Spring 2023

Effectiveness of Standardized vs. Individualized Cancer Treatment Education

Jija Issac
San Jose State University

Effectiveness of Standardized vs. Individualized Cancer Treatment Education

Jija Issac

The Valley Foundation School of Nursing at San Jose State University

NURS295: Research Methods

Dr. Robin Whitney

May 19, 2023

Abstract

As the number of cancer diagnoses continues to increase and is expected to keep rising, it becomes imperative to explore avenues to optimize patient education. Research has consistently demonstrated that effective education plays a crucial role in improving patient outcomes. Through my previous experiences in various outpatient oncology infusion centers, I have observed significant variations in the methods employed for delivering patient education across different facilities.

In this literature review, I explored the effects of standardized chemotherapy education and individualized chemotherapy education on patients in outpatient oncology clinics. The predominant themes across these studies encompass patient awareness of anticipated symptoms, effective symptom management, and levels of anxiety experienced. Standardized education was found to enhance symptom knowledge among patients, leading to improved symptom management. However, this method of education was found to have little to no effect on patient anxiety. Individualized chemotherapy education, on the other hand, was proven to be an effective education method to decrease patient anxiety and improve patient knowledge. However, its impact on patient symptom management remains unclear due to the lack of available information provided within the research.

Background

Cancer is the second leading cause of death in the United States (*Cancer Facts & Figures 2022*). According to the American Cancer Society, it is estimated that in 2022, there will be an estimated 1.9 million new cancer diagnoses and 609,360 deaths related to cancer in the United States (*Cancer Facts & Figures 2022*). In 2015, 55% of new cancer diagnoses were patients over the age of 65 and it is estimated that by 2050, 63% of patients diagnosed with cancer will be

over the age of 65 (Weir et al., 2021). Cancer is a stressful event that is highly associated with anxiety (Kangas, 2013). A study conducted by Nikbakhsh et al. (2014) found that about 30% of cancer patients reported having mild anxiety and 17% reported symptomatic anxiety. Anxiety is one of the most experienced symptoms among chemotherapy patients, which affects their ability to understand and retain pertinent chemotherapy education (Garcia, 2014; Malone, 2007; Atlin & Stock, 2016). Ineffective education can lead to serious consequences leading to increased incidence of avoidable hospitalization and death in some cases (Aranda et al., 2020; McCaughan & McKenna). Considering the increasing incidence of cancer and the current variations in patient education practices, it is vital to explore and implement effective and evidence-based education practices within the oncology population to improve overall patient care and outcome.

The Center for Health Care Strategies (2013) reports that patients who are not adequately educated regarding chemotherapy treatment are unaware of the importance of communicating experienced adverse effects with their providers resulting in delays in treatment and management as well as unnecessary hospitalization. Appropriate patient education can decrease patient anxiety leading to increased receptiveness towards treatment education and ultimately, more favorable treatment outcomes and better symptom management.

Methods

Study Purpose & Design

The purpose of this literature review is to ascertain the effects of standardized versus individualized cancer treatment education in reducing patient anxiety and improving overall patient outcomes.

Search Strategy

Databases used to find relevant literature regarding oncology treatment education included EBSCO Host, Google Scholar and PubMed. Terms included 'chemotherapy education,' 'immunotherapy education,' 'group chemotherapy education,' 'individualized chemotherapy education,' and 'effectiveness of education on patient anxiety.' After reviewing the results obtained from the terms, additional terms such as 'effective patient education,' and 'standardized versus personalized patient education,' were included to find pertinent information regarding optimal patient education. Studies prior to 2000 were excluded except for a few studies that provided vital evidence and information pertaining to the research.

Inclusion & Exclusion Criteria

Studies included in this review were original research studies that explored the effects of standardizing chemotherapy education as well as studies that explored the effects of providing patient-tailored chemotherapy education. Although the focus was on outpatient oncology clinics in the United States, a few studies conducted outside of the United States were also included. Studies included all different types of chemotherapy treatment including immunotherapy and supportive treatments.

Studies that included patients who have received chemotherapy education in the past were excluded. Due to factors that can affect the reception of educational material, studies that included inpatient treatments were also excluded since a patient's ability to receive information can be altered by various physical or mental capacities. In addition, studies that focused on the effects of receiving prechemotherapy education in general were excluded along with literature review articles and in-patient studies.

