift  
A qualitative research

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Abstract <p>The specific of nursing job requires working around the clock. But the human is meant to work during the day not at night. Suchwise, a large number of nurses are working at night that is contrary to the biological rhythms.</p> <p>The aim of the thesis was to investigate the impact of night shift on nurse digestive system. By interviewing health care workers the goal was to find out, do they experience gastrointestinal symptoms caused by rotating night shifts. In addition the aim was to determine from nurse experiences, are there methods to reduce the negative impact of night shifts. The purpose was to provide information that can be used to minimize problems with digestive system of nurses who are working on night shifts.</p> <p>The study was completed through qualitative research. The data was collected by semi-structured individual interview. Five nurses were interviewed, all of them had at least two years of night shift work experience. The data was retained by note-taking method and analyzed by inductive content analysis.</p> <p>The study found that nurses are experiencing gastrointestinal symptoms such as bloating and flatulence, also constipation and abdominal pain. Investigated were also that physical activity and good rest in combination with a proper diet are main methods to avoid digestive problems associated with work night shifts.</p>		
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# 1 Introduction

Shift work and irregular working hours have increased in society, but the human has not changed much. The body functions follow a regular diurnal variation, where between different rhythms are specific timing and relation. The aim is to work during the day, not at night. Everyone adapts to shift work in their own way, but it still affects everyone's biological rhythm and sleep. (Partinen & Huovinen 2011, 90.)

As reported by Partinen (2012), in Finland about 25 per cent of employed are doing shift work or are following a very irregular working hours. In Europe and North America nearly 20 per cent of working population is doing shift work (McCluskey 2013). However shift work is offering some benefits to a worker, such as increased leisure time and financial compensation (Vuorotyö ja terveys [Shift work and health] 2014).

Since nurses are a big part of healthcare workers, where specific of work is to provide vital services around the clock, the night shift is an integral part of their work. Thus, nurses are among the most common representatives of shift workers and are exposed to the hazards of working nights. (Caruso 2012.)

According to Partinen (2012), night shift general disadvantages are tiredness, difficulties in falling asleep, intermittent night sleep and short daily sleep, especially after a night shift. Most likely, symptoms of depression may be related to shift work, during the year, about a third shift workers have suffered from symptoms of depression for more than five months. Also level of vigorous in early morning hours in all people is low, which is accompanied by a number of occupational accidents, traffic accidents and various types of error performance is clearly higher compared to day shifts.

The aim of the thesis was to investigate the impact of night shift on nurse digestive system. By interviewing health care workers the goal was to find out, do they experience gastrointestinal symptoms caused by rotating night shifts? In addition the aim was to determine from nurse experiences, are there methods to reduce the negative impact of night shifts. The purpose was to provide

information that can be used to minimize problems with digestive system of nurses who are working on night shifts.

## **2 Circadian rhythms and digestive system**

In the brain, above the optic chiasma, where the left and right optic nerves cross path is located the suprachiasmatic nucleus which is circadian rhythm regulator. It is unlikely to be a central clock, because the brain has thousands of nerve bundles that participate in a biological clock tuning, but, for example, the rhythms of hormone secretion are directed through this nucleus. Biological clock is not any particular place in the brain, but it is a mutual operational relationship of interacting neural networks. A nucleus suprachiasmatic is located in the hypothalamus, which nerve cells regulates all functions of the body, and also takes part in the formation of emotions. A suprachiasmatic nucleus generates a signal that results in a pronounced 24 h oscillation. (Hyypä & Kronholm 1998, 89.)

Circadian rhythms are "invented" by nature, to adapt the body to the alternation of light and dark time of the day, and therefore are directly related to the perception of the light. Information of the day light enters the suprachiasmatic nucleus through the light-sensitive membrane (retina) of the eye. Light information from the photoreceptors of the retina - rods and cones, through ends of ganglion cells is transmitted to the suprachiasmatic nucleus. Ganglion cells not only transmit information in the form of nerve impulses, they synthesize photosensitive enzyme - melanopsin. Therefore, even in circumstances when the rods and cones are not functioning (e.g., in congenital blindness), these cells are able to perceive the light information and send it to the suprachiasmatic nucleus. (Grinevich 2005.)

A major aftermath of contemporary life is disruption of circadian rhythms, leading to a number of pathological conditions, including sleep disturbances and depression. Studies have investigated circadian- clock cancer connection in shift workers who are more likely to have disrupted circadian cycles. Studies in mice, where disruption of circadian rhythms was provoked by exposure to light showed accelerated growth of malignant tumors. Also studies show that

breast and prostate cancer increases significantly among night shift workers. In addition prognosis of cancer is poorer in patients with disrupted circadian rhythms. (Palandino, Leone, Casiraghi, Agostino, Golombek & Chiesa 2010, 126.)

