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Application of Lymphedema Education Toolkit for Nurse Coordinators

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Abstract

Problem: There is approximately one in five breast cancer survivors affected by breast cancer-related lymphedema (BCRL), a potentially debilitating condition affecting the physical, emotional, social, and financial well-being of individuals. **Context:** This Quality Improvement (QI) project was conducted at an outpatient facility of Hospital X's Women's Cancer Center. Within this microsystem, there are 24 permanent clinical nurse coordinators and advanced practice providers, with 15 nurse coordinators dedicated to care for patients with breast cancer or gynecological conditions. **Intervention:** The intervention aims to evaluate if a standardized educational tool improves early interventions for patients with lymphedema and knowledge among healthcare providers on the comprehension of lymphedema stages, diagnostic modalities, risk reduction, and treatments. By implementing this toolkit for nurse coordinators, intervention helps assist patients make informed decisions about their care. **Measures:** Data collection gathered evidence-based research to improve early lymphedema interventions compared to current methods. The application of a pre-and post-survey assesses stakeholder's efficacy of the education toolkit. **Results:** A pre-assessment survey evaluating the effectiveness of an education toolkit achieved an 81% response rate, and the post-assessment survey had an average score of 93%. To institute early interventions for patients the average response rate improved by 12% after implementing a standardized education tool for nurse coordinators. **Conclusion:** In the transition of the change process of this microsystem, an increase in knowledge following the implementation of a standardized toolkit enhanced early interventions for patients and clinical nurse coordinators at Hospital X Women's Cancer Center.

Application of Lymphedema Education Toolkit for Nurse Coordinators

Lymphedema is a long-term, progressive condition due to a buildup of protein-rich fluid in one area of the body impairing the function of the lymphatic system (Kayiran, 2017). The gap in lymphedema care is attributed to healthcare provider's lack of knowledge concerning routine care, management, and prevention. Insufficient information about lymphedema in the healthcare system has made the management of this condition difficult, and reliable knowledge varies throughout countries. Nurses have an essential role in promoting awareness of lymphedema diagnosis, prevention management, risk factors, and treatment interventions. Identifying discrepancies in knowledge on lymphedema among clinicians can help nurses become more knowledgeable about the condition, increase patient education, deliver high-quality care, and enhance the health of those who are at risk for lymphedema. Addressing the gaps in knowledge provides an opportunity to discuss lymphedema content to improve patient outcomes.

Problem description

Evaluating a microsystem at Hospital X's outpatient facility, comprehensive lymphedema education poses a challenge for delivering high-quality care to breast cancer-related lymphedema (BCRL) patients. Creating a standardized educational platform for healthcare providers to implement toward patient education increases a patient's quality of life and improves health outcomes. Applying evidence-based practice to this microsystem allows nurses to adopt material on the available risk prevention practices, diagnostic modalities, prevention, and treatment interventions to establish a structured education system for BCRL patients. This quality improvement (QI) project highlights the knowledge gaps among providers in the healthcare system for patients who are dependent on nurses for information concerning lymphedema risk

and management. In a study identifying nurses understanding of lymphedema, research had gathered 29% of clients had the necessary information and 41% lacked the knowledge for breast cancer-related lymphedema (BCRL) to deliver patient education and treatment (Natarajan, 2023). This impact of lymphedema education in the healthcare system has been neglected among healthcare providers. For patients treated for BCRL, healthcare professionals lack the knowledge to associate information related to lymphedema physiology, risk reduction, and preventive strategies (Natarajan, 2023). Implementing a standardized educational toolkit for lymphedema in this microsystem will enhance health providers' knowledge to institute referrals, implement early interventions, and assess for lymphedema risk.

Available knowledge

PICOT Question

Oncology nurses have a fundamental role to help assist BCRL patients to assess the negative impact of lymphedema, increase individual awareness, and create intervention to better control their condition. Designing a Patient, Intervention, Comparison, Outcome, and Time (PICOT) question is the foundation of a study to connect evidence-based research to enhance understanding of the improvement process. The PICOT question states, does implementing a standardized education tool for nurse coordinators improve their knowledge and enhance early interventions for patients with lymphedema compared to the current practice in four months?

Search Strategy

A literature review was conducted to explore the PICOT question. Collecting peer-reviewed articles from databases of PubMed, Google Scholar, and Cumulative Index to Nursing and Allied Health (CINAHL) were used to access evidence for this QI project. For the inclusion criteria, the following keywords were used: *breast cancer-related lymphedema education, BCRL*

provider and patient knowledge, lymphedema treatment, risk reduction and prevention, standardized practice, lymphedema curriculum, and clinical practice toward lymphedema care.

Reviewing peer-reviewed evidence from January 2019 to January 2024, 11 credible articles were selected and evaluated for this research topic. The Johns Hopkins Research Evidence Appraisal Tool was utilized by analyzing each source's evidence level in Appendix A (Dang and Dearholt, 2018).

Literature Synthesis

Reviewing literature to raise nurses' awareness of lymphedema revealed applicable information related to risk reduction, diagnostic assessment tools, lymphedema education, and treatment interventions. Furthermore, evaluating evidence-based research to standardize lymphedema education in the healthcare system to improve patient outcomes.

Risk Factors

In a retrospective study analyzing 45 participants undergoing lymphatic microsurgery to reduce swelling and improve lymphatic flow. A four-year follow-up study assessed participants undergoing a lymphatic microsurgical preventive health approach (LMPHA) group and a non-LMPHA group through lymphatic venous anastomosis and radiotherapy. Researchers identified the incidence of lymphedema was 33.3% higher in participants of the LMPHA group due to their exposure to axillary lymph node dissection, obesity, and radiation therapy (Levy et al., 2023). Undergoing an LMPHA to regional radiation intervenes with the main risk for lymphedema to surrounding lymph nodes (Levy et al., 2023). In addition, McNeely et al. (2022) performed a clinical practice guideline identifying women with breast cancer are 20% at risk of developing lymphedema after undergoing axillary surgery or radiation therapy. Disseminating these studies

engages a standardized practice for clinicians to educate patients on alternative treatments for those at risk of lymphedema.