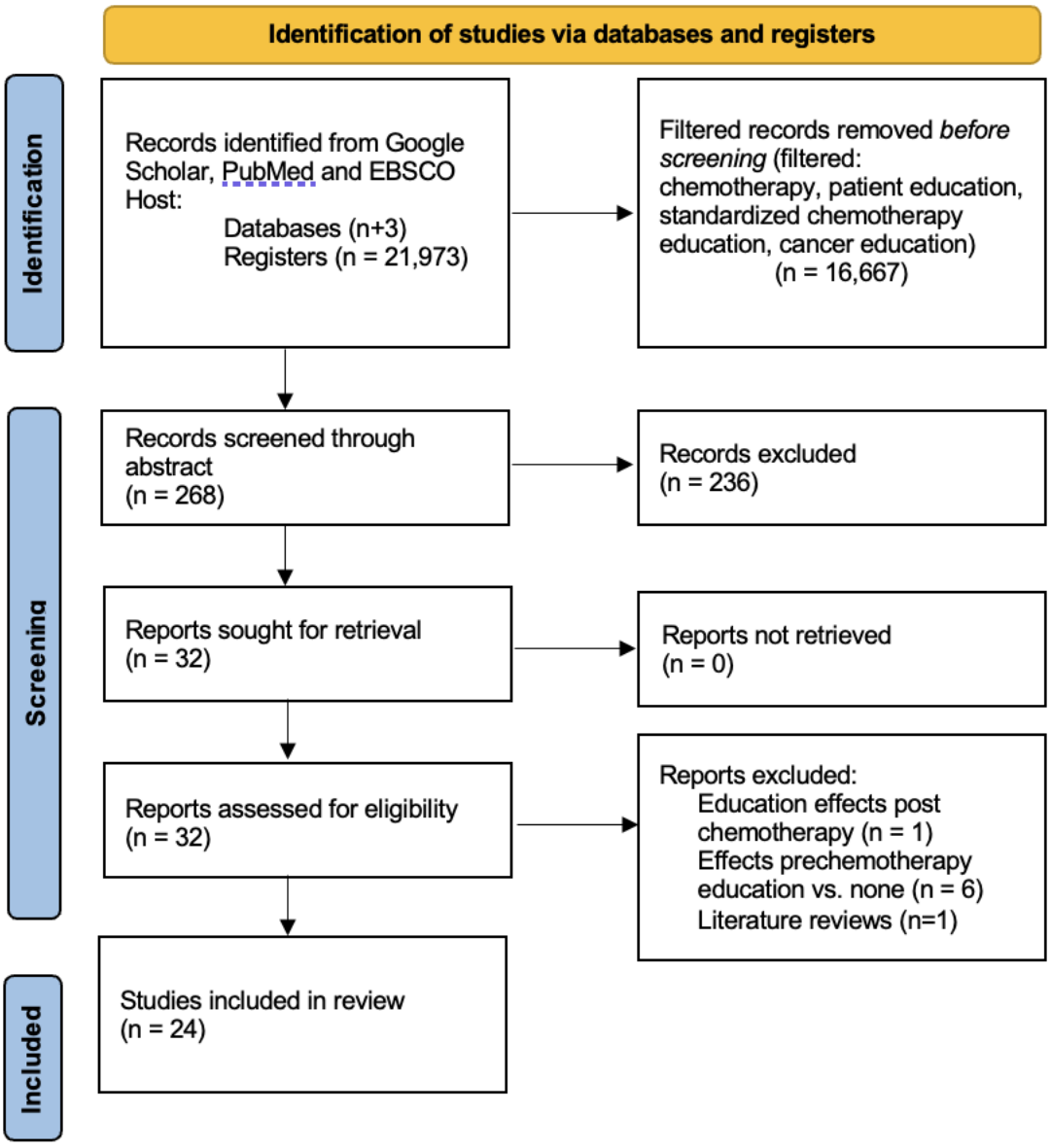
With the research question exploring effective oncology treatment education, studies found were primarily qualitative. Ideally, research studies included all types of cancer patients who are receiving both chemotherapy and immunotherapy since often, treatments include a combination of the two. From the studies that were found, the factors that were predominantly mentioned in assessing the effectiveness of patient education included patient anxiety, knowledge of symptoms and symptom management, and patient self-efficacy. For each study reviewed, information regarding study design, setting, population, sample size, intervention, and overall outcome or results were extracted. A narrative synthesis was used to describe the results.

Quality Appraisal

Once pertinent studies were reviewed, the level of evidence was assigned to each study used based on the *Hierarchy of Evidence for Intervention Studies* (Fineout-Overholt et al., 2010).

Results

On the initial search, more than 20,000 results were found. Studies before 1997 were excluded and filters for 'patient chemotherapy education' and 'standardized chemotherapy education' were applied, leaving a total of 268 studies. After screening through abstracts of the 268 studies, 24 of the studies were found to have information relevant to this literature review. Studies that were excluded during screening were studies that explored the effects of providing prechemotherapy education versus no prechemotherapy education. In addition, studies that examined the effects of long-term chemotherapy effects and education post-chemotherapy were also excluded as this does not provide data pertinent to the question at hand in this research study.



Population and Setting

The bulk of the studies that were reviewed were conducted within the United States. However, four of the twenty-four studies were carried out outside the borders of the US and included cancer centers in China, Canada, Europe, India, and Egypt. The studies were conducted at outpatient cancer infusion centers and ranged from 21-538 participants including patients,

family members, and healthcare providers. A significant number of the studies explored the experiences of new oncology patients who are receiving treatments for the first time, while a smaller portion of the studies included patients who were amid their treatments.

Although the search encompassed multiple studies, there were not many that specifically contrasted the impact of standardized patient education with individualized patient education. Rather, most of the studies concentrated on the effects of standardized education, with a few solely addressing the effects of individualized patient education and an another few that analyzed the effects of incorporating both individualized and standardized patient education. Aside from the studies conducted outside the US, there was no identification of patient background, language or learning preference and it was assumed that the participants favored English as their primary language.

RESULTS

The research pertaining to the impact of standardized chemotherapy education identified three main outcome predictors to assess the efficacy of patient education: level of anxiety, patient self-efficacy, and self-knowledge. Prior to implementing experimental changes, some facilities did not provide any patient education prior to treatment (Abu et al., 2021; Li et al., 2021; Rani & Rice, 2021) whereas most facilities relied on the treating nurse to incorporate chemotherapy teaching during the patient's first infusion appointment (Connell et al., 2013; Dalby et al., 2013; Fee-Schroeder et al., 2013; Gallegos et al., 2019; Jivraj et al., 2018; Kahn et al., 2017; Keener & Winokur, 2018).

Studies Exploring Standardized Chemotherapy Education

There were seventeen studies that explicitly explored the effects of standardized education. Of the seventeen studies, there were two studies appraised at Level II, and fifteen

studies that were appraised at Level V according to the *Hierarchy of Evidence for Intervention Studies* (Fineout-Overholt et al., 2010).

Among the studies that focused on standardized education, six of the studies examined delivery of the education through group education classes in which patients received the same information regardless of their treatment plan or cancer type (Connell et al., 2013; Dalby et al., 2013; Jivraj et al. 2018; Malone, 2007; McQuellon et al., 1998; Keener & Winokur, 2018). Most of these studies provided group education classes to all new oncology patients; however, Jivraj et al. (2018) examined group education classes tailored to disease-specific oncology patients. Four of the studies employed standardized education materials or instructional videos to convey information to patients, sometimes in addition to group education classes (Katz et al., 2014; Kahn et al., 2017; Parker et al. 2021; Philip & George, 2015). Most of the studies included found that standardized education was effective in improving knowledge of side effects and enhanced symptom management regardless of the delivery (Abu El-Kass et al., 2021; Dalby et al., 2013; Gallegos et al., 2019; Jivraj et al. 202018; Malone 2007; McQuellon et al., 1998; Katz et al., 2014; Parker et al, 2021; Rogers et al., 2021). Both generalized standardized chemotherapy education and disease-specific education classes were found to be effective. For example, Jivraj et al. (2018) conducted a study in which 538 patients and 506 caregivers attended a disease-specific chemotherapy class prior to the initiation of treatment of gynecologic patients and found that by doing so, there was a significant reduction of phone calls from patients related to chemotherapy medication, side effects, and appointments. Similarly, Abu El-Kass et al. (2021) conducted a qualitative study in which patients received non-disease-specific standardized chemotherapy education. The authors utilized a booklet with standardized chemotherapy education along with a chemotherapy class session reviewing common side effects and coping

strategies. The results of the post-survey conducted showed an improvement in understanding of common side effects and appropriate management strategies. Like the findings above, Dalby et al. (2013) also conducted a study of 53 patients in which standardized education was utilized to eliminate variations in patient teaching, there was an overall score of 97% in the knowledge of chemotherapy side effects compared to a pre-intervention score of 87%.

