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NURSING INTERVENTIONS IN PALLIATIVE CARE FOR LUNG CANCER PATIENTS

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BACHELOR'S THESIS | ABSTRACT

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Cancer is the leading cause of death globally and lung cancer accounts for about 12% of all cancers. A double increase in cancer incident has been predicted by 2030 arising the need for improved nurses' skill in cancer management and for palliative care. This study was carried out with the purpose of describe knowledge required in palliative care for lung cancer patients with the main aim of evaluating nursing students' competence for lung cancer palliative care.

The method used in this thesis work was literature review. Data search were conducted basically with PubMed, CINAHL, Elsevier Science direct databases. Articles were selected using inclusion and exclusion criteria. A total of 9 articles that met the inclusion criteria were selected and reviewed.

The result of the literature review indicated that with good knowledge of lung cancer and it's manifesting symptoms, the following competences are needed to improve patient quality of life and possible survival. They include symptom assessment and management, patient education, interdisciplinary care, coordination of care, communication and supportive skills.

KEYWORDS:

Nursing interventions, Palliative care, Lung cancer, essential knowledge, Nursing competences, Competence evaluation tool.

TURUN AMMATTIKORKEAKOULU

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HOITOTYÖN TOIMINNOT KEUHKOSYÖPÄPOTILAIDEN PALLIATIIVISESSA HOIDOSSA

Syöpä on johtava syy kuolema maailmanlaajuisesti ja keuhkosyöpä tilit noin 12% kaikista syövistä. American Cancer Society ennustaa, että syövän esiintyvyys tuplaantuu vuoteen 2030 mennessä. Tämän vuoksi sairaanhoitajalta vaaditaan lisääntyvissä määrin taitoja palliatiivisen keuhkosyöpäpotilaan hoidon toteuttamiseen. Tämän työn tavoitteena on arvioida sairaanhoitajien ja sairaanhoitajaopiskelijoiden pätevyyttä hoitaa palliatiivista keuhkosyöpäpotilasta.

Opinnäytetyö on toteutettu tutkien kirjallisuutta käyttäen systemaattista lähestymistapaa. Tietoa on haettu PubMed, CINAHL, Elsevier Science direct tietokannoista. Artikkeleiden valinnassa pyrittiin rajaamaan pois asiaan liittymättömät artikkelit, ja hyväksyttiin sisällöltään merkitykselliset. Yhteensä 9 artikkelia täytti sisällölliset vaatimukset, ja ne valittiin tähän työhön.

Kirjallisuuden tutkimisen seurauksena todettiin, että mikäli tietoa keuhkosyövästä ja sen oireista on riittävästi, seuraavia taitoja vaaditaan, jotta voitaisiin edistää potilaan elämänlaatua sekä mahdollista parantumista: oireiden arvio ja hoito, potilaan ohjaaminen, moniammatillinen hoito, hoidon koordinointi, kommunikaatio sekä potilasta tukevat taidot.

Avainsanat:

Hoitotyön toiminnot, Palliatiivinen hoito, Keuhkosyöpä, Olonnainen tieto, Hoitajalta vaadittavat taidot, Työväline taitojen arviointiin.

ABSTRACT

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1 INTRODUCTION

According to the world Health Organization, cancer is the world second leading cause of death and accounts for an estimate of 9.6 million death in 2018 (WHO, 2018).

Cancer, a disease that has globally attracted the attention of people from all walks of life and one that brings the thought of death to mind when mentioned. It is a malignant tumor, growth of abnormal cells in the body due to factors like gene, exposure to carcinogenic compounds. It affects various organs in the body depending on the part that is exposed to cancer-causing agents.

Lung cancers are cancers affecting the lungs and it's underlying organs. It usually starts in the cells lining the bronchi and parts of the lungs like the bronchioles or alveoli (American Cancer Society). It accounts for 12% of all cancers (Farbicka, Nowicki 2013). It is more prevalent in men than in women, though women have more survival rate than men according to the Finnish cancer registry in 2017 (www.cancerregistry.fi).

There has been reported 1710 new cases of lung cancer in men, 1035 in women in 2018 and also, 1473 death in men, and 812 death in women in the same year (Finnish cancer registry 2018).

Although exposure to occupational, environmental hazard, domestic biomass fuel, pulmonary conditions, genetic factors predisposes one to developing lung cancer, oftentimes, tobacco or cigarette smoking has been identified as the major cause of lung cancer (Barta, Powell et al. 2019).

Lung cancer has poor prognosis as a result of late diagnosis as about 50% of cases of lung cancer are diagnosed at the advanced stage (Farbicka, Nowicki 2013), with 5 years maximum life expectancy or less depending on dissemination of the disease (EBMG: Knuuttila, A. 2018).

Aggressive symptom management and support to lung cancer patients are the main goal of care to improve quality of life as lung cancer, like every other cancer, has the possibility of reoccurrence after survival (Ferrell, Koczywas et al. 2011). A gap has been identified in the approach of management of lung cancer related symptoms like

breathlessness, fatigue and anxiety occurring as a result of therapies used in palliative care interventions like radiotherapy, chemical and surgical therapies, and so on (Chan, Richardson et al. 2011).

Nurses are at the center of lung cancer patients' care pathway and are expected to have a grounded knowledge of lung cancer and related treatments in executing their role in lung cancer care (McPhillips, Evans et al. 2015). Furthermore, the American Cancer Society predicted an increase in the burden of cancer and need for palliative care is expected to double by the year 2030 and thereby arising the need for improved nurses' skill in cancer management and for palliative care (Walker, Edwards et al. 2017).
The purpose of this study is to identify required knowledge in lung cancer palliative care, as well as competences and measures to evaluate them.

2 LUNG CANCER

2.1 Risk factors for lung cancer

Lung cancer like every other disease is not without factors predisposing one to getting the disease. Knowledge of risk factor helps in preventing a disease or limiting exposure to it though some risk factors cannot be prevented like genetic factors.

A risk factor ''is a trait or characteristic that is associated with a statistically significant increased likelihood of developing a disease''. Risk factors do not predict who will certainly have a disease but rather who has an increased chance of developing the disease and it is vital in prevention and early detection of disease (Eggert 2009).

Risk factors for lung cancer can be either modifiable or non-modifiable. Tobacco smoking 80%, passive or secondhand smoking, exposure to radon (radioactive gas from breakdown of uranium in soil or rocks), exposure to asbestos such as in use of insulation like in mine, textile plant, mills and shipyards, and high level of arsenics in drinking water are modifiable risk factors. Other factors like previous radiation therapy to the lungs, air pollution (slight risk), and family history of lung cancer (genetic factor) relates to non-modifiable risk factors (American Cancer Society web page).

Lifestyle change plays an important role in the prevention or management of lung cancer especially cessation of smoking which is a common cause of lung cancer as smoking habit in combination with exposure to other carcinogenic compounds, and family history of lung cancer increases ones risk of getting lung cancer. Also avoiding exposure to passive smoking and other modifiable risk factors help prevent lung cancer.