Rupp et al. (2019) published a study investigating the rate of BCRL and its related risk factors after surgical resection with a follow-up period of at least five years. Research has gathered that 87.1% of patients who participated in local and locoregional radiotherapy developed lymphedema in the first two years (Rupp et al., 2019). Creating a client assessment tool is projected to be a suitable instrument for early detection of BCRL. The patient's subjectively reporting symptoms in the screening tool highlights the association between BCRL and symptoms associated with lymphedema.

A cross-sectional study by Jorgensen et al. (2021) evaluated cellulitis as a prevalent risk factor for patients with BCRL. With a sample size of 206 patients, participants enrolled between January 2019 to February 2020 analyzed the clinical presentation of BCRL (Jorgensen et al, 2021). The association between cellulitis episodes and the amount of fat mass in lymphedema is evaluated through a Dual-Energy X-ray Absorptiometry (DEXA) scan, bioimpedance spectroscopy (BIS) analysis, and lymphangiography comprehensive history. Additionally, a clinical practice guideline presents a standardized approach for a prospective model of care by using BIS for BCRL assessment for early detection and treatment (Shah et al., 2022). For patients with cellulitis and BCRL who are at risk, therapies are modified by healthcare providers to standardize alternative information to improve patient outcome.

Treatment

Chun et al. (2022) evaluated surgical management strategies in patients with lymphedema. This meta-analysis evaluated articles revealing vascularized lymph node transplant (VLNT) and lymphatic venous anastomosis (LVA) treatment to reduce the volume of

lymphedema and enhance a patient's quality of life. The elements of patient education applied for patient teaching issues VLNT procedure had a volume reduction of 44.8% and 34.6% among the LVA group (Chun et al., 2022). The loss of fluid volume to the affected limb was reduced by managing the conditions between these two methods. Surgical procedures for lymphedema are a desirable treatment for healthcare providers to inform patients regarding educational interventions to enhance patient satisfaction.

Literature from a clinical practice guideline identifies exercise intervention programs targeted volume reduction for BCRL. Tailoring exercise activity after axillary lymph node dissection (ALND) gradually reduced the risk of developing BCRL. This research showed an overall decrease in fluid volume by 47.2% after receiving a modifiable exercise program (Davies et al., 2020). The application of exercise regimen incorporated to an education assessment modifies information to deliver patient education for lymphedema.

Conducting a study by Nadal Castells et al. (2021), the application of compression garments was used in conventional lymphedema prevention programs. Evaluating a randomized controlled clinical trial of compression garments after a lymphatic surgery procedure reduces the incidence of lymphedema. The integration of compression garments as preventative measures for lymphedema shows a lower incidence of lymphedema by applying the device daily for eight hours in the first three months after surgery (Nadal Castells et al., 2021). By using compressive therapy in patient education, healthcare professionals and patients feel more empowered to take action to reduce lymphedema.

Education

Analyzing informational gaps among healthcare providers signifies structured education assessment is necessary to increase the knowledge of nurses and enhance collaboration among

the multidisciplinary team. Assessing the knowledge among nurses, 57.2% of participants reported having different lymphedema education delivery methods to improve patient outcomes (Yarmohammadi et al., 2021). Evaluating the gaps in content, assessment information varied from etiology, signs and symptoms, prevention management, treatment referrals, and risk reduction practices among health professionals to institute lymphedema education (Yarmohammadi et al., 2021). Promoting nurses understanding to implement evidence-based teaching offers an extensive understanding to decrease the incidence and severity of lymphedema among cancer patients. The level of education that patients receive depends on the healthcare provider's understanding of lymphedema.

A quasi-experimental study by Naumann et al. (2023) evaluated the patient's understanding through a physiotherapy assessment of the risk of lymphedema and post-operative shoulder recovery from healthcare providers. An assessment of fifty-five participants in an individualized BCRL education for breast cancer survivors assessing survivor's knowledge and risk reduction practices of the condition (Naumann et al., 2023). An educational intervention has the prospective to expand an individual's awareness of early signs and symptoms, risk factors, and treatment options to better control BCRL (Perdomo, 2023). Tailoring information to the standardized assessment tool for clinicians helps make patients aware of the risk for lymphedema.

Rationale

Applying change theories to QI projects enables research to evaluate the gaps in practices, analyze current practices, and create strategic interventions to improve healthcare quality issues (McDonald, 2004). The process of implementing change in QI projects involves a refined approach of collaboration in addressing the change frameworks to practice.

Change Theory

Applying Ronald Lippitt's theory emphasizes the role of the change agent in practice. Lippitt's framework contains seven phases diagnosing the problem, assessing the capacity for change, assessing resources, selecting progressive change objectives, choosing the role of the change agent, maintaining change, and terminating the helping relationship (Mitchell, 2013). The strength of Lippitt's theory is based on the concept of external agents creating change through extensive planning. This theory encounters resistance due to its high level of detail, as its effective application requires a profound understanding of the foundational principles of behavior change.

Applying Lippitt's framework of change will help guide the internal change agents at Hospital X Cancer Center to enhance lymphedema education. Utilizing this framework will allow the assessment of the microsystem's workflow and evaluate each intervention aimed at lymphedema care among cancer patients. The following phase in Lippitt's framework will incorporate the creation of an evidence-based practice toolkit for lymphedema care including content on risk factors, preventative measures, and treatment referrals. The preceding phase will consist of a post-survey to engage more education and further provide future recommendations in the unit.