According to Dobberstein (2014) the suprachiasmatic nucleus has an important role in digestive system because it controls gut circadian rhythm as well as sensation of hunger and satiety. The digestive tract rhythm - peristalsis which is the involuntary movement that pushes food thru the digestive tract is highly dependent upon gut circadian rhythms. Furthermore circadian rhythms affect gut motility, gastric acid secretion, maintenance and restoration of the protective mucosal barrier, production of digestive enzymes, nutrient transport in the small intestine, and the immunologic system of the gut. Numerous research showed that there is a link between circadian rhythm disruptions caused by shift work with gastrointestinal diseases.

Hakola and colleagues (2007) have stated that the body`s circadian rhythms adapts for a night working, when the night shifts are consecutive. Adaptation may be disturbed by weekends following after night shifts, when the worker returns to a day rhythm of life. Suchwise adhering at least partially the rhythm of night work during days off may promote a better adaptation for shift work. As well as exposure to a morning light, while traveling back home after a night shift may have a negative effect; sunglasses may be used to reduce the effect of exposure to the light. Moreover it may be possible to improve adaptation with exposure to a bright light at night time and avoiding it at morning hours. (125-128.)

### **3 The Night shift impact on digestive system and recommendations to minimize it**

Related studies have been performed before; between 2007 and 2009 was carried out the study - The Impact of Rotating Shift Work on the Prevalence of Irritable Bowel Syndrome (IBS) in Nurses. The study was implemented in United States of America by gastroenterology doctors worked in University of Michigan. The aim of the study was to determine whether disruption of biolog-

ical rhythms through the participation in shift work was associated functional bowel disorders. To the final analysis of the research were included 399 nurses, who were divided into 3 groups- 1) nurses working permanent day shifts 2) nurses working permanent night shifts 3) nurses rotating between day and night shifts. As a result rotating shift nurses had a significantly higher prevalence of IBS compared to day shift nurses. Prevalence of functional constipation and functional diarrhea was similar between groups. Rotating shift nurses had a significantly higher prevalence of abdominal pain compared to day shift and night shift workers. Authors of the study concluded that, participation in shift work, especially rotating shift work is associated with the development of irritable bowel syndrome and abdominal pain that is independent of sleep quality. Circadian rhythm disturbances may have a function in the pathogenesis of irritable bowel syndrome and abdominal pain. (Nojkov, Rubenstein, Chey & Hoogerwerf 2010.)

Another research was implemented in 2010 in Sweden; where was used literature review method. The topic name was- Gastrointestinal (GI) disorders among shift workers. The aim was to review published literature on the association between shift work and gastrointestinal disorders. Authors used PubMed, where they searched studies published between 1966 and 2009. As well as previous research authors, in conclusion authors state that shift workers appear to have increased risk of GI symptoms and peptic ulcer diseases.(Knutsson & Boggild 2010.)

According to Helasti (2008), at least half of the workers who carry out work at night are experiencing heartburn, abdominal pain and flatulence. He states that symptoms occur due to gastrointestinal daily rhythm: at night bowel function slows down, the digestive enzymes excretion is decreased and absorption of food is difficult. Moreover duodenal ulcer in men doing shift work is five times more common if compared to day workers.

### **Recommendations for minimizing the impact of night shifts**

Sindel (2009) claims that doctors recommend that those faced with night shift duties concentrate on two specific concerns—diet and sleep. On the other hand, Knauth and Hornberger (2003) emphasizes that there is no specific

prescriptions for promoting a good quality sleep and every shift worker has to find an individual solution from various recommendations. Recommendations to improve sleep after the night shift include: heavy curtains to make room as dark as possible, ensuring greatest possible silence by sound insulation and switching off phones and other devices, rules in family to avoid noisy activities while shift worker is sleeping, using an air conditioner. Informing friends, neighbors and relatives about sleep times and moving to live in quieter area may also help to maintain better sleep. (113.)

There are many tips for shift workers to avoid development of digestive problems. It is recommended to have a light meal at midnight during a night shift and a snack rich in protein rather than carbohydrates around 03.00-04.00 h. It is advised to avoid large and fatty meals during a night shift. Importance of a regular eating routine of three meals per day is also highlighted. (ibid., 113-114.)

Scholar (2010) advises for improving the quality of consumed food during a night shift to plan and pack meals and snacks every week. He finds that frozen meals are good option but emphasizes if buying meals from shops, attention should be paid to nutrition and ingredients lists to be sure that the sodium and sugars are appropriate for the serving level. He claims that night shift menu is based on 1,600-1,800 kilocalories per day but advises to consult nutrition expert to determine individual needs. (138-139.)