Unlike the findings from the above-mentioned studies, Kahn et al. (2017), Philip & George (2015), and Rani & Rice (2021) found that standardizing chemotherapy education can lead to gaps in patient knowledge thereby contributing to poorer patient outcomes. Kahn et al. (2017) conducted a cross-sectional survey of pediatric oncology patients and their families regarding their preferences for receiving chemotherapy education after providing standardized education. The findings denoted that some patients preferred to know their specific treatment plan and associated symptoms versus receiving a generalized chemotherapy education. Philip & George (2015) also conducted a study to assess the effectiveness of providing an antiemetic guideline to patients receiving chemotherapy. A questionnaire-based interview found that the guidelines provided did not uniformly represent all populations as there were variations in treatments, the severity of side effects, cultural beliefs, and familial support among others that affected the overall management of nausea. Rani & Rice (2021) also implemented a structured pre-chemotherapy education class and conducted a post-survey in which the 30 participants were found to have insufficient knowledge regarding their treatment and side effects.

In addition, only two of the studies reported the effects of standardized education on patient anxiety (Katz et al., 2004; McQuellon et al., 1998). Katz et. al. (2004) utilized an educational brochure that included psychosocial coping mechanisms for 10 patients with oral cancer while 9 patients did not receive the brochure. The post-survey showed increased patient

knowledge, decreased body image disturbance, and lower anxiety among the intervention patients. McQuellon et al. (1998) also conducted a study in which 75 cancer patients attended an orientation program prior to the start of treatment. The authors used State-Trait Anxiety Inventory (STAI) scale to assess patient anxiety post-intervention, results displayed lower states of anxiety in the patients who partook in the orientation program.

Studies Exploring Individualized Chemotherapy Education

There were five studies that focused on the effects of individualized chemotherapy patient education. Of the five studies, two were appraised at Level II, and three at Level V based on the *Hierarchy of Evidence for Intervention Studies* (Fineout-Overholt et al., 2010).

All five studies found improvement in patient knowledge and a decrease in patient anxiety (Godino et al., 2006; Johnson et al., 1997; Jones et al., 2008; Kean et al., 2016; Li et al., 2021; Sajjad et al., 2016). However, Godino et al. (2006) was the only study that examined the effects of individualized chemotherapy education on symptom management, specifically fatigue, and found an overall improvement in symptom management among patients. Alternatively, two studies found that utilization of individualized education can lead to variations of education provided leading to misunderstanding and poor patient outcomes (Rogers et al., 2021; Vidall et al., 2016).

In all the studies, treatment-specific individualized chemotherapy education was utilized and delivered by the respective treating nurse (Godino et al., 2006; Johnson et al., 1997; Jones et al., 2008; Kean et al., 2016; Li et al., 2021; Sajjad et al., 2016). For example, Johnson et al. (1997) conducted a qualitative study in which nurses provided treatment-specific education to patients. The author found that patients were more receptive when information is tailored to an individual's needs resulting in the patient's ability to better cope with their illness; therefore,

improving patient outlook for their disease and decreasing anxiety. Godino et al. (2006) conducted a study among patients with the same type of cancer. The 17 patients in the control group received standardized written education while 23 patients in the intervention group received written education in addition to individualized nursing education. The participants' fatigue level was assessed using the Functional Assessment of Cancer Therapy Fatigue (FACT-F) scale. The study found that the intervention group that received additional one-on-one nursing education reported overall decreased levels of fatigue compared to the control group. Kean et al. (2016) conducted a study in which patients received both written and verbal individualized. The results of the study found that patients who received individualized education were satisfied with their education. The authors also recognized that patients require individualized education as some treatment therapies require specific instructions such as holding a beta blocker in the morning prior to receiving treatment or taking steroids days prior to initiation of treatment. In addition to enhancing patient satisfaction, Li et al. (2021) also discovered a notable decrease in General Anxiety Disorder (GAD-7) scores among 237 patients who received personalized chemotherapy education, in contrast to the 126 patients whose sole prechemotherapy education involved a discussion with their physician prior to initiation of treatment. Similarly, Sajjad et al. (2016)) through their study found that patients felt a more emotional connection to their nurses through their one-on-one chemotherapy education sessions which helped decrease anxiety and improve their ability to retain the information provided.

On the other hand, Rogers et al. (2021) conducted a study following 1,243 nurses providing individualized education. A survey was provided to patients receiving the education and results indicate that patients felt there was a lack of knowledge among the nurses regarding symptom management and lifestyle issues. Vidall et al. (2016) had similar findings when

investigating nausea management among oncology patients. A survey questionnaire conducted found that patients were never provided a guideline regarding nausea management which led to inadequate symptom management and delays in treatment as a result.

Studies that Explored Standardized and Individualized Chemotherapy Education

There were two studies found that incorporated both standardized and individualized chemotherapy education. Both studies were appraised at Level VI based on the *Hierarchy of Evidence for Intervention Studies* (Fineout-Overholt et al., 2010).

Aranda et al. (2020) incorporated both standardized chemotherapy education as well as individualized follow-up and education from nurses. One hundred ninety-two breast, GI and hematologic cancer patients were provided a DVD to watch, self-care information, a one-on-one education consultation prior to the first treatment and a telephone follow-up 48 hours post-infusion. The study did not find a significant decrease in patient distress; however, this intervention was found to significantly decrease sensory and psychological concerns in patients regarding symptoms of chemotherapy, specifically, vomiting. Fee-Schroder et al. (2013) also conducted a study in which the authors utilized a DVD that provided standardized pre-chemotherapy education in addition to a nurse-facilitated discussion regarding their treatment. A post-intervention survey found that patients felt empowered in the management of their own care specifically regarding self-care techniques; however, there is no quantifiable data to assess knowledge in this study.

Discussion

The study findings suggest that adopting standardized chemotherapy education is the recommended approach to address the inconsistencies associated with individualized patient education. This approach ensures the effective dissemination of vital information to patients,

promoting consistency and reliability. Nevertheless, considering the significant variations in cancer treatments, encompassing immunotherapies characterized by minimal side effects and chemotherapy exhibiting varying levels of symptom severity, it appears that relying solely on standardized chemotherapy education may fall short, especially among patients experiencing anxiety. Although studies have found that a standardized chemotherapy education is the most effective approach in providing concise and relevant information, other studies have found that individualized education was more effective in reducing anxiety related to treatment which in turn can allow for better information retention and understanding of chemotherapy side effects and its management.