2.2 Classifications of lung cancer

Lung cancer is classified based on the type of lung cells affected and can be either Non-small cell lung cancer (NSCLC) and Small cell lung cancer (SCLC) (Latimer, Mott 2015). Non-small cell lung cancers (NSCLC) accounts for about 75% of lung cancer and has subgroups (adenocarcinoma (50%), squamous cell carcinoma (30-40%), and large cell anaplastic carcinoma 5%), while small cell lung cancer (SCLC) contributes about 20% of lung cancer (EBMG: Knuuttila, A. 2018). It is further grouped, by the American Joint Committee on Cancer (AJCC), into stages; stage I, II, II and IV, especially for NSCLC, based on tumor size, spread to nearby lymph nodes, and metastases (American Cancer Society).

2.3 Signs and symptoms of lung cancer

Patients with lung cancer experience various symptoms depending on the stage of the disease, severity or damage to body tissues. Most common symptoms are dyspnea, cough, hemoptysis, weight loss, fatigue, and anorexia (Latimer, Mott 2015), in metastasis bone pain, jaundice, swelling of neck lymph node, changes in nervous system including weakness, headache, numbness of arm or leg, balance problems or seizures (American Cancer society, 2019).

2.4 Treatments methods for lung cancer

Generally, treatment for lung cancer depends on the cell type involve, non-small cell or small cell, stage of the cancer; tumor size, the lymph node affected and whether or not the cancer has metastasized to other organs in the body (TNM), and comorbidity or overall health condition of the patient which affects treatment possibilities (EBMG: Knuuttila, A. 2018).

Survival rate of lung cancer has been linked to surgical treatment which is the primary treatment for stage I and II of the disease and a follow-up treatment with adjuvant platinum-based chemotherapy especially for stage II non-small cell lung cancer. There is reduced survival rate for stage III due to late diagnosis, and is treated with radiotherapy, chemotherapy and surgical resection depending on tumor location and if resectable. Treatment options for stage IV non-small cell lung cancer may include palliative external radiation therapy, combination chemotherapy and targeted therapy, and laser therapy. Other treatment strategies for non-small cell lung cancer are made to improve cancer-related symptoms, and increase survival and may include maintenance therapy, targeted therapy, immunotherapy and palliative symptom relief (Lemjabbar-Alaoui et al., 2015).

Small cell lung cancer could be treated with a combination of chemotherapy and radiotherapy, combination chemotherapy, surgery with chemotherapy or chemoradiotherapy, prophylactic cranial irradiation, targeted therapy, and immunotherapy (Lemjabbar-Alaoui et al., 2015).

3 PALLIATIVE CARE

Lung cancer patients like other cancer patients go through difficult life experience as a result of their deteriorating health caused by the disease, not just physical symptoms from overwhelming burden of the disease, but also emotional and social challenges due to physical changes and the stigma of having the disease from the society, friends or even loved ones. Therefore, treatments and care strategies that could alleviate patients physical, psychological and social distress should be the treatment point for improved quality of life and, or possible survival from the disease.

Palliative care is an approach of care intended for patients with life-threatening disease(s) for improved quality of life of patients and their family members through early recognition, proper assessment and treatment of pain, as well as other physical, psychosocial and spiritual factors related to the illness (World Health Organization). Non-disclosure of prognostic information, patient misunderstanding of disclosed information affects patient's decision on treatment choice and has led to unrealistic expectations of treatment outcome and as such consideration of individual need is recommended in relating disease prognostic information (Ghandourh 2016). Nursing ethical conducts demands patient-oriented approach to care where the patient not only receive deserved care but also participate in decision concerning care approach. Effective palliative care treatment has been linked to effective symptoms management therapies that outweighs the adverse effects (EBMG: Janes, R. 2018), while considering patient's health condition and care preferences (Farbicka, Nowicki 2013).

Palliative care procedures include surgery, chemotherapy, radiotherapy and symptom management. Surgical palliative procedures have been found useful in patients with airway obstruction, pericardial exudate, brain or bone metastases, and hemoptysis. Palliative chemotherapy has been noted to lead to adverse effects like neutropenia which predisposing patient to viral, bacteria, and fungal infections and

possibly death and therefore caution has been advised in that line of palliative treatment. There has been evidence to the use of palliative radiotherapy as linked to reduction of symptoms in upto 41-95% cases in treating airway obstruction, narrow airways and metastases to the central nervous system or bone (Farbicka, Nowicki 2013).

Early initiation of palliative care not only helps to improve quality of life, but also alleviates coexisting symptoms and requires less aggressive treatment (Farbicka, Nowicki 2013). Anorexia is a well-known common symptom associated with lung cancer and could be lead to loss of weight, fatique and deficiencies that could worsen patient's already existing condition. A combination of appetite stimulant (megestrol acetate – MA), and olanzepine has been reportedly helpful in treating anorexia (Lemjabbar-Alaoui et al., 2015).

4 NURSING INTERVENTIONS AND COMPETENCES IN LUNG CANCER PALLIATIVE CARE

According to the medical dictionary online (Farex & Partner 2009), nursing interventions involves the use of an approach of the nursing process which includes assessment, nursing diagnosis, planning, implementing, and evaluating patient's care.

The nurse plays a role in communicating, educating, offering emotional, physical and psychological support in patient's care. The nurse also coordinates care between different specialists in a multidisciplinary team involved in lung cancer treatment from diagnostic, treatment, and follow-up stages. There is need to educate cancer patients on palliative care and more effort to encourage greater access to palliative has been suggested (Feld M. et al. 2019).

The nurse plays counseling and advising role to the patient, encourages smoke cessation as smoking reduces the effects of treatment, and increases side effects. It also cause complications with healing, increases risk of developing further primary tumor, reduces overall quality of life and survival rate. The nurse also encourage the patient to use pharmacotherapy agents like nicotine replacement therapy (NRT); nicotine formulations like nicotine gum, lozenge, transdermal nicotine patches, nicotine nasal spray and nicotine oral inhaler; sustained release bupropion, and varenicline for smoke cessation. The nurse also informs the patients and their relatives about the disease, prognosis and treatment options as well as offer emotional or physical support to patient when needed (Lemjabbar-Alaoui et al., 2015).

Good communication skill, and a complete knowledge of lung cancer and treatments related to it and the course of treatment has been stated as competences required for lung cancer palliative care (McPhillips, Evans et al. 2015). The nurse needs to be a good communicator, relating diagnostic information and breaking of bad news to the patients and their relatives. Educating skills, another important competency the nurse needs to be equipped with. Oftentimes lung cancer patients lack basic knowledge of their diseases as well as the adverse effects of treatment and this can result in wrong

treatment choice and unrealistic expectations of treatment outcome. Patient-oriented approach in relating prognostic information and treatment options have been advised and results in good care outcome and patient satisfaction (Ghandourh 2016). The nurse also educates the patient on the use of prescribed medications, explains common adverse effects to be expected. With assessment skills, the nurse assesses the patient, make necessary and quick diagnosis and carry out appropriate interventions for treatment of symptoms or patient's complaints.

