USE OF NUTRITION ASSESSMENT OF CANCER PATIENTS WITH CHEMOTHERAPY: *LITERATURE REVIEW*

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ABSTRACT
Along with the increasing number of cases diagnosed with cancer, cancer treatment therapy is growing, one of which is chemotherapy. Chemotherapy is an indicated treatment for systemic, metastatic, and advanced cancers, whose use has increased from one to four in 10 patients diagnosed with cancer. This is because chemotherapy can reduce recurrence rates and prolong life. However, chemotherapy has some serious side effects, such as experiencing nutritional problems during and after chemotherapy, even continuing for the next year. Thus, the need for early screening to detect patients at risk for nutritional problems. The purpose of this study was to determine the use of appropriate nutritional assessment in cancer patients with chemotherapy. This research study is a *literature review* using PI(E)O (*patient, intervention/exposure and outcome*) to determine the keywords used in searches in several databases. The databases used are *PubMed, Wiley Online Library, Science Director* and *Google Scholar.* The keywords used are (Cancer AND Chemotherapy) AND (Assessment OR Measurement OR Instrument OR Screening) AND (Nutrition OR Nutritional Status OR Nutrition Score). A total of articles 134,274 were identified, after being screened for the last 5 years (2016-2021), in English, full text, duplication, and according to the title and abstract, obtained 73 articles and nine article include this study. The results of a literature search found nine articles describing nutritional assessments used by cancer patients with chemotherapy, namely; PG-SGA as many as four articles, NRS-2002 as many as two articles, MST as many as one article, MNA as many as one article, and a combination of MUST and PG-SGA as many as one article. PG-SGA is a nutritional assessment that is precise, effective, easy, accurate, simple, and has high sensitivity. In addition, PG-SGA can be used in conjunction with other nutritional assessments, and is proven to be efficient.

Keywords: cancer; chemotherapy; nutritional assessment; patient-generated subjective global assessment