Limitations and Gaps

This review was limited by the absence of a description of existing practices prior to the implementation of interventions. This lack of information weakens the robustness of the findings across the studies. Moreover, the overall strength of evidence across studies was low and few incorporated both a control and intervention group. Even among those studies with comparative data, there was insufficient description of the education they received making it harder for the reader to evaluate the results. Furthermore, due to variations in cancer treatments, cancer type, cancer stage, and overall patient health, it becomes challenging to determine the comparative effectiveness of different teaching methods, as there was only one study found that focused on a particular cancer type. Lastly, no studies mentioned variations in culture or patient language preference in the studies found.

In future studies, it would be advantageous to compare disease-specific outcomes between patients who receive personalized chemotherapy education and those who received standardized chemotherapy education. Such studies would enable the proper assessment of the

effects of each type of education on patient anxiety, knowledge of symptoms, symptom management, and overall satisfaction. Additionally, it is crucial to investigate the impact of providing chemotherapy education to patients whose primary language is not English and whose cultural beliefs may influence their care. This aspect is particularly important in this research as our society is becoming increasingly diverse. As Amaya (2019) highlighted, California alone has over 200 spoken languages with English, Spanish, Chinese, and Mandarin being the most prominent. This approach could facilitate the implementation of effective chemotherapy patient education among a vulnerable population that relies on education to manage their own care and improve their prognosis and outcomes.

Conclusion

Employing standardized chemotherapy education offers a multitude of benefits, encompassing the efficacy of teaching, elimination of variations in information delivered, enhanced patient knowledge regarding symptoms and symptom management, and the intention to provide relevant information without overwhelming patients. Nonetheless, healthcare providers should assess patients individually and ascertain if providing individualized education is more conducive to that patient's learning since standardized chemotherapy education may be extensive and not necessarily tailored to each patient's treatment or disease. While studies indicate the effectiveness and efficacy of standardized education, it remains crucial for providers to recognize the advantage of employing individualized education, particularly for patients with pre-existing anxiety as this method has been shown to reduce patient anxiety in this population. Drawing upon the insights derived from the information at hand, future research endeavors could be undertaken to probe the optimal approaches in developing a comprehensive patient education framework that effectively mitigates patient anxiety, augments knowledge acquisition, fosters

proficient symptom management, and bolsters patient confidence within the realm of oncology care.

REFERENCES

Abu El-Kass, S., Ragheb, M. M., Hamed, S. M., Turkman, A. M., & Zaki, A. T. (2021, April 26). *Needs and self-care efficacy for cancer patients suffering from side effects of chemotherapy*. Journal of Oncology. Retrieved March 31, 2022, from https://www.hindawi.com/journals/jo/2021/8880366/

Amaya, N. (2019, March 22). *The most spoken languages in California*. WorldAtlas. Retrieved April 19, 2022, from https://www.worldatlas.com/articles/the-most-spoken-languages-in-california.html

Altin, S. V., & Stock, S. (2016). The impact of health literacy, patient-centered communication and shared decision-making on patients' satisfaction with care received in German primary care practices. *BMC Health Services Research*, *16*(1), 450. doi:10.1186/s12913-016-1693-y

Aranda, S., Jefford, M., Yates, P., Gough, K., Seymour, J., Francis, P., Baravelli, C., Breen, S., & Schofield, P. (2020, January 6). *Impact of a novel nurse-led prechemotherapy education intervention (chemoed) on patient distress, symptom burden, and treatment-related information and support needs: Results from a randomised, controlled trial*. Annals of Oncology. Retrieved April 15, 2022, from https://www.sciencedirect.com/science/article/pii/S0923753419390362

Cancer Facts & Figures 2022. American Cancer Society. (n.d.). Retrieved March 2, 2022, from https://www.cancer.org/research/cancer-facts-statistics/all-cancer-facts-figures/cancer-facts-figures-2022.html

Chemotherapy side effects. American Cancer Society. (n.d.). Retrieved March 25, 2022, from https://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/chemotherapy/chemotherapy-side-effects.html

CHCS Health Literacy Fact Sheets - Center for Health Care ... (2013, October). Retrieved March 31, 2022, from https://www.chcs.org/media/CHCS_Health_Literacy_Fact_Sheets_2013_1.pdf

Connell, N. T., Sikov, W. M., Faricy-Anderson, K. E., Korber, S., Thomas, A. G., Rosati, K., Safran, H., & Mega, A. E. (2013). Assessment of the effectiveness of a chemotherapy education program: A Brown University Oncology Research Group Study. *Journal of Clinical Oncology*, *31*(15_suppl), 6574–6574. https://doi.org/10.1200/jco.2013.31.15_suppl.6574

Fee-Schroeder, Howell, L., Kokal, J., Bjornsen, S., Christensen, S., Hathaway, J., Judy, D., & Vickers, K. S. (2013). Empowering individuals to self-manage chemotherapy side effects. *Clinical Journal of Oncology Nursing*, *17*(4), 369–371. https://doi.org/10.1188/13.CJON.369-371

Fineout-Overholt, E., Mazurek Melnyk, B., Stillwell, S., & Williamson, K. M. (2010). Critical appraisal of the evidence, part I. *AJN, American Journal of Nursing*, *110*(7), 47–50.

Gallegos, R., Kogelman, A., Wagner, M., Cloud, A., Olson, M., Robideau, K., ... Hirko, K. (2019). Chemotherapy education: An interprofessional approach to standardizing processes and improving nurse and patient satisfaction. *Clinical Journal of Oncology Nursing*, *23*(3), 309–314. https://doi.org/DOI: 10.1188/19.CJON.309-314

Garcia S. (2014). The effects of education on anxiety levels in patients receiving chemotherapy for the first time: an integrative review. *Clinical Journal of Oncology Nursing*, 18(5), 516–521. https://doi.org/10.1188/14.CJON.18-05AP

Generalized anxiety disorder 7-item scale (GAD-7): English. ONS. (n.d.). Retrieved April 12, 2022, from https://www.ons.org/assessment-tools/generalized-anxiety-disorder-7-item-scale-gad-7-english

Goals of chemotherapy: How is chemotherapy given? American Cancer Society. (n.d.). Retrieved May 15, 2022, from https://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/chemotherapy/how-is-chemotherapy-used-to-treat-cancer.html

Jivraj, N., Gallagher, L. O., Papadakos, J., Abdelmutti, N., Trang, A., & Ferguson, S. E. (2018, February 1). *Empowering patients and caregivers with knowledge: The development of a nurse-led Gynecologic Oncology Chemotherapy Education class*. Canadian oncology nursing journal = Revue canadienne de nursing oncologique. Retrieved November 2, 2022, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6516211/

Johnson, J.E., Fieler, V.K., Jones, L.S., Wlasowicz, G.S., & Mitchell, M.L. (1997). *Self-regulation theory: Applying theory to your practice.* Pittsburgh, PA: Oncology Nursing Society.