Ethical Consideration

This project aligns with the criteria for an evidence-based QI initiative. An Institutional Review Board (IRB) was not required. A statement of non-research determination (SONRD) form was completed to validate this quality improvement initiative (Appendix B) followed by a review and approval by the University of San Francisco School of Nursing and Health

Professions clinical faculty. The project described did not receive any funding and members of the project disclosed no conflict of interest.

Applying the American Nurses Association (ANA) Code of Ethics to this QI project commences Provision 2.1 Primacy of the Patient's Interests. Standardizing lymphedema education in this provision signifies the action to prioritize the patient's best interest and ensure care is personalized according to their needs and values (ANA, 2015). The role of nurses incorporates education for risk reduction, minimizing the severity of the condition, and treatment referrals to improve lymphedema outcomes that patients can benefit from. Following this code of ethics provides an opportunity for patients to reflect on the planning and implementation process of care to improve the risk for lymphedema. The University of San Francisco (USF) Jesuit value of mind is incorporated into the QI project aimed at standardizing lymphedema education. The application of this Jesuit value nurtures an opportunity to pursue lifelong learning and education that would raise awareness for health providers' knowledge to incorporate inclusive education for patients with BCRL (USF, n.d.).

Project Aim

This quality improvement project aimed to implement a standardized education toolkit for patients with breast cancer-related lymphedema. There are no standard protocols in place within the Hospital X Cancer Center's healthcare system to enhance the health outcomes obtained from lymphedema education. To establish this aim, patients who are part of Hospital X Cancer Center will obtain early interventions by applying a standardized toolkit. The project's interventions evaluate the efficacy of a standardized education platform designed to improve patient education from healthcare providers.

Methods

Context

The Women's Cancer Center outpatient facility of Hospital X participated in an evaluation of the project's initiative to enhance patient education among healthcare personnel. To assess the training and understanding of stakeholders by using a standardized toolkit, a 5 P microsystem assessment was implemented. This 5 P assessment incorporates purpose, patients, professionals, processes, and patterns to evaluate the improvement process in this microsystem. Standardizing lymphedema resources and information is necessary for ensuring patients receive the best treatment possible.

The purpose of Hospital X's Women's Cancer Center is to work closely with clinical nurse coordinators to progress oncology practices associated with lymphedema conditions. By collaborating closely with clinical nurse coordinators, the objective is to develop an educational practice for managing lymphedema information in support of patients managing their conditions effectively. The patient population in this microsystem consists of individuals with breast cancer or other gynecological conditions, which encompasses ovarian, uterine, cervical, vulvar, and vaginal cancers (Stanford Women's Cancer Center, n.d.). Within this microsystem, Hospital X has a diverse multidisciplinary team consisting of Nurse Practitioners (NP), Physician Assistants (PA), Nurse Coordinators, and Patient Care Coordinators (Your Care Team, n.d.). In addition, the associated health professionals work alongside this quality improvement project with the University of San Francisco's clinical nurse leaders (CNLs). The process assessment evaluates patients by patient care coordinators to assist with paperwork from external and internal referrals of the macrosystem. Subsequently, clients undergo vital sign checks and provide relevant medical history with the assistance of a nurse, occasionally with a CNL. Then, information is relayed to NPs or PAs who review information for background insights. The NP or PA then

conducts a focused assessment for metastatic areas where patients receive education about the treatment plan before infusion. A pattern identified in this microsystem draws attention to issues with the standard of care given to cancer patients with inadequate lymphedema knowledge.

Healthcare providers require a robust knowledge foundation to assess the health literacy among patients to ensure information is presented at an appropriate comprehension level.

Fishbone Analysis

Among the discrepancies portrayed in lymphedema education at Hospital X, a fishbone analysis was performed to highlight potential factors affecting this microsystem. This diagram is a representation of barriers faced by healthcare personnel (Appendix C). The analysis of this microsystem investigates various factors such as people, providers, equipment, environment, processes, and providers that contribute to the delay in caring for patients with lymphedema (Appendix C). This illustration highlights the challenges encountered toward the outcome of the improvement process.

GANNT Chart

Utilizing a GANNT chart for the change process helped serve as a communication tool to ensure tasks were applied to the multidisciplinary team involved in this quality improvement project (Appendix D). Facilitating the elements for creating a GANNT chart provided an organized timeline of tasks and interventions to assess the fundamental properties associated with Hospital X's Women's Cancer Center.

Strength, Weakness, Opportunities, and Threats (SWOT)

A SWOT analysis was performed to evaluate different viewpoints on how the change process is developing within this specific. This analysis assessed the department's strengths,

internal weaknesses, improvement opportunities, and potential barriers to standardizing lymphedema education among providers (Appendix E).

Cost-Benefit Analysis (CBA)

A CBA was created to evaluate the potential cost spent to develop an educational toolkit and lymphedema training for clinical nurse coordinators (Appendix F). Within this microsystem, the capital cost to develop an educational toolkit among providers is a total amount of \$16,200 (Bryton, et al., 2014). Based on this analysis, the development of the Educational Toolkit involves one Certified Nurse Leader dedicating 200 hours at a rate of \$81 per hour to update evidence-based practice (EBP) and lymphedema education materials (Appendix F). Conducting the lymphedema bundle training for 24 registered nurses and advanced practice providers at \$82 per hour for one session acquires a capital cost of \$1,968 and yields an equivalent annual revenue, resulting in a capital expense of \$3,936 (Appendix F). CNL's ongoing lymphedema training, charged at \$81 per hour for a single session, measures an annual revenue cost of \$81 (Appendix F). Overall, implementing lymphedema training and creating an educational toolkit within this microsystem has a total cost assessment of \$4,057 (Appendix F). Furthermore, the annual savings per patient from reduced lymphedema-related complications amount to \$26,269 (Appendix F). Identifying the total cost-benefit ratio of 1.3 indicates the intervention yields more benefits than costs.