According to Hakola, Hublin, Härmä, Kandolin, Laitinen and Sallinen (2007) to avoid heartburn is advisable to replace the foods that can cause it, as coffee, onions, paprika, apples also fatty and savory foods. For example an apple can be replaced by banana, paprika by tomato and coffee should be consumed with food. The flatulence may be caused by swallowing air while eating, consuming a chewing gum, some of foods as fresh rye bread or pea soup, lactose-intolerance or constipation. In case of lactose intolerance suspicion, low lactose dairy products may be an option, as well as reducing a portion of normal milk or replacing it by sour milk. In the prevention of constipation fiber and liquid rich diet, physical activity and the regularity of meals are very important. (135.)

Hakola and colleagues have stated that the fear of eating at night causes digestive problems is often caused by one-sided and poor diet. However regular and various food in small quantities helps to maintain alertness during the night shift. (Hakola et al. 2007, 136.)

Contrary, Lowden, Moreno, Holmbäck, Lennernäs and Philip (2010) questioned the need for making dietary recommendations for shift workers, stating that there is no evidence, of food consumption need during a night shift. In addition they stated that there is lack of definitive evidence what should be eaten or avoided during a night shift. Moreover nutritious and palatable foods may be hardly accessible during a night shift. Finally, eating at night might improve wellbeing but at the same time deteriorate metabolism. (150.)

## **4 Wellbeing at work**

Occupational wellbeing is an integrity which is consisting of the work and its meaningfulness, health, safety and wellbeing. A good and motivating management, workplace environment and professional skills of workers are increasing wellbeing at work. Occupational wellbeing among other things improves coping at work. When the welfare increases, productivity and commitment to the work grows and the number of absences due to illness decreases. Promotion of work wellbeing belongs to both employers and workers. Ensuring the safety at workplace, good management and equal treatment of workers belongs to the employer. However, the worker has a great responsibility of maintaining own work ability and professional competence. (Wellbeing at work 2014.)

Working hours are affecting worker's welfare and health, functional ability and possibility to combine working and personal life. From perspective of work output working time solutions have an impact on productivity of work and worker's wellbeing. (Työaika [working hours] 2015.) Coping at work can be supported by developing shift work systems; there are proven shift work systems which have positive results. For example an experiment, where shift working system was changed to a fast-forward rotating shift work (2 morning, 2 evening, two night shifts, 4 days off), resulted a positive experience in form

of decreased sleep disorders and improved alertness. Another experiment where workers could influence on planning work schedule, facilitated combination of working and private life which brought more time to do sports. (Esi-merkkejä hyvistä työaikaratkaisista [Examples of good working time solutions] 2014.)

According to Lagerstedt (2008) shift work important factors are speed and direction of rotation as well as special cases. She recommends: consecutive night shifts two or three maximum, claiming that it will reduce falling asleep difficulties, to concentrate night shifts in one period if they are less than other shifts which may help in combination of working and private life. Is advised that night shift should end as early as possible and shorter night shifts should be deliberated which may provide a longer sleep time at nights. She believes that long term health hazards will be reduced if avoiding continuous night work.

## **5 Aim, Purpose, and Research Questions of the study**

The aim of the thesis was to investigate the impact of night shift on nurse digestive system. By interviewing health care workers the goal was to find out, do they experience gastrointestinal symptoms caused by rotating night shifts. In addition the aim was to determine from nurse experiences, are there methods to reduce the negative impact of night shifts. The purpose was to provide information that can be used to minimize problems with digestive system of nurses who are working on night shifts. In order to meet the aim and purpose of the study, the following research questions were set:

- 1) Does the night shift work impact nurse's digestive system, in the form of gastrointestinal symptoms?
- 2) What do nurses do to reduce the impact of night shift on their digestive system?

## **6 Method of implementation**

### **6.1 Qualitative research**

The aim of the thesis was to investigate the impact of night shift on nurse digestive system and what do they do to reduce the impact, suchwise the questions of this research are how and what. The optimal research method to answer those questions is qualitative research method.

Absolute advantage of qualitative method to use in this study was that, qualitative methods are not focused on the massive collection of data, but to achieve a deeper understanding of the phenomena being investigated. Lack of formalization in qualitative research makes impossible to subjects massive coverage, whereby the number of inspection units was reduced to a minimum. Rejection of a large number of study units was compensated by the depth of the research that is a detailed study of the phenomenon in its entirety and direct relationship with other phenomena. (Belanovski 2010, 6.)

According to Pitkäranta (2010) the idea of qualitative research is to understand, interpret and create a descriptive model of the study subject. This requires a conceptual framework, frame of reference through which the subject can be perceived and reviewed. Qualitative research may consist from a multi-channel data collection approach. It includes interviews, observations, the researcher's own notes, authentic documents; etc. Qualitative research is tied to the situation and unique. Understanding the context, how the study phenomenon is related to its environment is essential for further interpretation. It allows the analysis to be connected to broader social and cultural contexts. (20-21.)