Jones, K. L., Saucier, J. M., Sun, C. C., Bevers, M. W., Ramondetta, L. M., Brown, J., & Smith, J. A. (2008). Comparison of chemotherapy education and patient preferences in community versus academic gynecology oncology clinics. *Journal of oncology pharmacy*

practice : official publication of the International Society of Oncology Pharmacy Practitioners, *14*(1), 31–36. https://doi.org/10.1177/1078155207082947

Kahn, J. M., Athale, U. H., Clavell, L. A., Cole, P. D., Leclerc, J. M., Laverdiere, C., Michon, B., Schorin, M. A., Welch, J. J., Sallan, S. E., Silverman, L. B., & Kelly, K. M. (2017). How Variable Is Our Delivery of Information? Approaches to Patient Education About Oral Chemotherapy in the Pediatric Oncology Clinic. *Journal of pediatric health care : official publication of National Association of Pediatric Nurse Associates & Practitioners*, *31*(1), e1–e6. https://doi.org/10.1016/j.pedhc.2016.06.004

Kangas M. (2013). DSM-5 Trauma and Stress-Related Disorders: Implications for Screening for Cancer-Related Stress. *Frontiers in psychiatry*, *4*, 122. https://doi.org/10.3389/fpsyt.2013.00122

Katz, M.R., Irish, J.C., & Devins, G.M. (2004). Development and pilot testing of a psychoeducational intervention for oral cancer patients. *Psycho-Oncology, 13,* 642–653.

Kean, C., Iverson, L., & Boylan, A. (2016). Evaluation of a chemotherapy and medication education process for patients starting cancer treatment. *Clinical Journal of Oncology Nursing*, *20*(4), 364–366. https://doi.org/10.1188/16.cjon.364-366

Keener, K., & Winokur, E. (2018). Digitally recorded education: Effects on anxiety and knowledge recall in patients receiving first-time chemotherapy. *Clinical Journal of Oncology Nursing*, *22*(4), 444–449. https://doi.org/10.1188/18.cjon.444-449

Lambourne, T., Minard, L. V., Deal, H., Pitman, J., Rolle, M., Saulnier, D., & Houlihan, J. (2019). Optimizing Patient Education of Oncology Medications: A Patient Perspective. Journal of cancer education. *The Official Journal of the American Association for Cancer Education,* 34(5), 1024–1030. https://doi.org/10.1007/s13187-018-1406-9

Leventhal, H. & Johnson, J.E. (1983). *Laboratory and field experimentation: Development of a theory of self-regulation.* In: Woodridge,Pj. Scmitt MH, Skipper JK, Leonard RC (Eds.), Behavioral science and nursing theory (pp. 189-262).

Li, S., Li, L., Shi, X., Wang, M., Song, X., & Cui, F. (2021, May 3). *Personalized prechemotherapy education reduces peri-chemotherapy anxiety in colorectal cancer patients*. Disease Markers. Retrieved March 6, 2023, from https://www.hindawi.com/journals/dm/2021/6662938/

Malone, P. (2007). Implementation of a prechemotherapy educational intervention. *Clinical Journal of Oncology Nursing*, *11,* 707–710. doi:10.1188/07.CJON.707-710

McCaughan, E., & McKenna, H. (2007). Information-seeking behaviour of men newly diagnosed with cancer: a qualitative study. *Journal of clinical nursing*, *16*(11), 2105–2113. https://doi.org/10.1111/j.1365-2702.2006.01785.x

McQuellon, R.P., Wells, M., Hoffman, S., Craven, B., Russell, G., Cruz, J., et al. (1998). Reducing distress in cancer patients with an orientation program. *Psycho-Oncology, 7,* 207–217.

National Comprehensive Cancer Network. (2013). Clinical Practiice Guidelines in Oncology: Distress management [v.1.2013]. Retrieved from http://www.nccn.org/professionals/physician _gls/f_guidelines.asp#supportive]

Nikbakhsh, N., Moudi, S., Abbasian, S., & Khafri, S. (2014). Prevalence of depression and anxiety among cancer patients. *Caspian journal of internal medicine*, *5*(3), 167–170.

Parker, P. D., Heiney, S. P., Friedman, D. B., Adams, S. A., & Dawson, R. M. (2021). The Experience of Chemotherapy Teaching and Readability of Chemotherapy Educational Materials for Women with Breast Cancer. *Journal of cancer education : the official journal of the American Association for Cancer Education*, *36*(1), 47–55. https://doi.org/10.1007/s13187-019-01596-1

Philip, C., & George, B. (2015). *An evidence practice gap in antiemetic prescription with chemotherapy*. Journal of Pharmaceutical Care. Retrieved March 30, 2022, from https://jpc.tums.ac.ir/index.php/jpc/article/view/39

Rani, R. U., & Rice , V. (2021). A study to assess the knowledge regarding the side effects of chemotherapy among cancer patients in selected hospital, Bangalore. *Asian Journal of Nursing Education and Research, 11*(1), 83–85. https://doi.org/10.5958/2349-2996.2021.00021.5

Rogers, B., Pesata, B., Lee, J.-H., Zhao, J., Krieger, J., & Daily, K. (2021, May 27). *Chemotherapy education: Current practices of Oncology Nurses Counseling Patients - supportive care in cancer*. SpringerLink. Retrieved March 30, 2022, from https://link.springer.com/article/10.1007/s00520-021-06308-4

Sajjad, S., Ali, A., Gul, R. B., Mateen, A., & Rozi, S. (2016, February 9). *The effect of individualized patient education, along with emotional support, on the quality of life of breast cancer patients - A pilot study*. European Journal of Oncology Nursing. Retrieved March 30, 2022, from https://www.sciencedirect.com/science/article/abs/pii/S1462388916300060