Intervention

This quality improvement project's main intervention incorporates evidence-based training exercises to increase the clinical nurse coordinator's knowledge and pre- and post-assessment surveys. Implementing a survey assessment for staff evaluated healthcare providers understanding and existing knowledge on themes related to lymphedema stages, risk factors,

diagnostic modalities, prevention, and treatment interventions (Appendix G). After completing the pre-survey, staff will attend an instructional session consisting of evidence-based information related to the lymphedema curriculum. This education session would approximately take twenty-five minutes to conduct an individual session with CNLs to evaluate staff understanding and provide additional context to lymphedema. In addition, each clinician was required to participate in a post-assessment survey to improve early interventions for patients with lymphedema. To provide uniform education for patients, the proposed intervention for Hospital X was to strengthen comprehension with accessible information on lymphedema.

Study of the Intervention

The primary intervention of this study will evaluate the effectiveness of a consistent educational platform to develop healthcare providers' knowledge to deliver patient education. The following practices applied to this microsystem adopted a Plan, Do, Study, Act (PDSA) cycle to initiate a change process for this organization (Appendix H). Creating a PDSA cycle documented the test of change for medical education to augment an assessment for development, observation, and analysis for Hospital X's Women's Cancer Center (McNicholas, et al., 2019).

In the initial planning phase of this project, gathering insight from clinical nurse coordinators on the proposed intervention for CNLs to evaluate the gaps in lymphedema delivery. Collaborating with clinicians before implementation, a PICOT question and AIM statement were developed to consolidate this project. Within the Do phase of this cycle, a literature review to identify potential instructional resources for creating a standardized lymphedema toolkit for nurse coordinators. CNLs assessed the current practices in place within this microsystem to administer a pre- and post-knowledge assessment, root cause analysis, and 5 P's assessment. In the Study phase, observation of the proposed practice and collection of data

were evaluated within this microsystem. The post-knowledge survey assessed the provider's perception and confidence level for recurring themes in lymphedema education. Lastly, the Act phase examined the lymphedema curriculum to identify any improvement to initiate early intervention by utilizing the standardized toolkit for patient education. This phase proposes an intervention that creates a recommended practice to assist workflow in the unit.

Outcome Measures

To improve healthcare professionals' knowledge and enhance early interventions for patients, pre- and post-knowledge assessment data collection was assessed for standardized practice at Hospital X. A standardized patient education delivery identifies the knowledge gap associated with lymphedema stages, risk factors, diagnostic modalities, prevention, and treatment interventions. The CNL's intervention through a survey and educational training assessed open-ended questions and quantitative data to perceive reoccurring knowledge and barriers faced in delivering lymphedema education. The outcome of gathering data estimated health professionals utilized multiple evidence-based resources to remain compliant with lymphedema education procedures. The effectiveness of a standardized educational toolkit will be measured by refining understanding of lymphedema modalities, improved confidence level for patient education, and patient satisfaction to improve quality of life.

Results

The CNL team developed and administered pre- and post-assessment surveys to analyze the efficacy of the lymphedema educational tool amongst nurse coordinators at Hospital X's Women's Cancer Center. 15 clinical nurse coordinators are working within this microsystem. Upon analysis, six of them participated in this intervention with a cumulative participation rate of 40% (Appendix I). Each participant in the study receives a pre-assessment survey to evaluate

nurses' baseline knowledge of lymphedema. The pre-assessment survey, which aimed to evaluate the current effectiveness of incorporating lymphedema information practice, achieved an 81% response rate (Appendix I). In contrast, they also received a post-assessment survey following the review of the education toolkit. The average post-assessment score among health professionals acquired a rate of 93% (Appendix I). These interventions are associated with an improvement in early interventions for patients, demonstrated by a 12% increase after the implementation of a standardized tool for healthcare providers. This improvement process indicates an enhanced understanding and ability to advance interventions for patients with lymphedema compared to the current practice within the microsystems.

Discussion

Summary

Within this microsystem, recognizing a need for standardized education for patients with lymphedema. To address this problem, this quality improvement project aims is to enhance early interventions for lymphedema patients at Hospital X Women's Cancer Center by introducing a standardized education tool for clinical nurse coordinators. The CNL team applied evidence-based research to evaluate the existing process for early interventions for patients toward lymphedema practice and patient education. Incorporating a structured educational intervention applied a 5 P assessment, SWOT analysis, PDA cycle, CBA, and pre-and post-assessment survey. This analysis and evaluation identified opportunities to initiate early interventions for patients with lymphedema at this microsystem. Implementation of the proposed intervention shows standardizing lymphedema education for healthcare providers increases patients to obtain interventions early. Following the introduction of the lymphedema education toolkit, there was an average 12% rise in scores, indicating an enhancement in knowledge in the practice of

providing early interventions for patients. With a clear change process through a PICOT question, root cause analysis, and microsystem assessment, targeting patient education for standardized education can improve current practices for patients with lymphedema.

Limitations

Throughout the change process, this study encountered certain limitations in the process. At Hospital X, implementing the lymphedema training and education was obstructed by miscommunication among the interdisciplinary team. Effective monitoring and evaluation of the project required collaborative efforts, tracking providers' performance, and accessing outcomes. Identifying miscommunication as a limitation within this microsystem presented challenges in coordination, increasing the risk of inconsistent patient education practices, and barriers in delegating interventions among the microsystems. Moreover, the constrained availability of time to execute interventions and the shortage of staff significantly disrupted the workflow needed to implement the lymphedema educational toolkit. These time constraints and staff shortages limited the ability to effectively institute the toolkit within the unit, delaying the provision of essential education, and training among nurse coordinators. Despite these challenges, the valuable information and data collected would enhance the unit's understanding of delivering lymphedema education.