### **6.2 Recruitment of participants**

The target was to interview practical and registered nurses who are rotating night shifts or working only in night shifts on a permanent basis. Thus the main criteria for selection was – working in night shifts, and to obtain more reliable information, it was found that the participants should have working experience of not less than one year.

The snowball sampling method was used to select research participants. According to Katz (2006,4) snowball sampling is a special nonprobability method for developing a research sample where existing study subjects recruit future subjects from among their acquaintances. For this study, the author found first two participants among own acquaintances, following three participants were sampled by snowball sampling method. Thus, in this study were involved five participants, three of them were practical nurses and two registered nurses. Minimum work experience in night shift among the participants was 2 years, maximum 13 years, on average interviewees had 8 years' experience of working in night shifts. Three of participants are doing rotating shift work and two are working only in night shifts.

All interviews took place during June and July 2015 and were arranged with participants in Finland and in Estonia. With each of the participants, the author contacted by phone and time and place of the meeting was agreed.

### **6.3 Data collection the individual interview**

The individual interview was used as a qualitative research method. According to Pitkäranta (2010, 80), the interview is optimal to find out people's views, experience, beliefs and motivation of the phenomenon. An interview is a conversation, having the structure and purpose. Interviewing can mean from the daily conversation between the two partners, and ending with a thorough round of questions and answers for a specific purpose to test the theories and knowledge. Interviewing has a big advantage over other data collection methods it is flexibility, the possibility to adjust data collection to situation and respondents. (Mitendorf 2010.)

The semi-structured thematic interviews were performed. It means that questions for all participants were the same, but interviewees had to answer questions in own words, there were no ready-made answers. According to Honkasaari and Ikonen ( 2002, 18-20) this method is missing accurate format and order, thereby the interviewer has to ensure accurately that theme areas are covered during the interview without attaching great importance to the order of questions.

Interviews were conducted in two countries, three in Finland and two in Estonia. With each participant an individual meeting was organized. Before starting an interview the information of research letter was given to the participant to familiarize with the purpose of the study. (See appendix 1.) After when the participant read the information of research and had no questions concerning the research and information confidentiality both parties signed a consent form. (See appendix 2.)

The main communicative language in Finland was Finnish language, in Estonia communicative language was Russian. Each participant was asked two key questions: 1) Have you ever been experiencing, gastrointestinal symptoms associated to work the night shift such as indigestion, disturbed appetite, nausea, bloating, flatulence, stomach upset and constipation? And 2) Do you use any methods to reduce the impact of night shifts on the digestive system? (See appendix 3.) Questions have been pre-translated into Finnish and Russian languages.

During interviews the data was collected by note-taking method. According to Tessier (2012) note-taking method's main advantage is that it allows to record initial thoughts, additionally it is simple, fast and cheap. She divides note taking method into two stages. First is writing down data while interview, which gathers information on context, nonverbal cues, and situational background. Second stages is shortly after the interview, which is more interpretive, summarizing and contains the researcher's impressions. (448-452.)

The author made notes in language in which the interview was done, in order to preserve the thoughts of participants and not to lose the idea during an immediate translation. The length of each interview was between 25 and 45 minutes.

## **6.4 Data analysis**

Inductive content analysis method was used to condense extensive and varied text obtained during the interviews into a brief summary format and to establish clear links between the research objectives and the summary findings. This method is frequently used in health and social science research and is

appropriate to use in analyzing data collected during interviews. (Thomas 2003.)

The main feature of the inductive content analysis method is that conceptual description is based on the concrete material. The first stage in inductive content analysis is reduction of the conducted material, formation of analysis units - terms. The second stage is grouping of material, compounding terms with the same meaning into one category. The final stage is abstraction of material, forming upper level categories from categories with the same content. (Janhonen & Nikkonen 2001, 24-29.)

According to Metsämuuronen (2006) before the actual analysis of the data, materials conducted for qualitative research, must be in such form that the analysis is possible to perform. In general, notes and interviews are transcribed. It is also possible to transcribe only parts of data, which are important in study reporting. (122.)

In this study, transcription of interview notes was done immediately after an interview to save the information as best as possible. The raw data was transcribed into written form in word program, first in interview language, after transcribed data was translated into English language. Four complete pages of transcribed data were the result of processing notes of interviews.