INTRODUCTION

Cancer is a serious threat to public health (Varea et al., 2017), with an increasing prevalence globally reaching 1,806,590 diagnosed cancer cases, which is equivalent to 4,950 new cases every day (Siegel et al., 2020). Along with the increase in cases diagnosed with cancer, cancer treatment therapy is growing, one of which is chemotherapy (Chan & Ismail, 2014; Ferreira et al., 2016). Chemotherapy is an indicated treatment for systemic, metastatic cancer (Wilkes & Allen, 2018), and advanced cancer (Xie et al., 2017). Its use has increased from one to four in 10 patients diagnosed with cancer (Miller et al., 2019). This is because chemotherapy can reduce recurrence rates and prolong life (Xie et al., 2017).
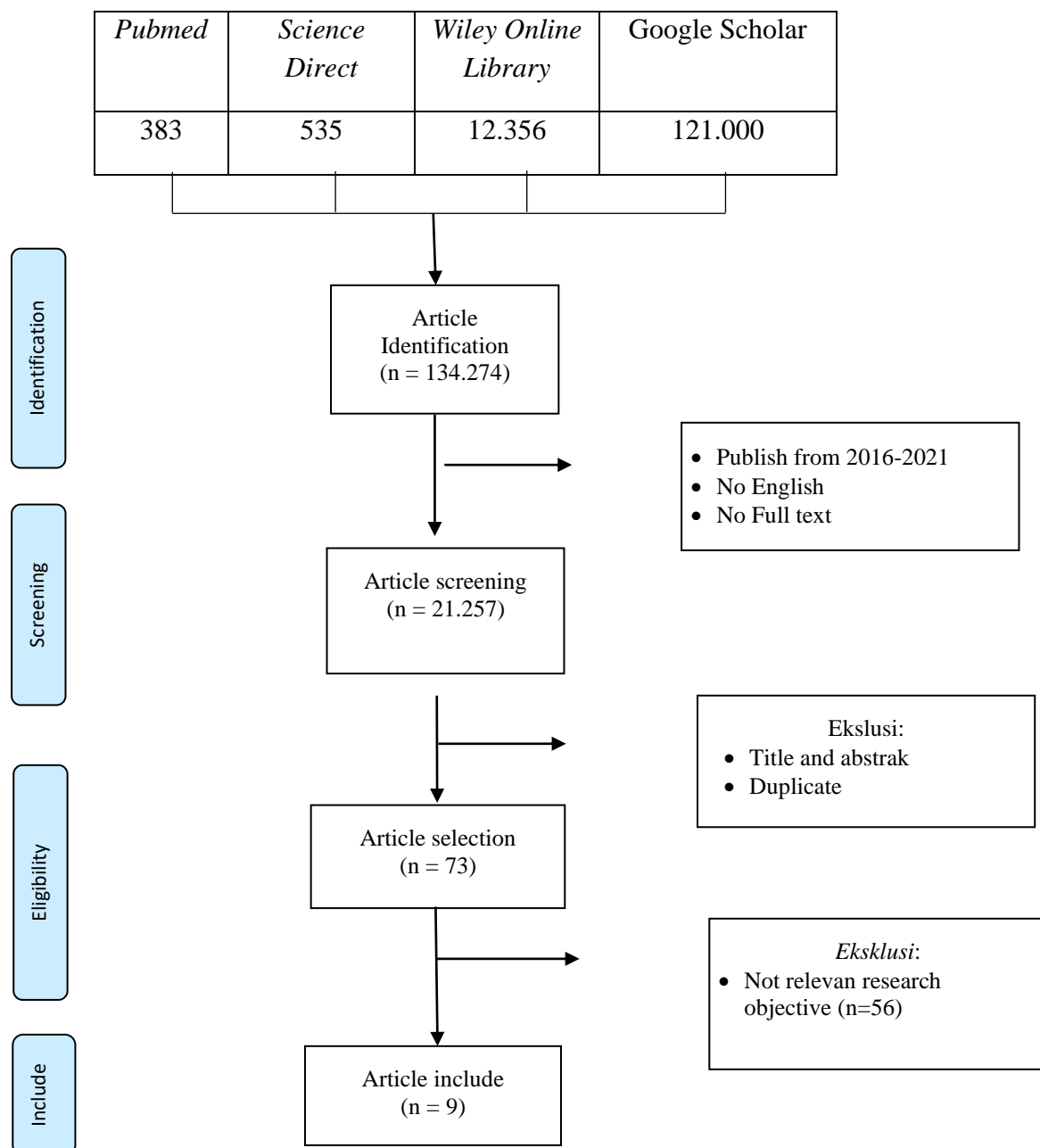
Besides having benefits, chemotherapy also has some serious side effects (Pearce et al., 2017). It was reported that 79% of cancer patients experienced nutritional problems during and after chemotherapy, even around 49% continued for the next year (Shaw, 2018). The most common symptoms are changes in diet, dry mouth, nausea, vomiting, diarrhea, stomatitis, reduced appetite (American Cancer Society, 2018). This, will have an impact on weight loss and changes in nutritional status, so that patients feel weak, tired, decrease in endurance until chemotherapy is discontinued (Pearce et al., 2017). Thus, the need for handling related to nutritional problems.

However, cancer patients undergoing chemotherapy with nutritional problems often go undetected and are still under-treated in clinical practice (Michel et al., 2020). Nutritional problems with nutritional changes can be detected through nutritional assessment (Reber et al., 2019). Studies using comprehensive nutritional assessments have been developed and validated to identify the nutritional status of cancer patients, especially those undergoing chemotherapy who are at risk for nutritional disorders *The European Society for Clinical Nutrition and Metabolism* (ESPEN) and a number of other studies recommend the use of comprehensive assessments including the *Malnutrition Universal Screening Tool* (MUST) (Chao et al., 2015), the *malnutrition screening tool* (MST) (Di Bella et al., 2020), *Nutritional Risk Screening* (NRS-2002) (Lee et al., 2020), *Mini Nutritional Assessment* (MNA) (Mazzuca et al., 2019), and *Scored Patient Generated Subjective Global Assessment* (PG-SGA) (Harriet jager-wittnear & Faith D Ottery, 2017).

However, in reality determining the use of appropriate nutritional assessment is still a problem for nurses and there is no standard method for evaluation in cancer patients undergoing chemotherapy (Planas et al., 2016). Reported articles have carried out a systematic review and identified appropriate nutrition screening and assessment tools for use in patients with cancer in hospitals and communities (Kristensen et al., 2020; Mendes et al., 2019). Therefore, the purpose of this study was to determine the use of appropriate nutritional assessment in cancer patients with chemotherapy.

METHODS
This research study is a *literature review* using PI(E)O (*patient, intervention/exposure and outcome*) to determine the keywords used in searches in several databases. The databases used are *PubMed, Wiley Online Library, Science Director* and *Grey literature.* The key words used are (Cancer AND Chemotherapy) AND (Assessment OR Measurement OR Instrument OR Screening) AND (Nutrition OR Nutritional Status OR Nutrition Score) (Figure 1.) A total of articles 134,274 were identified, after being screened for the last 5 years (2016-2021), in English, full text, duplication, and according to the title and abstract, obtained 73 articles and nine articles include this study (Picture 1).