Conclusions

To address standardized lymphedema practice for nurse coordinators at Hospital X Women's Cancer Center. This quality improvement project engaged CNL students from the University of San Francisco to develop a standardized educational tool through evidence-based research and analysis. Continuous investigations focused on the effectiveness of introducing this educational intervention for nurse coordinators and patients with lymphedema, aimed to enhance

early intervention practices when compared to the current approach. Over four months, the team of CNL's innovative approach highlighted an increase in knowledge following the implementation of a standardized toolkit and enhancing early intervention for patient care at Hospital X. Through the implementation process, the interdisciplinary team sought to contribute valuable insights to the field and enhance strategic approach for patients to manage their condition effectively. In the transition of the intervention, the CNL team suggests regular use of the provided toolkit for annual staff training on lymphedema education and improving communication for frequent interactions. This quality improvement project brought an innovative approach to utilize the designed toolkit to offer education training to clinical nurse coordinators and lymphedema patients. Implementing universal guidelines and standardized lymphedema practices for healthcare professionals can enhance comprehension of the disease and risk factors associated with BCRL, aiding in prevention, early detection, and timely management of lymphedema.

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Appendix A

Johns Hopkins Research Evidence Appraisal Tool

Journal #	Citation	Evidence Type	Sample, Sample Size, Setting	How Does Article Address Problem?	Quality of Evidence	Other Highlights from Article (consider including limitations & outcomes)
1	Chun et al., 2022	Systematic review with meta-synthesis	<p>Sample: A search process yielding 1255 articles from published dates between 2009 and 2019. Meta-synthesis studied lower and upper extremity treatment of lymphovenous bypass, vascularized lymph node transplant (VLNT), lymphaticovenous anastomosis (LVA), vascularized groin lymph node transfer, and lymph node flap transfer.</p> <p>Setting: A statistical data extraction and screening for published nonsurgical interventions, literature reviews, and cadaver studies.</p>	Evidence on diagnosing, monitoring, and treating lymphedema is a complication of lymph node surgery. There were 15 research data of patients who met the inclusion criteria of 1 arm meta-analysis. 387 upper extremity treatments and 196 lower extremity treatments. The reduction rate of upper extremity lymphedema was 38% with a lower extremity treatment gathering to be 49.5% reduction rate. A common postoperative complication among 45% of the population group reported with cellulitis and seromas collected 4.5% and 4.6%. Undergoing upper extremity treatment improved the quality of life by 52.2%.	Level III	<p>Outcome: Surrounding literature on surgical treatment show an overall volume reduction and improved quality of life for patients with lymphedema.</p> <p>Limitation: The aspect of limitation to the grade of fibrosis conditions secondary to lymphedema with prolonged inflammation varies among race and ethnicity groups.</p>

2	Davies et al., 2020	Clinical practice guideline	<p>Sample: Individuals in all stages of BCRL; Consisted of four physical therapists with lymphedema management certified and one academic physical therapist coordinator.</p> <p>Setting: incorporating preventive interventions early postoperatively setting over the time frame of January 2000 through March 2019.</p>	<p>A clinical practice guideline to aid clinicians to identify interventions for people with breast cancer-related lymphedema, targeting volume reduction, beginning at breast cancer diagnosis, and continuing cancer treatments. The incidence rate of BCRL reported 16.6% in individuals three months to 20 years after diagnosis. Post-axillary lymph node dissection has an increased incidence at 19.9% highlighting 1 in 5 survivors may develop BCRL. 87.1% to 89% of individuals develop BCRL within 2 to 3 years post-surgery.</p>	Level IV	<p>Outcome: Among the research population significant study and review standardized the definition for participant characteristics, diagnostic criteria, and clinical interventions.</p> <p>Limitations: Due to the study population other than breast cancer, this clinical practice guidelines are limited to individuals with BCRL.</p>
3	Jorgensen et al., 2021	Cross-sectional study design	<p>Sample: 206 patients enrolled with unilateral BCRL between January 2019 to February 2020; Patients undergoing dual-energy X-ray scans, bioimpedance spectroscopy, and lymphangiography comprehensive history and clinical examination.</p> <p>Setting: referral from outside hospitals and general practices to be</p>	<p>The aim of this study was to investigate the association between cellulites incidence and the size the lymphedema mass through Dual-Energy X-ray Absorptiometry (DEXA) scans and bioimpedance spectroscopy analysis. By 35.6%, patients with cellulitis had more excess fat mass in their lymphedema arm compared to patients without cellulitis episodes. Patients with cellulitis used second-line lymphedema treatments compared to patients without</p>	Level II	<p>Outcome: DEXA measurements have identified the volume and mass of the fat and lean content of the arm that would issue the treatment necessary for patient's condition with lymphedema and cellulitis.</p> <p>Limitation: This study's weakness could not divide the lean mass into fluid and muscle.</p>