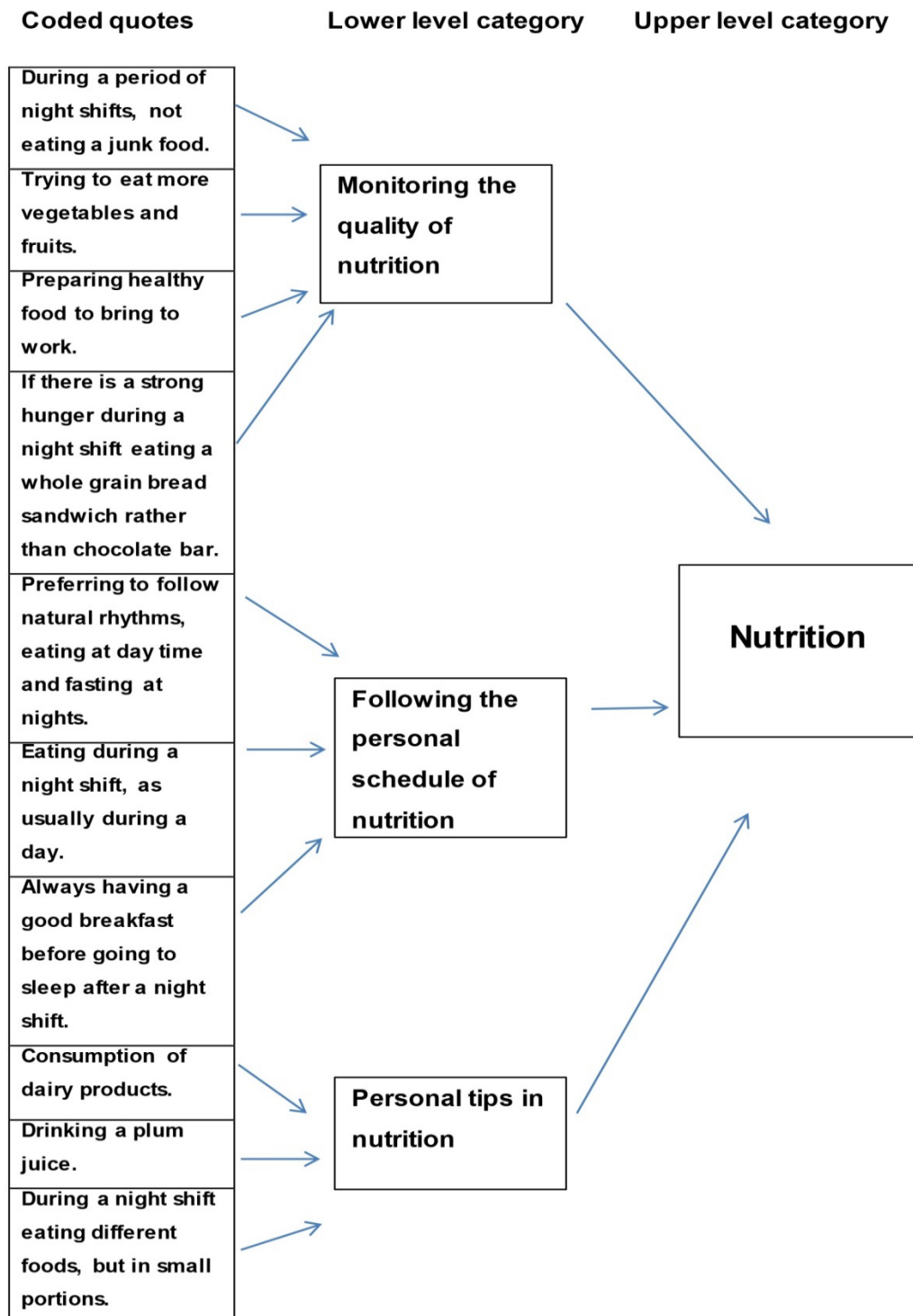
As stated by Janhonen and Nikkonen (2001) setting the unit of analysis before starting of a process is an essential task too in both deductive and inductive content analyzes. Data and aims of the research affect the selection of analysis unit. The most common units of analysis are word, sentence, the part of sentence, the idea or combination of words. (25-26.)

As the aims of the thesis were to find out -how night shifts impact on nurses' digestive system and what do nurses do to reduce the impact of night shift on their digestive system, the most appropriate unit of analysis in this case was the sentence. Since use of word or combination of words, were not sufficient units of analysis and the idea may not be the unit of analysis, it does not fit within the meaning of the study.

As the aims of the thesis consist of two parts, the author analyzed collected data in two phases. The data concerning information of the impact of night shifts on digestive system was analyzed first. Secondly the author analyzed the information of nurses' methods reducing the impact of night shifts on digestive system.

The process of analysis was divided in several parts. Author started with data reduction. Transcribed data was carefully read several times and continued to highlighting answers based on research questions. Useful quotes were marked and inserted into the word table. Thus the author got reduced data subjected to further analysis stage. The next stage was development of categories. The author was looking for differences and similarities in meanings of quotes; quotes with the same meaning were combined to categories assigned with descriptive name. Suchwise were created lower level categories. The final stage of analysis was an abstraction stage, lower level categories with the same content were combined into upper level categories. Once the whole data has been streamlined, the author proceeded to describe the results of the study. An example of analysis process is included below. (See table 1.)