Vidall , C., Sharma, S., & Amlani , B. (2016, September 8). *Patient-practitioner perception gap in treatment-induced nausea and vomiting*. British Journal of Nursing (Mark Allen Publishing). Retrieved March 26, 2022, from https://pubmed.ncbi.nlm.nih.gov/27615540/

Weir, H. K., Thompson, T. D., Steward, S. L., & White, M. C. (2021, June 10). *Cancer incidence projections in the United States between 2015 and 2050*. Centers for Disease Control and Prevention. Retrieved March 28, 2022, from https://www.cdc.gov/pcd/issues/2021/21_0006.htm

What is health literacy? Center for Health Care Strategies. (2013, October). Retrieved March 28, 2022, from https://healthcareinnovation.vermont.gov/sites/vhcip/files/documents/CHCS_Health_Literacy_Fact_Sheets_2013.pdf

LITERATURE REVIEW MATRIX

STUDY / AUTHOR	HYPOTHESIS	N = SETTING	METHODS/MEASURES	DATA ANALYSIS	OUTCOMES	STRENGTHS/WEAKNESS	QUALITY ASSESSMENT
ABU EL-KASS et al. (2021). Needs and self-care efficacy for cancer patients suffering from side effect of chemotherapy.	Patients were not provided adequate education regarding their chemotherapy treatment, side effects and management of side effects	N = 150	Descriptive cross-sectional design; utilized structure interviewing questionnaire, patient assessment needs tools and self-care activity for side effects of chemotherapy	Overall lack of knowledge regarding chemotherapy, side effects, symptoms management and reportable adverse effects in patients receiving chemotherapy.	Results indicate patients did not receive appropriate education leading to a lack of knowledge about side effects of chemotherapy and its management. Authors recommend providing patients and family members be given simplified comprehensive booklet with information about cancer care and symptom management strategies	**S:** Provides assessment of current patient knowledge in patients receiving treatment. Clearly identifies areas of knowledge that are lacking **W:** Study is conducted in a facility outside of the US. Does not indicate current practice of patient education if at all; therefore, no comparative data.	V
ARANDA et al. (2020). Impact of a novel nurse-led pre-chemotherapy education intervention (Chemed) on patient distress, symptom burden, and treatment-related information and support needs: Results from a randomized, controlled study	High levels of distress and need for self-care information suggests that chemotherapy education is suboptimal	N = 192	Education, follow up and one-on-one consultation provided. Psychological distress was measured via Hospital Anxiety and Depression Scale (HADS), and treatment related information and support needs were measured via Cancer Treatment Scale (CaTS) and symptoms management was assessed via Chemotherapy Symptoms Assessment Scale)	Treatment 1: HADS score did not different significant t(189) - 0.72, P = 0.47; by T3, psychological distress score did improve on average compared to control group but not significant. Cancer Related concerns: T1 t(190) = -0.59, P = 0.56 but T3 indicated significant improvement compared to control group (who received pre chemotherapy education from nurses, information could be varied). All data was analyzed via SPSS Version 17.0.	Results indicate that chemotherapy education needs to be tailored to patient's baseline distress. Those with low distress might need less intense education while others with high distress may be benefit for more intensive education and follow-up. However, having structured approaches while providing access to appropriate information and support material is likely to help reduce treatment-related information and support needs.	S: Assessed for various aspects of patient's status include side effect management as well as anxiety related to treatment. W: Population only included English-speaking patients; therefore, unable to assess efficacy in multilingual population. Does not specify type of treatment patients receiving. No way to ensure patients are practicing suggested management of side effects at home.	V

CONNELL et al. (2013). Assessment of the effectiveness of chemotherapy education program	Group education sessions for chemotherapy patients would be effective in reducing patient anxiety regarding treatment	N = 142	Analytic Cross- Sectional Study ; 10 question survey	Chi-square tests were used to evaluate the changes in surveys pre and post group session	Results show an overall improvement in knowledge of treatment, side effects and there was an overall reduction in patient reported anxiety.	**S:** Shows that group education was effective in providing knowledge regarding chemotherapy. **W**: There was no comparison group. Patients were not provided one-on- one teaching to assess which is better. This was patient reported based on scales so no way to fully assess their knowledge and accuracy of their knowledge	V
DALBY et al. (2013). Standardization of initial chemotherapy teaching to improve care.	Standardizing chemotherapy education will improve patient knowledge of symptoms and symptom management and eliminate variations in education provided	N = 53	Patient education survey pre and post intervention	Average patient satisfaction score of 4.86 (0-5). Improvement in overall score from 87% to 97% in regarding to knowledge of chemotherapy side effects and its management	Standardizing chemotherapy can contribute to improved patient understanding and high patient and staff satisfaction	**S:** Setup of the study helps identify that the intervention did help overall score **W:** Patients already had some knowledge regarding their treatment and side effects prior to intervention. Does not include population, specific chemotherapy regiment, etc. so unable to generalize results	V

FEE-SCHROEDER et al.. (2013). Empowering individuals to self-manage chemotherapy side effects.	This study utilized a 11 minute education video to assess effectiveness.	N = 81 patients (66 cancer patients, 15 caregivers)	Researcher-Generated questionnaire in relation to anxiety and symptoms management	Descriptive statistics (ie. Mean, standard deviation) were used to. Collected data using SPSS version 5.0	Results show this form of teaching was effective in that patients reported feeling empowered especially in terms of self-care techniques ; however, noted that participants also like being able to ask nursing staff questions in order to obtain knowledge	**S**: Explored effectiveness of impersonal teaching through education videos but also implemented nurse led teaching ; unable to assess if one is more effective than the other **W**: Teaching was optional so those who chose to partake in this are assumed to be motivated learners so it is not a reflection of the general population.	V
GALLEGOS et al.. (2019) Standardization of chemotherapy education improved nurse and patient satisfaction	Standardizing chemotherapy education will improve patient and nurse satisfaction. Lack of standardization leads to decreased education efficiency for nurses and increased anxiety for patients.	N=80 patients pre-intervention N = 84 patients post intervention N = 30 nurses pre-intervention N = 25 nurses post intervention	Questionnaires	SPAWN model; interprofessional team developed to improve patient education. Workbook with checklists was provided.	Patient pre and post knowledge was assessed. Pre-test score at 81.11 and post test score of 84.44	**S:** Results indicate there is an improvement of patient knowledge post intervention **W:** Only colorectal & pancreatic CA ; not significant difference in the pre and post test. The pre and post test score did not show significant improvement in knowledge base	V