Pubmed	*Science Direct*	*Wiley Online Library*	Google Scholar
383	535	12.356	121.000

Identification

Article Identification
(n = 134.274)

- Publish from 2016-2021
- No English
- No Full text

Screening

Article screening
(n = 21.257)

Ekslusi:
- Title and abstrak
- Duplicate

Eligibility

Article selection
(n = 73)

Eksklusi:
- Not relevan research objective (n=56)

Include

Article include
(n = 9)

Picture 1. Algoritm Research

RESULTS

The results of a literature search found nine articles describing nutritional assessments used by cancer patients with chemotherapy, namely; There are four PG-SGA articles (Abbott et al., 2016; Esfahani et al., 2017; Shahvazi et al., 2017; Sharma et al., 2016). NRS-2002 consists of two articles (Peng et al., 2018; Wang et al., 2018). MST as many as one article (Di Bella et al., 2020). MNA as many as one article (Hung et al., 2021). The combination of MUST and PG-SGA is one article (Hettiarachchi et al., 2018).

Research conducted by Wang et al., (2018) on 97 esophageal cancer patients with chemotherapy using the assessment 2002 NRS, found that the NRS-2002 is an easy, standardized, fast, non-invasive, and cost-effective diagnostic tool to identify patients. cancer with nutritional risk in routine clinical practice. The NRS-2002 score and the *Prognostic*

Nutritional Index (PNI) are simple and valuable markers for predicting long-term outcome in patients with post-chemotherapy esophageal cancer.

Research was also conducted by Sharma et al., (2016) on 57 cancer patients during treatment using the PG-SGA and assessment *Body Mass Index* (BMI) Cancer. Early detection of nutritional risk symptoms will result in a comprehensive nutritional assessment and interventions that can help prevent further or delayed malnutrition and weight loss during treatment and ultimately improve the quality of life of advanced cancer patients. Another study from Abbott et al., (2016) on 300 patients who received anti-cancer treatment using the PG-SGA instrument, it was found that the application of PG-SGA as a simple and accurate method to detect the risk of malnutrition in cancer patients undergoing anticancer treatment. PG-SGA SF and additive score combinations have higher sensitivity than MST. Then, a study conducted by Hettiarachchi et al., (2018) on 100 cancer patients with chemotherapy using MUST and PG-SGA assessments, it was found that the use of MUST and PG-SGA together can detect chemotherapy outpatients who are at risk of malnutrition.

Research was also conducted by Di Bella et al., (2020) on 201 outpatient cancer patients with chemotherapy using SGA and MST assessments, the results showed that MST has proven to be a valid screening method in outpatient cancer nurse units in patients undergoing chemotherapy and supportive care to identify patients at risk and not at risk of malnutrition. Furthermore, another study conducted by Shahvazi et al., (2017) on 300 cancer patients with chemotherapy using the PG-SGA assessment, it was found that the use of the standard PG-SGA questionnaire by nutritionists or nurses can be effective in detecting malnourished patients and reducing complications associated with malnutrition. caused by cancer. Then, a study conducted by Esfahani et al., (2017) on 71 gastric cancer patients using PG-SGA, it was found that malnutrition screening with PG-SGA has been suggested as an available and easy-to-use tool for malnutrition screening in patients with gastric cancer.

Research conducted by Hung et al., (2021), on 461 head and neck cancer patients using MNA-SF assessment, it was found that nutritional assessment with MNA-SF should be included in the evaluation before chemoradiotherapy for all neck and head cancer patients. Research was also conducted by Peng et al., (2018) on 3232 nasopharyngeal cancer patients, using the 2002 NRS assessment, it was found that the 2002 NRS represents a simple instrument that is clinically useful for screening nutritional risk in nasopharyngeal cancer.