Table 1. The sample of inductive content analysis.



In the Table 1 is shown a part of analysis. Highlighted quotes from the transcript, with similar meaning were combined into categories and assigned with descriptive name, thus lower level categories were formed. After lower level categories with accordance of meaning were combined into upper level categories.

## **7 Results**

### **7.1 The impact of night shift on digestive system**

Experiences of the impact of night shift on digestive system in the form of gastrointestinal symptoms were different between study participants. Nurses expressed experience of gastrointestinal symptoms presence as well as complete absence of them. In cases when participants were not experiencing the negative impact on digestive system, was emphasized the importance of healthy lifestyle. Bloating and flatulence were reported symptoms, which nurses experience directly during the night shift. Abdominal pain and constipation were expressed symptoms, which cause discomfort after the night shift.

According to the study participants, being awake at night impact the digestive system. Nurses reported that they heard from colleagues, complains of gastrointestinal symptoms presence, and highlighted the fact that usually young colleagues are more susceptible. By nurse opinions, colleagues with extensive experience in night shift work, are less susceptible to symptoms occurrence. However the study participants emphasized the occurrence of gastrointestinal symptoms with the quality, quantity and the time of food intake.

### **7.2 Methods reducing the impact of night shifts**

As a result of the research, individually matched **nutrition** is a major method among participants to reduce the impact of night shifts on digestive system. Nurses are thoroughly monitoring the quality of consumed food. Refraining from oily and junk food and consuming more vegetables and fruits during a period of night shifts according to the participants, is an effective preventive method. Nurses prefer drinking plenty fluids, especially pure water during a night shift, considering it as a preventive method.

Each participant has some individual aspects in nutrition, helping to avoid gastrointestinal symptoms. It was reported that eating and drinking dairy products during a night shift reduces gastrointestinal symptoms. Drinking a plum juice during a night shift was reported as a method to avoid constipation. Additionally was reported that eating different foods without any specific variety limitations but in small portions during a night is good for digestive system.

Nurses highlighted that it is important to follow a personal nutrition schedule. By opinion of one nurse it is necessary to have complete nutrition consisting of three meals during a night shift, since the activity takes place at night and at day time is a need to sleep and rest. Another participant has an opposite opinion, believes that it is necessary to take food at the day time and prefers to abstain from eating at night completely, considering it as a key point of own welfare during a night shift.

**Physical activity** was mentioned by participants as an important element of welfare. Nurses prefer to have different kind of physical activities at their free time. Male participants prefer to have gym activities and seasonal sports such as skiing in winter time or rowing a boat in the summer. Female participants prefer aerobic group exercises, jogging or running and cycling. Opinions in this aspect in all participants agreed, each participant reported that physical activity helps to eliminate the problems of the digestive system. Alternatively they give preference to bike to work rather going by car or by bus.

Separately, it was emphasized that physical activity directly during a night shift helps to reduce the occurrence of digestive problems. Additionally was reported that with changing a work place from passive to active specific of work during a night shift, gastrointestinal symptoms were disappeared.

Also, research participants believe that changing body posture during the night shift helps to relieve gastrointestinal symptoms. As a method to relieve abdominal pain, was suggested to lie down on stomach for some time, if there is an opportunity to do it. It was also noted that while working with computer for a long time without changing posture, bloating may occur and to prevent it is good to walk around or stand for some time.

By opinion of research participants having a good **rest** after and prior the night shift is an important part of methods to avoid digestive problems. As was reported the basis of good rest is sleeping long enough, duration of needed sleep varies among participants, in average needed period for sleeping is six hours. Nurses highlighted that having a breakfast after a night shift helps to have a good sleep. Also nurses are avoiding drinking a coffee after the midnight during a night shift, they find that it helps to fall asleep better in the morning. Having a hot shower prior going to the bed helps to relax and get rid from unpleasant feelings in the stomach.

## **8 Discussion**

### **8.1 Discussion on the results**

The aim of the thesis was to investigate the impact of night shift on nurse digestive system. By interviewing health care workers the goal was to find out, do they experience gastrointestinal symptoms caused by rotating night shifts. In addition the aim was to determine are there methods to reduce the negative impact of night shifts. The purpose was to provide information that can be used to minimize problems with digestive system of nurses who are working on night shifts.