GODINO et al. (2006). Nursing education as an intervention to decrease fatigue perception in oncology patients	The study hypothesized that nurses providing education to patients in regarding to fatigue and management will help with overall perception of fatigue in patients with colon or gastric cancer	N = 40	Control group vs. Experimental group. Nursing education was individualized, and counseling provided to patients receiving treatment	Utilized Functional Assessment of Cancer Therapy Fatigue (FACT-F) Scale	The experimental group that received individualized education vs standardized in the control group shows decreased levels of fatigue. Those in the control group experienced higher levels of fatigue.	S: Utilization of validated assessment tools to show direct effectiveness of individualized education on better symptom management W: Small sample size. Does not take into consideration what else could be affecting levels of fatigue; therefore, hard to verify that it is only due to education intervention	II
JIVRAJ et al. (2018). Empowering patients and caregivers with knowledge: The development of a nurse-led gynecologic oncology chemotherapy education class.	Implementing a nurse-led education class will help lower patient anxiety and equip patients with knowledge and skills required to manage their side effects	N = 538 patients N = 508 caregivers	New implementation of nurse-led education was provided to all patients, those currently receiving chemotherapy and those that are about to receiving first-time treatment	Evaluations	Results indicate that a teaching class was effective in improving knowledge among patients; however, found that it was somewhat counterproductive to provide generalized information when patients are receiving different regiments that have different side effects and adverse effects	S: Used patient evaluation to assess effectiveness. W: No validated tool was used to analyze results	V

JONES et al. (2008). Comparison of chemotherapy education and patient preferences in community versus academic gynecology oncology clinics	Hypothesis is that patient's prefer one-on-one chemotherapy teaching. Patients were surveys in community clinics as well as academic clinics	N = 203	Survey for patient preference in receiving chemotherapy education	13 item Questionnaires Survey	Results indicate that community clinic patients prefer to have written chemotherapy education that is then reviewed with a healthcare professional with detailed information regarding the drugs they are receiving, specifically in terms of prevention and side effect management. The patients surveyed in academic clinics were less likely to want to know side effects of	S: The use of community clinics is more indicative of general population perspective on chemotherapy education W: There is no indication as to what patients in the academic clinics wanted in terms of education	V
JOHNSON et al. (1997). *Self-regulation theory: Applying theory to your practice.* Pittsburgh, PA: Oncology Nursing Society.	Proposed utilization of self-regulation theory to tailor chemotherapy education for patients.	N =40	Provided individualized chemotherapy education to patients with symptom management pertinent to their lives	Conducted post interview survey	Survey revealed patient preferred individualized education and improved overall patient satisfaction	S: Strong evidence showing the effectiveness of individualized chemotherapy teaching with theories backing. W: No control group	VI

KAHN et al. (2017). How variable is our delivery of information approaches to patient education about oral chemotherapy in Pediatric Oncology Clinic	Variations in patient education can lead to noncompliance and inadequate symptom management in patients receiving treatment.	N = 68 physicians and nurses from Dana-Farmer Cancer Institute ALL Consortium	Survey among physicians and nurses who provide patient education to pediatric oncology patients taking oral chemotherapy	Survey	Survey reveals that patients see different providers each time and usually not their primary care doctor who provides the education. Study demonstrates variability exists in provider-driven education leading to variations in information provided to patients and their family members	S: Studies demonstrate variability in information without standardized chemotherapy education. W: Its only from the perspective of providers for the most part and has does not indicate the effects of lack of standardization other than variability in information provided	V
KATZ et al. (2004). Development and pilot testing of a psychoeducation intervention for oral cancer patients.	Psychoeducation intervention is effective in dispersing education while facilitating effective coping	N = 19	The educational brochure was created for patients with oral cancer. 10 patients received this brochure which also contained coping mechanisms while 9 patients did not receive this brochure	Survey	The results show that intervention group had better knowledge, less body image disturbance and lower anxiety	S: Standardized education shown to be effective specifically with coping mechanisms including providing mental resources to patients W: Small sample size. No pre-survey to assess changes	II
KEAN et al. (2016). Evaluation of a chemotherapy and medication education process for patients starting cancer treatment.	Study hypothesizes that chemotherapy and medication teaching that meets patients' learning needs enhance knowledge and support adherence to instructions and promote optimal patient outcomes, satisfaction and overall safety	N = 41	Surveys were given to assess patient satisfaction after being given an education session consisting of verbal and printed education regarding their chemotherapy and regimen along with follow up instructions specific to their care	Survey	Most patients indicated they were satisfied with the education provided; however, many still reported a lack of understanding and states they could not remember what was taught. Others indicated that they preferred an alternative learning method	Study suggests that oncology nurses should work collaboratively with other health care providers to determine each patient preference in receiving education and tailoring it accordingly.	V

KEENER & WINOKUR (2018). Digitally recorded education: Effects on anxiety and knowledge recall in patients receiving first-time chemotherapy.	Variations in education can lead to poor retention of information potentially delaying appropriate treatment which all can result in consequences affecting patient survival	N = 92	Teaching was standardized and each patient received the same information	Pre and post surveys given to patients	Results indicate that anxiety was lower and patients had better knowledge recall suggesting that standardizing chemotherapy education lead to decreased anxiety while increasing patient knowledge of critical and beneficial treatment-related information	S: Study shows standardizing chemotherapy education proves to be beneficial in reducing anxiety pre-intervention. W: No control group; therefore, unable to conclude that non-standardized chemotherapy education would not be as effective	V
LAMBOURNE et al. (2019) Optimizing Patient Education of Oncology Medications: A Patient Perspective	Utilizing patient perception of gaps in patient education, educational needs of patients, and patient experience with healthcare system can optimize delivery of oncology education	n = 21	Focus Groups with Qualitative Study Design	Three focus groups with qualitative analysis regarding patient perception of gaps in education, patient educational needs, patient experience with healthcare and patient satisfaction	Mixed results. Some patients felt comprehensive data reduces their anxiety while others reports compressive education increases their level of anxiety. The authors have concluded that patient education must be tailored to individualized patient needs and preferences	**S:** assessed patient perception which is very impactful to modeling patient education. **W:** extremely small sample therefore hard to determine if outcomes would be effective in a large sample of oncology patients	V
LI et al. (2021). Personalized Prechemotherapy Education Reduces Peri-Chemotherapy Anxiety in Colorectal Cancer Patients.	Personalized chemotherapy teaching provided by physician and medical staff is effective in reducing patience anxiety.	N = 364	Chinese version of GAD-7 was used to evaluate patient anxiety at initiation of treatment versus 14 days post intervention	Categorical data was expressed as number of cases and analyzed used x2-test. Predication equation for predicational and post chemotherapy anxiety was obtained using logistic regression. SPSS24.0 was used for statistical analysis.	The results show significantly lower GAD-7 scores for the group that received pre-chemotherapy education.	S: Large sample population with utilization of good statistical tools W: No mention of whether all patients receive same education. The study is done outside the US.	II