			screened through email and telephone.	cellulitis. The proportional amounts of BCRL fat and lean mass further associated the possible individualized BCRL treatment.		
4	Levy et al., 2023	Retrospective cohort study	<p>Sample: 45 women in lymphatic microsurgical preventive healing approach (LYMPHA) and non-LYMPHA.</p> <p>Setting: Women were conducted in axillary lymph node dissection procedure at the center from November 2012 to November 2016.</p>	Data collection evaluated lymphedema risk and long-term lymphedema incidence. In the LYMPHA group, the incidence was 31.1% and non-LYMPHA group had an incidence rate of 33.3%. This identifying no significant differences in lymphedema incidences for patients receiving radiation therapy and patients with obesity receiving radiation therapy.	Level III	<p>Outcome: An increase in Lymphatic microsurgical preventive healing approach proposes an alternative option for lymphedema prophylaxis in patients undergoing an axillary lymph node dissection.</p> <p>Limitations: more long-term studies were required to determine the potential of the dissection procedure.</p>
5	McNeely et al., 2022	Clinical practice guideline	Sample: patient-oriented research approach focusing on the ability of people with breast cancer in managing their lymphedema. Project outlines 20 stakeholders across Canada: including clients with BCRL, palliative care physician, BC oncologist, physical medicine, and rehabilitation resident.	Clinical guideline will be to improve the quality of care of women with BCRL. A patient-oriented research approach with a focus on self-management. Online databases proceeded from lymphedema conferences and websites housing clinical trial details. The proposed categories of this guideline are related to categories of sensitivity and specificity of diagnosis, incidence rates related to risk reduction practice for prevention, limb volume for effective	Level IV	<p>Outcome: an area of focus identified the basis on areas of contention where guidance is currently lacking in practice. Metrics established an focused assessment of diagnosis, risk reduction, effective management, and measurement outcomes.</p> <p>Limitation: Potential limitations to the guideline protocol outlines the availability of high-quality</p>

			<p>Setting: A developed survey questionnaire basis for groups in cancer and lymphedema of an online databases by the Women and Children's Health Research Institute and faculty of Medicine and Dentistry at the University of Alberta.</p>	<p>management, and reliable methods to detect and monitor lymphedema.</p>		<p>research evidence to all categories of the database.</p>
6	Nadal Castells et al., 2021	Randomized controlled clinical trial	<p>Sample: A criteria of 70 patients enrolled of ages 18 to 85 years old who have undergone axillary lymph node dissection (ALND) compiled in a 2 year program.</p> <p>Setting: Participants were randomized to receive conventional and experimental p preventative therapy consisted of education sessions and exercise program.</p>	<p>Patient's undergoing ALND are at risk of developing lymphedema. This study aimed to determine the compression garment to conventional lymphedema prevention program could improve treatment effectiveness. Two study groups presented showed an overall 12.3% with no significant differences among conventional and experimental arms. The incidence of lymphedema was significantly lower among the experimental arm was 12.1% and the conventional arm represented a 12.5%. Additional implementation to this study highlighted exercise and education did not adhere to decreasing the incidence of lymphedema.</p>	Level I	<p>Outcome: Evaluation of the study population measured the volume of upper limbs using lymphedema calculation formula based on the truncated cone.</p> <p>Limitation: The proposed limitation to this study are the limited sample size and difficulties associated with morning home-based exercise and compression garment use over a two year follow-up.</p>

7	Naumann et al., 2023	Cross-sectional quasi-experimental study design	<p>Sample: 55 participated; recruited from post-operative breast clinical appointments at a public hospital facility in Australia. Eligibility required access to internet computer devices to attend telehealth interventions.</p> <p>Setting: Participating in a axillary node dissection surgery attend a group lymphedema education and monitoring session were evaluated for satisfaction of individual surveillance appointments between telehealth and in-person care for participants following breast cancer surgery.</p>	<p>This study compares the rates of group at lymphedema education and same day individual surveillance appointment between telehealth (TH) and in-person (IP) care for participants following breast cancer surgery. Participants involved in study, 92% attended the TH intervention reported high levels of satisfaction, minimal technical disruption and considerable cost saving for participants making the model feasible to the availability of care. This therapy intervention provided lymphedema education and monitor recovery time of shoulder range of motion for early signs of breast cancer-related lymphedema (BCRL). Participants in TH (75%) and IP (65.4%) addressed accessibility in education for cancer survivors to BCRL, risk factors, and awareness of the condition. Leading to the diagnostic cut-off for possible BCRL.</p>	Level II	<p>Outcome: Participant-related cost per appointment was \$39.68 for TH group and \$156.26 for IP group. Which provides \$0 out of pocket expenses and work opportunity cost. Thus, making feasible for education and assessment intervention for care.</p> <p>Limitation: An aspects to this study highlighted barriers that were faced to be able to detect the development of BCRL from the TH group in absence of the reliable objective assessment and intervention to the bioimpedance spectroscopy (BIS).</p>
8	Perdomo, 2023	Systematic review of qualitative studies with meta-analysis	<p>Sample: Participants of the study combined 2230 women diagnosed with breast cancer with or without lymphedema that received education .</p>	<p>This study identifies the impact of the breast cancer-related lymphedema education content, modes of education, and timing on arm volume, quality of life, adherence to interventions, and</p>	Level III	<p>Outcome: knowledge measures pre- and post-education needs improve quality of life, adhering to self-care practices, and early identification of lymphedema.</p>

			<p>Varied in characteristics of age greater than 53 years of age, mean body mass index of 25, stage of cancer from I to III, axillary lymph node dissection, and chemotherapy.</p> <p>Setting: literature search from the University of Southern California.</p>	<p>knowledge in individuals' diagnosis with breast cancer. Education was provided pre-and post-operatively after BCRL developed. Education requirements included early signs and symptoms and risk reduction practices. Four studies included the following outcome measuring arm volume, quality of life, lymphedema life impact scale, and functional outcomes via the Disabilities of the Arm, Shoulder, and Hand.</p>		<p>Limitation: BCRL education varied across time for breast cancer care.</p>
9	Rupp et al., 2019	Retrospective Study	<p>Sample: 385 patients undergoing multimodal therapy for breast cancer who received surgery, axillary dissection, and radiotherapy.</p> <p>Setting: An analysis of retrospective data outlining questionnaire survey of BCRL from medical records and radiation therapy reports.</p>	<p>Chemotherapy and postoperative complication linked to the main risk factors in promotion BCRL. There were 23.5% of clients suffered from stage II to III permanent BCRL. Follow-up evaluation highlighted 87.1% of patients developed lymphedema in two years. An overall 90% BCRL occurred in the first two years after receiving radiotherapy. Subjective symptom report became a reliable instrument for early detection of BCRL.</p>	Level III	<p>Outcome: Using the numerical rating scale of the survey indicated the stage of lymphedema chronically impaired the quality of life of patients.</p> <p>Limitations: This study analyzed subjective report of symptoms. The dependence of information was recall bias with elderly population proclaimed memory lapses and poor capacity of self-inspection.</p>
10	Shah et al., 2022	Experimental study,	<p>Sample size: 879; Patient selection for breast cancer-related</p>	<p>Clinical practice guidelines for bioimpedance spectroscopy (BIS) in the management of breast</p>	Level I	<p>Outcome: data support the utilization of BIS as part of a prospective model to the care</p>