As a result of the study nurses experience of impact on digestive problems differed. This confirms the statement of Partinen and Huovinen (2011, 90) that everyone adapts to shift work in their own way. Some nurses reported that they do not experienced digestive symptoms caused by working night shifts. At the same time, they emphasized that their lifestyle promotes avoiding problems of the digestive system. It is impossible to ignore the fact that nurses reported absence of gastrointestinal symptoms, have significantly higher working experience than the rest of the study participants. This can be considered as approve of explanation which is done by Hakola and colleagues (2007, 125-128) that the body's circadian rhythms adapts for a night working, when the night shifts are consecutive. In its turn, this of explanation can be more likely applied to only one case, where the nurse works on a permanent basis only in night shifts.

Participants of the study reported experiencing some of gastrointestinal symptoms caused by work night shifts. Nurses mentioned experiencing in prevalence bloating and flatulence during a night shift, also constipation and abdominal pain that usually occurs after a night shift. Result agrees with the results obtained in related study. Nojkov and colleagues (2010) stated as a result of their research that circadian rhythm disturbances caused by shift work, may have a function in the pathogenesis of irritable bowel syndrome and abdominal pain. Similar results also appeared in the research performed by Boggild and Knutsson (2010) stated that shift workers occur to have increased risk of GI symptoms and peptic ulcer diseases.

Reported methods for avoiding the negative impact of night shift, had individual differences, but in overall the emphasis was done on common aspects. The opinion of interviewees partially agreed with the opinion of Sindel (2009) who claimed, relied on recommendations of doctors that those faced with night shift duties should concentrate on two specific concerns—diet and sleep. All of the study participants mentioned the importance of diet on welfare and moreover used consumption of certain foods as a digestive problems preventive method. Most of the participants reported, as well as advises Sindel (2009, 113), prefer to avoid large and fatty meals during a night shift.

Sleep was mentioned by nurses as an important component of welfare, but special methods to provide better sleep were not reported. Participants emphasized only importance of sleeping long enough. None of participants reported using a special methods to improve the quality of sleep such as heavy curtains, sound isolation, switching phones and other devices and etcetera as was suggested by Knauth and Hornberger (2003).

More attention by nurses is paid to physical activity. According to participants, problems with the digestive system often arise because of a lack of physical activity. Despite the fact that shift works creates limitations for physical training, all participants of the study reported having an active life style. Contrary, Atkinson, Fulljck, Grindey, Maclaren and Waterhouse (2008) stated that night workers have problems with implementation and maintenance of an active lifestyle.

## **8.2 Ethical considerations**

According to Hesse- Biber and Leavy (2011) a consideration of ethics needs to be a critical part of the substructure of the research process from the inception of the problem to the interpretation and publishing of the research findings. Participants in the study must be informed about the type of the research project and the researcher must obtain their consent prior to their participation in the study.(59-63.)

In this study participants were informed of the nature of research by informed consent letter prior the interview. The letter of information included: the topic, the aim, the purpose and data collection method of research. (See appendix1.) In addition it contained information of confidentiality and voluntary participation in this study. After the participants read and familiarized themselves with the information, a consent form was signed by both parties. (See appendix 2.)

Ruusuvuori, Nikander and Hyvärinen (2010) stressed the importance of ethical handling of materials in practice. They advised to remove identification information from the data, after interview materials were converted to plain text for the analysis. As a direct identifiers, were stated the name of the interviewee, accurate contact information and date of birth. They claimed that interviews often include indirect identifiers, such as place of residence, place of work, gender and educational background. (452.)

In this study during interviews data was collected by hand written notes and did not include names or other direct identification information throughout the study. The indirect identification information was removed while transcription of interview data. All hand written notes were destroyed after the transcription was done and participants were informed that it will be done.

## **8.3 Credibility, dependability and transferability**

The first major aspects that should be paid attention to, when it comes to credibility are: focus of the study, selection of context, participants and method of data collection. Credibility of research findings also deals with how well categories and themes cover the data; one way to approach this, is to show repre-

sentative quotations from the transcribed text. (Graneheim & Lundman 2003, 110.)

The study had direct focus on digestive system problems caused by circadian rhythm disturbances caused due to work night shifts. In addition study focuses on methods what can be used to avoid the negative impact caused.

Participants for this research were chosen considering they experience work in night shifts. Since the goal was to gain experience of the nurses, participants had long enough night shift working experience; minimum work experience among participants was 2 years and maximum 13 years. When the interviews were performed, all respondents were currently doing rotating shift work or night shift work.

Individual thematic semi-structured interviews were used as data collection method. This provided more in-depth information as well as the ability to monitor non-verbal information. Collected data were analyzed using an inductive content analysis. In purpose to add credibility to the study and show representative quotations from the transcribed text, the table which includes one part of data analysis is added to this study.

According to Graneheim and Lundman (2003), dependability is an important part of trustworthiness of the study. Dependability indicates how well the collected information in its origin was preserved throughout the study. Moreover stressed is the importance of maintaining the focus of the study. (110.) In this study in order not to lose the sense of obtaining information in the course of the interview, records were made in the language that was used during the interview. Moreover the transcription of interview notes was done immediately after an interview to save the information as best as possible. To maintain accurate focus of the study all study participants were asked the same questions.