5 PURPOSE, AIM AND THE RESEARCH QUESTION(S)

The purpose of this research is to identify the knowledge needed in exercising the nurses' role in palliative care for lung cancer patients for improved care outcome.

The aim is to evaluate nurses'competency. Continuous rise in the incidence of lung cancer calls for need for good care outcome by health care providers and consequently need for evaluation of required competences in delivering of lung cancer palliative care in order improve quality of life and survival rate. This will help nurses and nursing students re-examine, as well as validate their knowledge in lung cancer nursing.

The research questions are ;

(1) What are the essential knowledge nurses need in palliative care for lung cancer patient?

(2) What are the competences required in the execution of nurse role in palliative care for lung cancer?

(3) What are ways (tools) of measuring nursing competences for lung cancer palliative care?

6 THE RESEARCH METHOD

6.1 Literature Review

The research method used in this work was literature review. According to Hart, C. (2018), literature review is the use of existing knowledge in a research work, analyzing, critically evaluating and synthesizing them based on relevance to a research problem. In this method, already existing research works on a particular subject or field are collected, organized and critically analyzed with an intent of answering already formulated question(s). This method is useful in that it helps update knowledge on a particular field of study as a result of integrating the findings of original research works in an attempt to answer ones research question. On the other hand, use of already existing research work not undertaken systematically and biased can undermine the results of a review (Snyder, H. 2019). In this sense, it is pertinent that the researcher critically examine a study's method for evidence of a systematic research approach had resulted to the findings.

6.2 Data Collection

Data used in this work were based on existing literature gotten from the school databases. PubMed, CINAHL, Elsevier Science Direct, and Terveysportti were the databases used for article search in this work. Original research articles were sourced. ''Nursing interventions'', ''palliative care'', ''lung cancer'', ''essential knowledge'', ''nursing competences'', and ''competence evaluation tool'' were keywords used for articles searches. Articles between years 2011-2020 were used. Different hits results were gotton from the three databases used. Articles were choosen based on how they are related to the topic, and research question and are also full text articles. In other words, inclusion and excliusion criteria applied to the selection of articles.

Inclusion and exclusion criteria also applied in the selection of articles and those articles that met the inclusion criteria were selected. The inclusion criteria are articles related to the topic, which answer the research questions, written in English language, published between years 2011-2020, with free full access and original research work. The exclusion criteria are not meeting the inclusion criteria as shown in table 2 below.

Table 1. Data collection table with search term, filter, databases, and search results

KEYWORDS/ SEARCH TERM	FILTER	DATABASE	HITS	CHOSEN BY TOPIC	CHOSEN BY ABSTRACT	CHOSEN BY FULL ARTICLE
´´NURSING INTERVENTIONS´´ OR ´´NURSE ROLE´´ AND ´´PALLIATIVE CARE´´ OR ´´SYMPTOM MANAGEMENT´´ AND ´´LUNG CANCER´´ AND ´´ESSENTIAL KNOWLEDGE´´ AND ´´NURSING COMPETENCE´´ OR ´´NURSING SKILLS´´ AND ´´COMPETENCE EVALUATION TOOL´´	RESEARCH ARTICLES 2011 – 2020 Free full text English language	ELSEVIER SCIENCE DIRECT	6,620	**5**	0	**5**
		PUBMED	3600	3	0	3
		CINAHL (EBSCO)	966	1	0	1

Table 2. The inclusion and exclusion criteria

INCLUSION CRITERIA	EXCLUSION CRITERIA
Articles related to research topic	Articles not related to the topic
Articles answer research questions	Articles that does not answer the research questions
Research articles	Review articles
Articles published between years 2011-2020	Articles published before 2011
Free full text articles	Articles that are not free or, that are abstract
Articles written in English language	Articles not written in English

6.3 Data Analysis

Data analysis is a very important aspect of every research work or study without which a research will make no meaning and no results derived. Manifest content analysis was used in analyzing data. According to Bengtsson, M. (2016), in content analysis, a large volume of data are analyzed in a systematic way, resulting to a condensed meaning of the information content of the data while still retaining the actual meaning. In other words, content analysis follows a systemic way of coding and categorizing data with contextual similarity, and interpreting the results. Manifest content analysis contrary to latent content analysis conveys the literal meaning of data observable to the researcher. It portrays the contextual meaning of information contained in a data without deviating from the actual meaning of the text. Latent content analysis on the other hand discovers and interprets deep or implied meaning within a text. Table 3 below shows details of article analysis, purpose of study, sample size, data collection method, findings, and study's limitation(s).

Table 3. Data Analysis

TITLE	AUTHOR (S) AND YEAR OF PUBLICATION	THE PURPOSE OF THE STUDY	THE SAMPLE	DATA COLLECTION METHOD	FINDINGS	LIMITATIONS
Managing Symptoms in Patients with Advanced Lung Cancer During Radiotherapy: Result of a Psychoeducational Randomized Controlled Trial	Chan W.H.et al. 2011	Examine the effectiveness of a psychoeducational intervention on symptom cluster of anxiety, breathlessness, and fatique.	N= 140	Randomized, controlled trial	Correlation between symptoms of breathlessness, fatique and anxiety were found, psychoeducational intervention help to understand symptom causes, pattern and management, and improved functional ability through self-care	Participants were not blinded to the study. There were missing data as a result of death of participants postintervention
Trajectories of Symptom Occurrence and Severity From Before Through Five Months After Lung Cancer Surgery	Oksholm et al. 2015	Evaluate changes, predictors and the pathway in symptom occurrence and severity from preoperative to five months postoperative period.	N= 264	Cross sectional study	Assessment of symptom occurrence and severity help to identify patients at high risk of intense symptom and aggressive palliative intervention is to be used to	Factor like time frame of the study may have influenced patient's ratings of symptom occurrence and severity. Also impact of symptoms on functional status

					manage symptoms	were not evaluated.
Interdisciplinary Palliative Care for Patients With Lung Cancer	Ferrel et al. 2015	Test the effectiveness of an interdisciplinary palliative care intervention for patients with stage I-IV Non-small cell lung cancer	N= 491	Quasi-experimental study	Early and concurrent palliative care improved quality of life, reduce symptoms and distress and is in line with the American Society of Clinical Oncology (ASCO) recommendations	There were no specific components of the intervention resulting in outcome
A Structured Nursing Intervention to Address Oral Chemotherapy Adherence in Patients with Non-small Cell Lung cancer	Boucher et al. 2015	Evaluate the effect of educational intervention on medication knowledge and adherence	N= 30	Feasibility study	Education provided by health care providers impacted on patient knowledge of erlotinib medication, handling, adherence, and managing side effects	The research population was small