		<p>random control trail</p>	<p>lymphedema undergo surveillance that are targeting at highest risk of developing breast cancer-related lymphedema undergoing lymph node evaluation, receiving node irradiation, and taxane based chemotherapy.</p> <p>Setting: Optimized outcomes with prospective surveillance with bioimpedance spectroscopy of patients at the University of Kansas Cancer Center, University of Pittsburgh, Macquarie University, Nashville Breast Center, and Breast Care Specialists Continued follow-up 33 months.</p>	<p>cancer-related lymphedema (BCRL). With a 3 year follow-up, an absolute reduction of 11.3% and relative reduction of 59% in chronic BCRL through utilization of compression garment therapy with BIS as compared to tape measurement. A key component of survivorship efforts demonstrated the early detection and treatment of BCRL. BIS guidelines the utilization of the L-Dex U400 device for BCRL assessment. SOZO device simplifies test time, the need and cost associated for use of electrodes and eliminates dedicated procedure to perform tested. Given the randomized nature, size of the study, and longer-term follow-up, evidence to support prospective surveillance with BIS is in conjunction to reduce chronic BCRL.</p>		<p>of patients following routine intervals of early identification of lymphedema.</p> <p>Limitations: implementing the BCRL surveillance measurement for BIS are the associated cost. Recognizing the cost is an important factor associated with chronic BCRL with high rates of hospitalization and cost of managing this chronic disease.</p>
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Appendix B:

Statement of Determination

Title of project: Application of Lymphedema Education Toolkit for Nurse Coordinators

Brief description of project: About 20% of women undergoing treatment for breast cancer experience breast cancer-related lymphedema (BCRL), a condition that can significantly impact the quality of life for breast cancer survivors (Ren et al., 2022). Currently there are no standardized guidelines accessible to healthcare providers for adequately educating patients about BCRL (Perdomo et al., 2022). This quality improvement project aims to improve early interventions for patients with lymphedema at Hospital X Women’s Cancer Center by implementing a standardized educational tool. This project assesses the effectiveness of a standardized educational toolkit in enhancing the knowledge of healthcare providers and patients. Introducing a lymphedema educational platform aims to enhance the understanding of lymphedema among nurse coordinators and facilitate consistent patient education. Standardized delivery of lymphedema education is crucial for risk prevention, early recognition, and management. Nurses play a vital role in lymphedema management by systematically assessing patient risk, and the toolkit will empower them to support patients in making informed decisions to prevent long-term complications. Implementing this standardized education toolkit improves the timeliness of interventions for patients with lymphedema at Hospital X Women’s Cancer Center.

This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). Student may proceed with implementation.

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *

Project Title: Application of Lymphedema Education Toolkit for Nurse Coordinators	YES	NO
The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	X	
The specific aim is to improve performance on a specific service or program and is a part of usual care . ALL participants will receive standard of care.	X	
The project is NOT designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does NOT follow a protocol that overrides clinical decision-making.	X	
The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does NOT develop paradigms or untested methods or new untested standards.	X	

The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does NOT seek to test an intervention that is beyond current science and experience.	X	
The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP.	X	
The project has NO funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	X	
The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., not a personal research project that is dependent upon the voluntary participation of colleagues, students and/ or patients.	X	
If there is an intent to, or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: <i>“This project was undertaken as an Evidence-based change of practice project at X hospital or agency and as such was not formally supervised by the Institutional Review Board.”</i>	X	

ANSWER KEY: If the answer to **ALL** of these items is yes, the project can be considered an Evidence-based activity that does NOT meet the definition of research. **IRB review is not required. Keep a copy of this checklist in your files.** If the answer to ANY of these questions is **NO**, you must submit for IRB approval.