Graneheim and Lundman (2003, 110) stated that to facilitate transferability of the study is needed to describe culture and context, selection and characteristics of participants, data collection and process of analysis. All parts of this study are clearly described. The method of the study and method of data col-

lection is stated; furthermore objective description of why a certain method is used is enabled. The study also includes an accurate description of the selection and characteristics of participants. The process of analysis is defined in details and an example is inserted in to the study.

## **9 Limitations and recommendations for further studies**

As a main limitation of this study is certainly is that the researcher was only one. According to Anderson (2010), researcher skills, personal biases and peculiarity influence heavily research quality. Thus the quality of the research could be improved with the participation of several researchers or more.

Moreover participants of this study had a diverse specific of shift work. Three study participants work on a permanent basis in three shifts. Therefore they have to constantly adapt to different time and in connection with this circadian rhythms disruption is more likely to occur. Two interviewees work only night shifts. In this regard, it can be assumed that their bodies are more adapted to work in night shifts. During the research process the author came to the realization that it would be more appropriate to include into the study participants with same type of shift work. Therefore the recommendation for further studies is to include into study participants with the same specific of shift work.

As participants in the study were only five, they were not separated into age groups. But during interviews was received information that young colleagues often have complains of gastrointestinal symptoms. Thus it can be assumed that young nurses are experiencing a greater impact on the digestive system. Recommendation for further researchers is to pay more attention to age of participant, as impact of night shift may differ between age groups.

However this study has provided information of the impact caused by night shift work and what do nurses do to reduce the impact. Information gathered within this research may provide useful information for nurses and nursing students, how to reduce the impact on digestive system, caused by work night shifts. The results of this study can be also used as a base for further studies.

This research is reflecting on the experiences of the impact on digestive system of nurses caused by circadian rhythm disturbances. Those interested in the topic could further study the impact of night shift on different body systems. Also further researchers would gather more information in preventive methods of night shift work negative impact.

## **10 Conclusion**

The aim of the thesis was to investigate the impact of night shift on nurse digestive system. By interviewing health care workers the goal was to find out, do they experience gastrointestinal symptoms caused by rotating night shifts. In addition the aim was to determine are there methods to reduce the negative impact of night shifts. The purpose was to provide information that can be used to minimize problems with digestive system of nurses who are working on night shifts. The qualitative research was held and semi-structured individual interviews were performed as data collection method.

The study found that working the night shift has an impact on digestive system of nurses. The nurses revealed that they experienced bloating and flatulence during a night shift and also constipation and abdominal pain caused discomfort. On the other hand, not all participants were experiencing gastrointestinal symptoms associated with work night shift.

The general consensus, however was that properly chosen diet helps to prevent the occurrence of symptoms. Moreover the nurses stressed that physical activity and good rest in combination with a proper diet are main methods to avoid digestive problems associated with work night shifts.

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## Appendix -1 Information of Research

Dear participant,

Please read this carefully and ask any questions you may have before agreeing to take part in this study. The topic of this research is -The impact on nurse digestive system caused by working the night shift. The aim of the thesis is to investigate the impact of night shift on nurse digestive system. By interviewing health care workers the goal was to find out, do they experience gastrointestinal symptoms caused by rotating night shifts? In addition the aim was to determine from nurse experiences, are there methods to reduce the negative impact of night shifts. The purpose was to provide information that can be used to minimize problems with digestive system of nurses who are working on night shifts

You will have an individual interview, during which a researcher will ask questions concerning your own experience working in night shift. During the interview the researcher will use note-taking method to collect the information. After transcription, the row papers of note will be properly destroyed.

Your participation is completely voluntary and you are free to withdraw at any time of interview. There is no specific risk to participate in this research. Collected data will be available only for researcher and will be used for the purpose of this research. You will receive a copy of this form and your confidentiality and anonymity is guaranteed.

If you have any questions, please feel free to contact the researcher:

## Appendix 2 – Consent form

I have read the information above and have received answers to any questions I had. I consent to take part in this research.

Signature of participant \_\_\_\_\_ Date \_\_\_\_\_

Signature of researcher \_\_\_\_\_ Date \_\_\_\_\_

## Appendix 3- Interview questions

### Background information

- What working night shift experience do you have?
  - How many night shifts do you have per week?
- 
- 1) Have you ever been experiencing, gastrointestinal symptoms associated to work the night shift such as indigestion, disturbed appetite, nausea, bloating, flatulence, stomach upset and constipation?
  - 2) Had any of your colleagues complained about having gastrointestinal symptoms associated to work the night shift?
  - 3) Do you use any methods to reduce the impact of night shifts on the digestive system?