Lung cancer treatment rates and the role of lung cancer nurse specialist: a qualitative study	Tod et al. 2015	Examine lung cancer nurse specialist role and possibility of improved role	N= 4	Case study	Lung cancer nurse is at the center of a multidisciplinary team, maintains a holistic patient focused, and unwavering support to patient on care pathway	The study was small
In-hospital physiotherapy improves physical activity level after lung cancer surgery: a randomized controlled trial	Jonsson et al. 2019	Effects of physiotherapy on postoperative in-hospital physical activity level and physical capacity	N= 94	Single-blind Randomized contrlloed trial	In-hospital physiotherapy improved patient level of activity in the first day after surgery	There were no preoperative assessment of physical activity due to short notice before patient's arrival. Also some data on six-minute-walk-test were missing as a result of early discharge or patient inability to perform test
Tai Chi Exercise for Cancer-Related Fatique	Zhang et al. 2016	Effectiveness of Tai chi exercise for cancer-related	N= 96	Randomized controlled trial	Tai chi exercise helps to decrease general and	Study time was short and as such could not

in Patients With Lung cancer Undergoing chemotherapy: A Randomized Controlled Trial		fatique in patients with lung cancer undergoing chemotherapy			physical fatique associated with lung cancer and also increases strength.	determine long-term effect of the intervention
Effectiveness of the Certificate Course in Essentials of Palliative Care Program on the Knowledge in Palliative Care among the Participants: A Cross-sectional Inetrventional study	Sushma Bhatnagar & Anuradha Patel	Evaluate the effectiveness of the certificate course in essentials of palliative care (CCEPC) program on the knowledge in palliative care among the participants	N= 29	Cross-sectional study	Certificate course in essentials of palliative care helps to improve knowledge on palliative care and consequently improve patient quality of life.	The study population was small with only two nurses and could limit applicability to nurses
Psychometric properties of self-assessment clinical competency questionnaire in baccalaureate nursing students	Nehir et al. 2018	Validate self-assessment clinical competence questionnaire of undergraduate nursing students.	N= 300	Cross-sectional study	Self-assessment questionnaire tool is a reliable and valid assessment tool for measuring clinical competences of nursing students.	Possibility of sampling bias exist with the use of convience sampling method. Did not take the psychological aspect of care

7 RESULTS

Lung cancer patients experience a lot of symptoms at the same time and their effects often overlap and undermines their functional abilities (Chan et al, 2011). Though surgical treatment of lung cancer followed by adjuvant chemotherapy as intervention in early stage of the disease increases survival rate, they exacerbate already existing symptoms of pain, fatique, shortness of breath or dyspnea, drowsy feeling, anxiety, cough, difficulty sleeping or insomnia, but tend to improve over time (Oksholm et al, 2015). It is important that the nurse who is at the center of lung cancer patient care in a multidisciplinary team (Tod et al, 2015), understand not just the treatment pathway of the disease, but also the causal effects of the treatment procedure, ways of tackling them for better treatment outcome and improved quality of life.

The study revealed evidence of competencies needed in execution of lung cancer palliative care treatment with the understanding of the disease and it's manifesting symptoms, and a way to evaluate competency. The outcome are grouped into the following themes: (i) assessment of symptoms occurrence, (ii) symptom management, (iii) patient education, (iv) interdisciplinary care, (v) physical therapy (two articles related to physical therapy intervention were grouped into this theme, (vi) Cordination of care, (vii) evaluation of nurse's knowledge and (viii) competence assessment.

I. Assessment of symptom occurrence:- According to the study by (Oksholm et al, 2015), symptoms experienced by lung cancer patients were evaluated for changes in occurrence and severity from before surgical procedure upto five months postoperative and are influenced by factors like age, gender, comorbidity and receipt of adjuvant chemotherapy. Changes in the most common symptoms of pain, lack of energy or fatique, shortness of breath or dyspnea, drowsy feeling, worrying or anxiety, cough, and difficulty sleeping or insomnia were observed.

Younger patients who has comorbid conditions and are receiving chemotherapy were observed to experience pain before and a month after surgery, and tend to subsequently decrease afterwards though the severity remained unchanged over time. Lack of energy (fatique), was influenced only by receipt of chemotherapy and having comorbidities Patients who are receiving chemotherapy, and/or have comorbid conditions were observed to experience shortness of breath, fatique, worrying, insomnia, with drowsy feeling, and pain more in younger patients before and after surgery, and persisted over time with the exception of insomnia and worrying which decreased over time and are more in female than male patients.

Severity of pain in younger than older patients are observed to be due to differences in treatment, changes in biological processes like perception of symptoms (Cataldo et al, 2013 in Oksholm et al, 2015). Also receipt of neoadjuvant chemotherapy relates to 2.5- to 4.2-fold increase in the occurrence and severity of pain, fatique, drowsy feeling, insomnia, and cough especially in advanced stage of the disease. Knowledge of the assessment of the occurrence and severity of symptoms helped health care providers to identify patients who are at high risk of experiencing particular symptoms and the severity before and after lung cancer surgery and aggressive palliative care interventions followed.

II. Symptom management:- Care during chemotherapy and radiotherapy is an important aspect of symptom management in palliative care. Radiotherapy is used to reduce endobronchial lesions of lung cancer, but it's effects leaves the patient with severe and health undermining side effects especially breathlessness, fatique and anxiety. Managing these symptoms as a cluster would breed more effective outcome (Chan et al, 2011).

Study by Chan et al., 2011 on 140 lung cancer patients using a 40-minute educational intervention and coaching on progressive muscle relaxation delivered a week before and three weeks after commencing radiotherapy examined the effectiveness of treating fatique, breathlessness and anxiety as a cluster. Predicting factors were illness-related

knowledge, understanding of symptoms, clarification of misconceptions, enhance control over illness, and promotion of self-care. The intervention was led by a nurse research assistant who clarified the causes of symptoms experienced by lung cancer patients and offered coping strategies for self-management of symptoms.

Based on the intervention, it was proven that managing the symptoms of breathlessness, fatique, and anxiety as a cluster resulted in significant relief of symptoms and improved patient's functional ability. Symptom-cluster strategy was commended as a contemporary measure for effective and efficient cancer and palliative care. Coping strategies were also identified and includes, moke cessation, relaxation exercise, nutritious diet, getting enough sleep, support group, meditation, dealing with frightening thoughts, and good ventilation (Chan et al, 2011).The authors reported that no previous research has been carried out on the impact of a psychoeducational intervention on the severity of the symptoms as a cluster.

III. Patient Education: A good number lung cancer patients are adults or aged, and as a result, the issue of adherence to oral chemotherapy and monitoring of adverse effects arises. As such, nurses has the duty to assess and identify patients in such category and appriopriate interventions are to be offered. Boucher et al. (2015) noted adherence as the main challenge to the efficacy of oral chemotherapy palliative care intervention and is related to poor administration, insufficient monitoring and adverse effect.