MALONE, P. (2007). Implementation of a pre chemotherapy education intervention	Implementing pre-chemotherapy education in a group setting prior to first chemotherapy treatment will reduce patient anxiety and help them retain information better	N = undisclosed	Patients were referred to chemotherapy class prior to first treatment and patient were encouraged to bring family members. Then patient satisfaction survey was mailed out. Which consisted of eight questions rated on a Likert scale. Questions focused on perceived effectiveness of class.	Likert Scale Survey	The results indicate that 84% of participants stated the class was “excellent” or “good.” Participants who rated it a “poor” or “fair” stated they would have liked to receive more detailed information regarding their specific treatments	S: Utilization of post-intervention survey W: Unknown sample size. Post-survey very generalized so unable to assess effectiveness in reducing patient anxiety and improving patient knowledge of symptom management	V
MCQUELLON et al. (1998). Reducing distress in cancer patients with an orientation program.	Implementing an orientation program for cancer patients prior to receiving treatment with lower state anxiety and lower distress	N = 150	Control vs. Intervention group. Assessed anxiety and distress relate to chemotherapy.	State-Trait Anxiety Inventory (STAI) to assess anxiety. Brief Profile of Mood States (POMS) to assess moods and Center for Epidemiologic Studies-Depression Scale (CES-D) to assess patient distress	Results indicate that the intervention group displayed lower states of anxiety and distress	S: Used validated tools to assess anxiety, distress and depression in oncology patients. W: Does not indicate what specific educational intervention was provided for patients	II

PARKER et al. (2019). The Experience of Chemotherapy Teaching and Readability of Chemotherapy Education Material for Women with Breast Cancer	Nurses need to supplement chemotherapy education materials with individualized teaching to ensure adequate patient comprehension.	N = 36 women undergoing breast cancer chemotherapy treatment	Qualitative Thematic Analysis using Flesch Reading Ease was used to assess patient's perception of readability of chemotherapy teaching material; results ranged from "difficulty" to "fairly difficult"	FRE (Flesch Reading Ease) and Qualitative questionnaire	Study found that to standardize chemotherapy education, printed material would need to be at a reading level of 7th-8th grader; however, utilizing individualized patient education empowered women to utilize other verified resources to gain further information regarding treatment, patient received unexpected support while receiving chemotherapy education and women described utilizing the education to learn with family members	Marking and highlighting on various pages assist the participants to recall important topics or reinforce self-management tips	V
PHILIP & GEORGE (2014) An Evidence Practice Gap in Antiemetic Prescription with Chemotherapy	Utilizing clinical practice guidelines can help maintain uniformity in prescription and patient tolerance of antiemetics	n = 121	6	Descriptive statistical analysis using American Society of Clinical Oncology (ASCL), National Comprehensive Cancer Network (NCCN) and Multinational Association of Supportive Care in Cancer (MASCC) guidelines for antiemetic protocols were compared to regimens prescribed at this facility	Recommendations are not effectively translated to daily practice across groups. Guidelines are not pan representative across communities. Authors recommend prescribers are aware of guidelines and use it as a tool to aid prescription of antiemetic regimen for patients	**S:** used published guidelines as comparison to practice at facility. **W:** study does not describe patient experience with antiemetic regimen practice at facility	V

RANI & RICE (2021). A study to assess the knowledge regarding the side effects of chemotherapy among cancer patients in selected hospital.	Study explored effects of providing structured chemotherapy class to patients prior to treatment.	N = 30	Quantitative Non-experimental	Mishel' Uncertainty in Illness model	Study found that most patients had insufficient knowledge regarding their treatment and side effects.	S: Specific population with clear Questionnaire and associate percentages to assess need to proper education W: Study does not indicate what education patients received prior to survey	V
ROGERS et al. (2021) Chemotherapy education: Current practices of Oncology Nurses Counseling Patients - supportive care in cancer	Guidelines should be followed regarding treatment, diagnosis, regimen, adverse effects and symptom management; however, practice lifestyle issues experienced by patients lack evidence based treatments and standardization	n = 1243 oncology certified RN	Anonymous survey	>50% of nurse reported their education practice was influence by institution and coworkers	Education is often provided via learned education by RN and by recommendations of providers or other nurses; there is no standardized evidence-based recommendations regarding lifestyle questions for patients undergoing chemotherapy	Due to lack of nurse-patient chemotherapy education regarding patient lifestyle and behavior, authors recommend an expert panel be in place at institutions to review literature and develop a guideline which can lead to more efficient, evidence-based, standardized approach that benefits both the nurse and the patient	V
SAJJAD et al. (2016). The effect of individualized patient education, along with emotional support, on the quality of life for breast cancer patients	Individualized patient education along with emotional support would yield high quality of life outcomes for patients	N = 50	Qualitative Pilot Study	The Function Assessment of Cancer Therapy - Breast (FACT-B v4)	Patients who received individualized patient education along with emotional support had better quality of life assessments compared to those who received standardized patient education	S: had control group to show clear effects of individualized patient education. W: small sample group	V

VIDALL et al. (2016) Patient-practitioner perception gap in treatment-induced nausea and vomiting	Exploring difference between health professional and patients in perceived incidence of chemotherapy induced nausea and utilized of established antiemetic guidelines.	Patients N = 78 Nurses N = 31 Physicians N = 75	Survey (Qualitative / Quantitative)	Questionnaire with open ended questions and Likert scale ratings assessed eligibility, antiemetic medication use/attitude, CINV/RINV incidence, impact of QOL, antiemetic regimen adherence, patient assessment/communication	29% patients reported physicians underestimate impact of n/v on their daily lives. 80% healthcare professional prescribed no or minimal antiemetic medication for drugs with low emetogenicity. Use of guideline-recommended prophylaxis decreased emetogenicity of chemotherapy agents used, Guideline-consistent antiemetic therapy improves nausea/vomiting vs guideline-inconsistent therapy	**S:** compares standardized guideline-initiated therapy vs. unstandardized. Utilizes data from all involved including patients& providers **W:** No details regarding providers perspective on why specific antiemetics were prescribed or not prescribed	V