DISCUSSION
Cancer patients have metabolic disorders caused by the presence of cancer cells, so they are at risk of malnutrition, this is exacerbated by the side effects of treatment such as chemotherapy (von Meyenfeldt, 2005). As many 40-80% of cancer patients are malnourished, which is the leading cause of cancer death (La Torre et al., 2013; Sanford et al., 2014). Thus, the need for proper nutritional assessment in cancer patients. The most widely used nutritional assessment in this study was the PG-SGA, which consisted of four articles stating that the use of the PG-SGA instrument was effective, easy, accurate, simple, and has high sensitivity to detect the risk of malnutrition in cancer patients undergoing anticancer treatment, and reduce complications caused by cancer. This is supported by research which explains that PG-SGA is the most accepted and recommended nutritional assessment to evaluate the level of malnutrition in cancer patients (Read et al., 2005). This is in line with a review study which said that PG-SGA showed better sensitivity, specificity, and predictive value to assess the level of malnutrition in cancer patients (Mendes et al., 2019). Supported by other studies which found that PG-SGA is a valid nutritional instrument used to identify malnutrition in

cancer patients cancer (Nitichai et al., 2019). Furthermore, other studies also suggested that measurements with PG-SGA were declared valid to measure food intake according to energy and protein intake according to changes in body weight (Bye et al., 2019).

In addition, another study explained that PG-SGA and NRS 2002 are suitable assessments for preoperative nutritional screening in cervical cancer patients (Tian et al., 2021). In this study, using the 2002 NRS assessment, two articles were found, which stated that the 2002 NRS is an easy, simple, standardized, rapid, non-invasive, and cost-effective diagnostic tool to identify cancer patients at nutritional risk in routine clinical practice. This is in line with research which states that the 2002 NRS assessment method is effective for assessing the nutritional risk of cancer patients, so as to improve the quality of life of cancer patients (Cao et al., 2021). This is supported by research showing that the 2002 NRS was able to predict morbidity, mortality, and survival outcomes for metastatic gastric cancer patients (Li et al., 2019). Another study also said that the 2002 NRS represented a simple tool for screening nutritional risk in nasopharyngeal cancer (Peng et al., 2018).

This study also found one article using MST nutritional assessment, which stated that MST is a valid screening method in outpatient cancer nursing units in patients undergoing chemotherapy and supportive care to identify patients at risk and not at risk of malnutrition (Di Bella et al., 2020).. This is supported by research which says that MST has the potential to minimize treatment delays, unplanned hospitalizations, fulfill nutritional support, and reduce treatment costs (Symonette et al., 2019).This is in contrast to studies that show that MST provides weak diagnostic evidence in classifying at-risk or malnourished groups with good nutrition, but the MST screening tool can be used in conjunction with several other more sensitive screening tools (Nakyeyune et al., 2021). This is evidenced by research that explains that the recommendation for implementing the 2002 MST or NRS nutritional assessment, followed by PG-SGA, is effective in determining food intake, measuring body weight, body composition, biochemical nutritional markers, muscle function, and physical performance (Castillo-Martinez et al., 2018).

In addition to nutritional assessment PG-SGA, NRS 2002, and MST. This study also found an MNA assessment which stated that nutritional assessment with MNA-SF should be included in the evaluation before chemoradiotherapy for all neck and head cancer patients (Hung et al., 2021). This is supported by research which states that the MNA-SF is a valid nutritional screening tool for geriatric nursing professionals when BMI cannot be calculated (Kaiser et al., 2019). This is in line with research showing that MNA-SF can identify individuals at risk and malnutrition, and can confirm the diagnosis and plan interventions (Rubenstein et al., 2001). In addition, studies have shown that MNA is able to predict mortality or survival, cancer progression, treatment, and quality of life, but is unable to predict the outcome of treatment effects and functional decline in cancer patients (Torbahn et al., 2020). Then, in a subsequent study which said that the joint use of MNA and SGA created the best results in detecting malnutrition in radiotherapy patients (Demirel & Atasoy, 2018).

This research study found research using MUST and PG-SGA assessments, the results showed that the use of MUST and PG-SGA together could detect chemotherapy outpatients who were at risk of malnutrition (Hettiarachchi et al., 2018). Another study explained that nutritional assessment using MUST can diagnose malnutrition in a timely manner so as to be able to implement appropriate intervention strategies to improve the quality of life and cancer survival (Karami et al., 2021). This is supported by research which states that MUST is the main screening tool to refer patients who need counseling to a nutrition professional, which is

then followed by a PG-SGA assessment (Boléo-Tomé et al., 2012). Although the MUST assessment is a quick and easy-to-use screening tool, health professionals often report being overwhelmed by the sheer number of procedures (Boléo-Tomé et al., 2012).

CONCLUSIONS
Nutritional assessment in cancer patients undergoing chemotherapy aims to conduct initial screening of patients at risk for malnutrition. PG-SGA is a nutritional assessment that is precise, effective, easy, accurate, simple, and has high sensitivity. In addition, PG-SGA can be used in conjunction with other nutritional assessments, and is proven to be efficient.

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