In their study, (Boucher et al., 2015) conducted to evaluate the outcome of a nurse-led intervention to promote medication knowledge and adherence, a sample of 27 lung cancer patient receiving oral chemo agent erlotinib were studied. An educational session was provided using the Multinational Association for Supportive Care in Cancer Oral agent Teaching Tool (MOATT) and accompanied with a 72-hour telephone follow-up on learning outcome and to identify issues related to procurement of the medication, administration and experience of side effects. (Boucher et al, 2015). As it was indicated that Improper self-administration results in reduced efficacy of treatment and increased

toxicity (Hartigan, 2003; Maloney & Kagan, 2011; Partridge et al, 2002; Rudy et al., 2009; wood, 2012 in Boucher et al., 2015), education provided by health care providers impacted on patient knowledge of chemotherapy medication, handling, adherence, and managing side effects and is in congruence to findings reported by Weingart et al. (2011).

IV. Interdisciplinary care:- In interdisciplinary care, holistic care, medical, physical, psychological, social, and spiritual care are provided by the interdisciplinary team (IDT) as a curative or life-prolonging measures and often times it not only improve quality of life, but also increases survival from the disease (Ferrel et al., 2015). According to a quasi-experimental study conducted by (Ferrel et al., 2015), the effectiveness of an interdisciplinary palliative care for patients with stages I-IV Non-small cell lung cancer (NSCLC) was tested in 491 patients. Baseline assessment on quality of life, symptoms, and psychological distress; patient-assessed-quality of life presentation to the interdisciplinary team; and four educational sessions regarding physical, psychological, social, and spiritual aspect of quality of life interventions were carried out. Questionnaires were used to collect data at baseline and 12-week**.** An interdisciplinary team (IDT) consisting of nurses, palliative medicine physicians, thoracic surgeons, medical oncologists, geriatric oncologist, pulmonologist, social worker, chaplain, dietitian, and physiotherapist offered various care interventions to patients in the intervention group. This resulted in a significant improvement in symptoms, distress and quality of life as predicted care outcome and was in congruent with studies by Bakitas et al. (2009), and Temel et al. (2010).

V. Physical therapy:- Surgical resection has been noted as the first-line curative treatment for non-small cell lung cancer with limited physical activity as a common after effect of the intervention which could be related to change in respiratory mechanism, pain, and dyspnea (Jonsson et al., 2019). The effectiveness of physiotherapy in improving in-hospital physical activity after surgery was proven in a study conducted by

Jonsson et al. (2019) on 94 lung cancer patient who went through elective thoracic surgery.

Physical therapy included six-minute walk test (6MWT), range of motion exercise (shoulder elevation and flexion or thoracic rotation), and breathing exercise (taking deep breath). The six-minute walk test is a well-known test for assessing functional capacity and is used in different circumstances like to measure surgical patient's physical capacity. Patients walked as far as they could in six minutes with or without walking aid and distance they were able to cover was measured. The participants received training intervention on the admission day and the fourth day after surgery. Also coughing techniques was taught to reduce pain**.** Patients in the treatment group reported more physical activities as they had more strength than those in the control group. No other studies had reportedly conducted an intervention on the effect of in-hospital physiotherapy on physical activity with control group according to the authors of the study.

In another study Zhang et al. (2015) proved the effect of Tai Chi exercise as a nonpharmacological intervention for cancer related fatique in 96 lung cancer patients receiving chemotherapy at six and twelve weeks.

Tai Chi is a Chinese traditional low-to-moderate intensity physical exercise which aid health promotion (Zhang et al., 2015). The participants were grouped into Tai Chi group and control group (had low-impact exercise). Tai Chi group practiced the eight-form easy Tai chi as taught by an experienced Tai Chi instructors and instructional DVD and includes raising hands to shoulder level, curving back arms, sideways step while moving arms, hand movements, diagonal strides, standing on one leg, pushing while stepping, both hands to the side, and left leg drawn to the right leg and at the same time focusing on coordinated movement and regulated breathing. The participants also performed a 5-10 minutes warm up exercise before the intervention. Arm, neck, and leg circles, and the stretching of the upper and lower body muscle together with deep abdominal breathing were practiced by the low-impact group.

Patients were assessed before receiving first session of chemotherapy, before the third, and also at the end of the fourth session of chemotherapy**.** Patients in the intervention group showed significant decrease in general and physical fatique and more strength as indicated by lower multidimensional fatique symptom inventory-short form (MFSI-SF) total score (between 0.83 and 0.92) compared with controlled group, and higher vigor subscale of $p < 0.05$. The MFSI-SF is a known reliable tool for assessing fatique.

VI. Coordination of care:- The nurse has been identified to be at the center of lung cancer treatment pathaway and areas of impact on treatment noted (Tod et al.,2015). In a case study carried out by Tod et al. (2015), the lung cancer nurse specialist role was examined in 4 nurses working in four different hospitals, the nurse unique involvement which extends to not just the routine clinical activities, but also understanding of patient and their lives in a social context, how lung cancer diagnosis affect their life was discovered. This positively influenced treatment as the nurse knows the right time and way to give information concerning the disease, and discuss treatment headway.

In fatiqued patient, nurse's assessment relates fatique to appetite loss and improving appetite reliefs symptom, introduction of steroid help boost fitness needed for anticancer treatment. Also the nurse's listening and counselling skills was identified to provide much needed emotional and psychological support, promote coping mechanism, self-esteem and confidence, overcome fear, and stigma (Tod et al., 2015). Interviews were used to collect data from 24 clinicians who worked with the nurses, and structured observation of the multidisciplinary team in each case study made regarding the nurse's job descriptions and patient pathways. The findings of the study is line with Roy Castle Lung Cancer Foundation survey in 2013, that lung cancer nurse aid treatment access, and manage symptoms.

VII. Evaluation of nurse's knowledge: Lack of knowledge, attitude and skills has been identified as the main challenge to the provision of palliative care (Bhatnagar S. & Patel A., 2018). Healthcare providers lack essential knowledge required for effective palliative care, which a certificate course on the essentials of palliative care has been proven to improve according to a cross-sectional interventional study by Bhatnagar S. & Patel A., 2018, involving 29 healthcare providers including nurses who had completed the Certificate Course in Essentials of Palliative Care (CCEPC). Based on the study, Quality of palliative care will improve by improving knowledge of palliative care. The participants completed a pre-and posttest comprising of 30 questions with grading scale >20 being ´´good knowledge´´, 15-20 equals ´´fair/average knowledge, and <15 as poor knowledge, questionnaire data was collected. The participants showed improved knowledge in palliative care in communication skill, symptom management, breaking of bad news, and assessment of pain at the end of the program.

Bhatnagar & Patel (2018) described the impact of education on nurses knowledge in the form of table.

Table 4.1 Impact of certificate course in essentials of palliative care on the knowledge level in palliative care among the participants (n=29) (Bhatnagar & Patel, 2018).

	Knowledge		
	Good	Average	Poor
Pretest (%)	7 (24.1)	18 (62.1)	4 (13.8)
Posttest (%)	24 (82.8)	5 (17.2)	0

Bhatnagar & Patel (2018) has also described the impact of education on nurses knowledge level in the form of Figure (Figure 1).

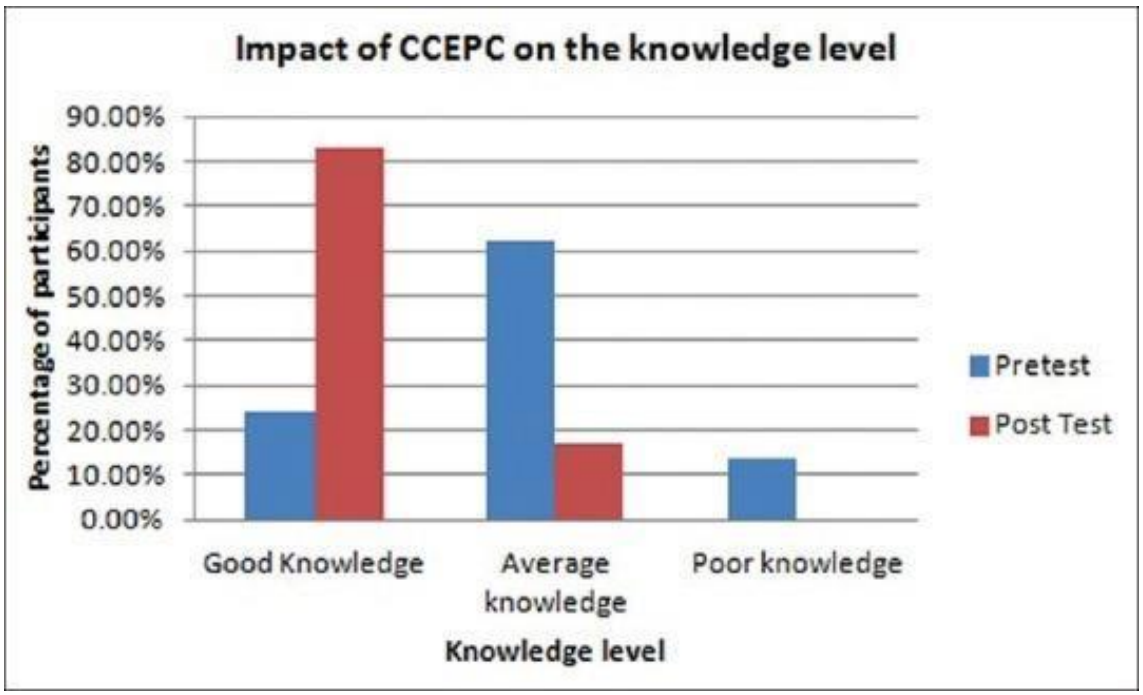

Figure 1. Impact of certificate course in essentials of palliative care on nurse knowledge level (Bhatnagar & Patel, 2018).

Dealing with the specific knowledge about communication skills, pain assessment, symptom management and delivering bad news, the outcome of education had also improved. Bhatnagar and Patel (2018) described this also in the form of table (Table 4.2)

Table 4.2 Impact of certificate course in essentials of palliative care on communication skills, pain assessment, symptom management, and delivering bad news (n=29) (Bhatnagar & Patel, 2018).

	Pretest	Posttest
Communication skills		
Yes	10 (34.5)	27 (93.1)
No	9 (31)	0
Not sure	10 (34.5)	2 (6.9)
Symptom management		
Yes	5 (17.2)	24 (82.8)
No	9 (31)	1 (3.4)
Not sure	15 (51.7)	4 (13.8)
Breaking bad news		
Yes	10 (34.5)	24 (82.8)
No	12 (41.4)	1 (3.4)
Not sure	7 (24.1)	4 (13.8)
Familiarity with pain scales		
Yes	20 (68.9)	25 (86.2)
No	2 (6.9)	1 (3.4)
Not sure	7 (24.1)	3 (10.3)

Bhatnagar & Patel (2018) has described this also in the form of Figure (Figure 2 below) that education in palliative care has effect in the level of many essential aspects in palliative care.

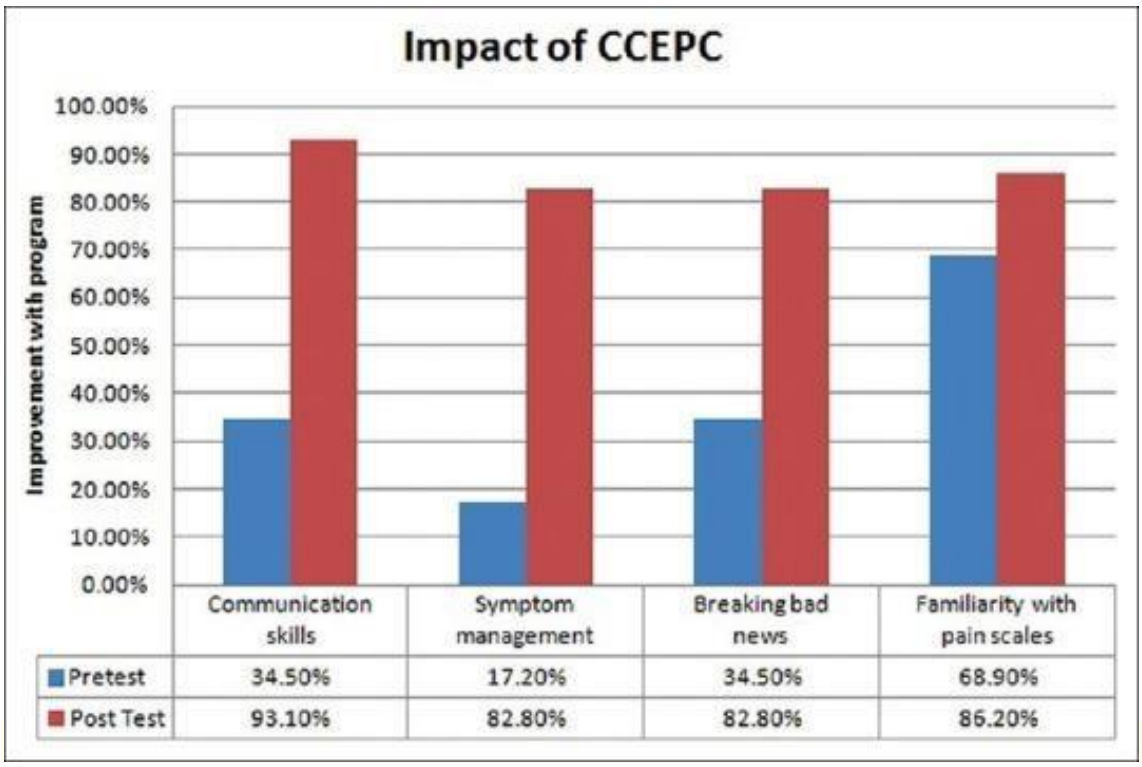

Figure 2. Impact of certificate course in essentials of palliative care on communication skills, pain assessment, symptom management, and delivering bad news (n=29) (Bhatnagar & Patel, 2018).

VIII. Competence assessment:- It is important to evaluate the capability or skilled preparedness of nursing students for the purpose of delivering good care to the patients. The predictive increase in the burden of cancer and palliative care arises the need for improved nurse skill in the management of cancer and palliative care (Walker, Edwards et al. 2017). There is an evidence that a self-assessment questionnaire could be utilized as an assessment tool for measuring of clinical competence of undergraduate nursing students according to a psychometric evaluation study conducted by Nehrir et at., 2018 on 300 nursing students. Questionnaire were used to collect data with 0,96 (0,82-0,91) reliability using Cronbach's alpha coefficient and 0,98 (0,88-0,99) with intraclass correlation coefficient (ICC). Technical, ethical, care management, safety, and advanced competences were the resulting factors and are in congruent with result of study by Liu and Cheng 2007.

8 ETHICS, RELIABILITY AND VALIDITY

This work was carried out using literature review and as such it is based on already made research materials and does not need contact with lung cancer patients and poses no risk to them as no contacts will be made, nor use of interview, nor questionnaire and so privacy and data protection issues did not arise according to guideline of National Board on Research Ethics (TENK 2019). However, ethical issues concerning data acquisition and analysis were considered and maintained. Other authors work in use in this work were properly recognized in the reference according to Turku University of Applied Science (TUAS) reference guideline and ruled out the issue of plagiarism.

The materials for the research were selected from TUAS library database and provide quality and trusted materials free from selection bias and are reliable sources of information and so accounts for the reliability of information provided in this work. English was used as the only language in writing this work and for article search and selection, and removes language bias based on understanding the research materials.

Materials in use for this work were original research articles for lung cancer, and as such provides valid information about lung cancer interventions. There is a bit of bias on the validity of this work due to the fact that most recent articles were not freely accessible, therefore beyond the author's reach due to lack of funding, though the author was able to lay hands on some articles published previous year preceding the year this work was completed.

9 DISCUSSION

The purpose of the study was to describe knowledge required for lung cancer palliative care with the sole aim of evaluating nurse student's competence for delivery of more effective care in order to reduce lung cancer symptoms, improve patients quality of life, and possible survival. Despite measures taken to combat cancer including lung cancer, it continues to pose threat to life globally and a double increase in it's incidence is predicted by the yaer 2030 and there arises the need for improved skill in cancer management and palliative care (Walker, Edwards et al. 2017).

Lack of essential knowledge and skills pose a barrier in the provision of palliative care as identified by Bhatnagar, S. & Patel (2018), in their study evaluating the effect an intensive palliative care course on the knowledge of palliative care. This motivated the author of this work to look into the knowledge needed in palliative care as well as evaluate nurse students' preparedness for the tasks ahead.

Lung cancer patients experience various symptoms resulting from not only the disease, but also the effects of treatments they receive. The result of the reviewed articles shows that the knowledge required for lung cancer palliative care could be grouped into assessment of symptom occurrence, symptom management, coordination of care, patient education, communication skill, and emotional and psychological support.

A better understanding of the symptom occurrence helps healthcare providers to know patients who are at high risk of experiencing certain symptoms and appriopriate interventions channelled to them, and helps to avoiding futile treatments. The nurse needs to be aware of the effects of stress as a trigger of certain symptoms like anxiety, breathlessness, and fatique as evident in the study by (Chan et al., 2011), and their treatment as a cluster provides more effective result and improves quality of life. Treating lung cancer from a holistic perspective involving a expertise from various discipline with the nurse in the center of the team has been shown to not only alleviate patient suffering especially breathing problem, but also increase survival rate.

Consequently, it is demanded that the nurse knows how to work in a team and also has cordinating skills for maximum utilization of expertise of members of the disciplinary team for a better patient health outcome especially ease breathing problem as a major problem in lung cancer.

Oftentimes, lung cancer patients do have basic knowledge of their disease and ignorance or misconception have led to unrealistic expectations,
affects treatment choice and adherence to the treatment plan (Ghandourh 2016). The reviewed study further indicates the nurse need to know how to effectively communicate and educate for a greater part of the nurse job lies on both tasks as he/she needs to relate lots of information to the patient and their relatives regarding their treatment as well as giving answers to lots of questions coming their way. Educating patients make a lot of changes, empowers the patients to take charge and control of their condition in self-care. Owing to the fact that knowledge is power, the patient's understanding of their disease prognosis, and changing pattern of symptoms exposes them to what to expect from the disease, and this preparedness reduces or takes away their fears, and anxiety, encourages them to the use of symptom reduction techniques, and gives them hope of survival. Also couching patient on six-minute-walk-test, and range of motion exercise has been to shown, according to the result of the study, to facilitate patient physical activity after lung cancer surgery and a known native Chinese exercise, Tai-Chi has been proven as an effective intervention in managing cancer-related fatique in lung cancer patients.

The burden of cancer not only weighs down the patient physically, but also have emotional and psychological impact on them so they need a shoulder to lean or cry on. The nurse offers his/her shoulder to the patient whenever they need it, even when their families and friends abandon them. The nurse need to be aware of this task of giving emotional and psychological support, in other words, the nurse needs counselling skills. Counselling and psychological support of the nurse has resulted in patient acceptance to start and complete treatment, helped depressed patient get back to

treatment as an evident result from the literature review based on the study by Tod et al. (2015).

The importance of evaluating the competence of nurse student cannot be overemphasized for the task ahead. It helps in the development of curriculum, planning and evaluation of learning (Nehrir et al., 2018) and to spot out gap in the training of nursing students. A self-evaluation questionnaire covering the aspect of student's technical, ethical, care management, safety, and advanced competences has been indicated as an effective tool for evaluating nurse student's clinical competence.

10 CONCLUSION

As a result of the incurable nature of lung cancer like every other cancer, relief of patient's suffering for prolongation of life remains the only treatment strategy. The nurse is at the centre of the patient's care, lung cancer palliative care inclusive, navigating from the time of referral, assessment, treatment and follow up, and end-of-life, and need to be equipped with up-to-date evidence-based knowledge of the disease, it's manifesting symptoms, and causal effects of it's various treatment methods, have good communication skills in order to be competent in the areas of assessment, management of symptoms, patient education, team work, coordination of care for effective and efficient intervention in lung cancer palliative care.

This work provides nurses and nurse student with relevant update and evidence-based knowledge in lung cancer palliative care especially with the management of the symptoms of dyspnea, fatique and anxiety as a cluster which results in better outcome than managing them as individual symptom. Nurse student competences are best assessed with self-assessment questionnaire as evidence support it's use as an effective assessment tool.

Further nursing research is suggested on lung cancer palliative care as there few studies on lung cancer than in other cancers to deepen nurse's knowledge on lung cancer palliative care especially with predicted future increase in cancer.

REFERENCES

Barta, J.A., Powell, C.A. & Wisnivesky, J.P. 2019b. Global Epidemiology of Lung Cancer. Annals of global health, Vol. 85 (1), pp. 10.5334/aogh.2419.

Bengtsson, M. 2016. How to plan and perform a qualitative study using content analysis. NursingPlus Open, 2016. Vol. 2, pp 8-14.

Bhatnagar, S. & Patel, A. 2018. Effectiveness of the Certificate Course in Essentials of Palliative Care among the Participants: A Cross-Sectional Interventional Study. Indian Journal of Palliative Care, 2018. 24(1): pp 86-92.

Boucher J., Lucca, J., Hooper, C., Pedulla, L. & Berry, D.L. 2015. A Structured Nursing Intervention to Address Oral Chemotherapy Adherence in Patients With Non-Small Cell Lung Cancer. Oncology Nursing Forum, July 2015. Vol. 42 (4). Pp. 383-389.

Chan, C.W.H., Richardson, A. & Richardson, J. 2011. Managing Symptoms in Patients with Advanced Lung Cancer During Radiotherapy: Results of a Psychoeducational Randomized Controlled Trial. Journal of Pain and Symptom Management Feb. 2011. Vol. 41(2), pp. 347-357.

Eggert, J. 2009. Cancer Basics. Pittsburgh: Oncology Nursing Society, chp.3, pg.40.

Farbicka, P. & nowicki, A. 2013. Palliative care in patients with lung cancer. Contemporary oncology (Poznan, Poland), 17(3), pp. 238-245.

Feld, M., Singhi, E.K., Philips, S., Huang, Li-C., Shyr, Y. & Horn, L. 2019. Palliative Care Referrals for Advanced Non-small cell lung cancer: Patient and Provider Attitudes and Practices. Clinical Lung Cancer: Vol. 20(3), pp e291-e298.

Ferrell, B., Koczywas, M., Grannis, F. & Harrington, A. 2011. Palliative care in lung cancer. The Surgical clinics of North America, 91(2), pp. 403-417.

Ferrel, B., Sun, V., Hurria, A., Cristea, M., Raz, D.J., Kim, J.Y., Reckmap, K., Williams, A.C., Borneman, T., Uman, G. & Koczywas, M. 2015. Interdisciplinary Palliative Care for Patients With Lung Cancer. Journal of Pain and Symptom Management, December, 2015. Vol. 50 (6), pp. 758-767.

Finnish Cancer Registry, Cancer in Finland. Available at https://cancerregistry.fi/statistics/cancer-in-finland/

Gerrish, K., Lathlean, J. & Cormack, D. 2015. The Research Process in Nursing. John Wiley & Sons, incorporated, pg. 336.

Ghandourh, W.A. 2016. Palliative care in cancer: managing patients' expectations. Journal of medical radiation sciences, 63(4), pp. 242-257.

Hart, C. 2018. Doing a literature review: Releasing the Research Imagination, 2nd Edition. SAGE Publication Ltd. January 2018, United Kingdom. Pg. 3.

Janes, R. 2018. Palliative treatment. Evidence-Based Medicine Guidelines (EBGM),Duodecim Publishing Company Ltd. 6.7.1018. Available at https://www-terveysportti-fi.ezproxy.turkuamk.fi/dtk/ebmg/koti

Jonsson, M., Hurtig-Wennlöf, A., Ahlsson, A., Vidlund, M., Cao, Y. & Westerdahl, E. 2019. In-hospital physiotherapy improves physical activity level after lung cancer surgery: a randomized controlled trial. Chartered Society of Physiotherapy 2019. Vol. 105 (2019), pp. 434-441.

Knuuttila, A. 2018. Lung cancer. Evidence-Based Medicine Guidelines (EBMG); Duodecim Publishing Company Ltd. 14.6.2018. Available at https://www-terveysportti-fi.ezproxy.turkuamk.fi/dtk/ebmg/koti

Latimer, K.M. & Mott, T.F. 2015. Lung cancer: diagnosis, treatment principles, and screening. American Family Physician, Vol. 91(4), pp. 250-256.

Lemjabbar-Alaoui, H., Omer, H., Yang, Y. & Buchman, P. 2015. Lung cancer: Biology and treatment options. Biochim Biophys Acta, December, 2015. Vol. 1856 (2), pp. 189-210.

Medical Dictionary online; Farlex & Partner, 2009. Nursing Intervention. 2009. Available at https://medical-dictionary.thefreedictionary.com/nursing+intervention

Mcphillips, D., Evans, R., Ryan, D., Daneshvar, C., Sarkar, S.A. & Breen, D. 2015. The Role Of A Nurse Specialist In A Modern Lung-Cancer Service. Mark Allen Holdings Limited, British Journal of Nursing, Vol 24(4), pp. S21-S27.

Nehrir, B., Ebadi, A, Vanaki, Z., Nouri, J.M. & Khademolhosseini, S.M. 2018. Psychometric properties of self-assessment clinical competency questionnaire in baccalaureate nursing students. Electronic Physician March 2018, Vol.10 (3), pp. 6494-6499.

Oksholm, T., Rustoen, T., Cooper, B., Paul, S.M., Solberg, S., Henriksen, K., Kongerud, J.S. & Miaskowski, C. 2015. Trajectories of Symptom Occurrence and Severity From Before Through Five Months After Lung Cancer Surgery. Journal of Pain and Symptom Management, June 2015. Vol. 49 (6), pp. 995-1015.

Shamseer, L., Moher, D., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelle, P., Stewart, L.A. & Prisma-P Group. 2015. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P): elaboration and explanation. British Medical Journal (Clinical research ed.), Vol. 350, pp. G7647.

Snyder, H. 2019. Literature review as a research methodology: An overview and guidelines. Journal of Business Research, November 2019. Vol. 14, Pg. 333-339.

Tod, AM., Redman, J., McDonnell A., Borthwick, D., White, J. 2015. Lung cancer treatment rates and the role of the lung cancer nurse specialist: a qualitative study. BMJ 2015; 5: e008587.

The American Cancer Society. 2015. what is lung cancer. Available at https://www.cancer.org/cancer/cancer-basics/what-is-cancer.html

The American Cancer Society. Lung cancer risk factors. Available at https://www.cancer.org/cancer/lung-cancer/causes-risks-prevention/risk-factors.html

The guideline of the Finnish Advisory Board on Research and Intergrity. 2019. Available at https://www.tenk.fi/sites/tenk.fi/files/Ihmistieteiden_eettisen_ennakkoarvioinnin_ohje_2019.pdf

Walker, D.K., Edwards, R.L., Bagcivan, G. & Bakitas, M.A. 2017. Cancer and Palliative Care in the United States, Turkey, and Malawi: Developing Global Collaborations. Asia-Pacific journal of oncology nursing, Vol. 4 (3), pp. 209-219.

World Health Organzation (WHO). 2018. Cancer. Avalaible at https://www.who.int/health-topics/cancer#tab=tab_1

World Health Organization. February,2018. Palliative care. Available at https://www.who.int/news-room/fact-sheets/detail/palliative-care

Zhang, L., Wang, S., Chen, H. & Yuan, A. 2015. Tai Chi Exercise for Cancer-Related Fatique in Patients With Lung Cancer Undergoing Chemotherapy: A Randomized Controlled Trial. Journal of Pain and Symptom Management, March 2016. Vol. 51 (3), pp. 504-511.