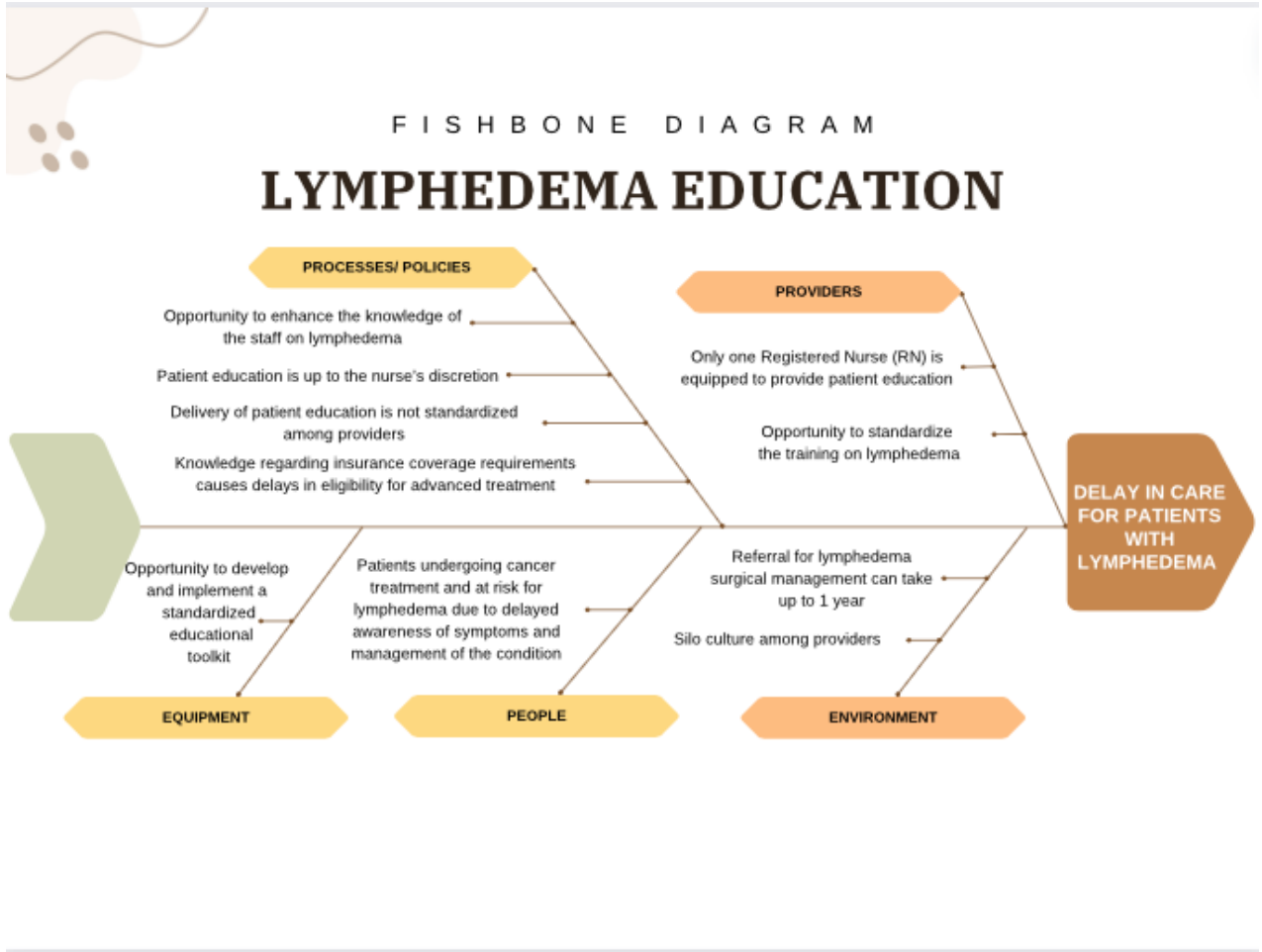
*Adapted with permission of Elizabeth L. Hohmann, MD, Director and Chair, Partners Human Research Committee, Partners Health System, Boston, MA.

Signature of Supervising Faculty:  (Date: 03/23/24)

Signature of Student:  (Date: 03/07/2024)

Appendix C

Fishbone Analysis



Appendix E

SWOT Analysis

SWOT ANALYSIS

S

STRENGTHS

- Small unit (staff)
- Financial resources (low cost)
- Easy implementation
- Staff desire to increase level and depth of knowledge
- Staff desire to integrate EBP

WEAKNESSES

- Time (staff)
- Staff shortage with workflow
- Unable to gather data due to staff on leave
- Lack of in person engagement with staff
- Inconsistent/ unclear expectations for QI project

W**O**

OPPORTUNITIES

- Magnet status
- Resourced / highly equipped
- Teaching institute
- Innovative/ advanced medical practice
- Society/ Lymphedema network partnership

THREATS

- Contradicting educational guidelines from other organizations
- Insufficient communication and collaboration with mesosystem

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Appendix F

Cost-Benefit Analysis

Cost Benefit Analysis			
Cost	Capital Costs (one time large purchase)	Annual Revenue Costs (reoccurring expenses)	
Development of Educational Toolkit (\$81/hr x 1 CNL x 200 hours updating EBP and lymphedema education)	\$16,200	\$0	
Materials	\$40	\$40	
Lymphedema Bundle Training (\$82/h x 24 RNs and APPs x 1 training)	\$1,968	\$1,968	
Ongoing Clinical Nurse Leader Training on Lymphedema (\$81/hr x 1 CNL x 1 training)	\$0	\$81	
Total Costs	\$18,208	\$2,089	
Benefits			Annual Benefit Savings (per patient per year)
Decreased Lymphedema Related Complication			\$26,269
Total Savings			\$26,269
	Total Cost Ratio for Initial Implementation	\$26,269 / \$18,208	Starting Cost Benefit Ratio 1.44:1
	Total Cost Ratio for Annual Implementation	\$26,269 / \$2,089	Annual Cost Benefit Ratio 12.57:1

Appendix G

Pre- and Post-Assessment Survey

1. True or False: All patients undergoing cancer treatment will develop lymphedema.

- True
- False

2. Which of the following are common risk factors for lymphedema (select all that apply)?

- A. Increased fat distribution in upper limbs
- B. High BMI
- C. Patient history of axillary lymph node dissection (ALND)
- D. Rurality

3. The following best describes what stage of lymphedema.

The patient is experiencing pitting edema. The swelling is soft and may reduce when the affected area is elevated.

- A. Stage 0
- B. Stage I
- C. Stage II
- D. Stage III

4. What is the stage of lymphedema when scarring is visible, and swelling cannot be reduced by elevating the limb?

- A. Stage 0
- B. Stage I
- C. Stage II
- D. Stage III

5. Which of the following diagnostic tests provides specialized imaging to detect lymph fluid and identify blockages?

- A. Bioimpedance spectroscopy
- B. Lymphoscintigraphy
- C. Ultrasound
- D. CT scan

6. True or False: Patients with lymphedema are more susceptible to cellulitis.

- True
- False

7. True or False: Patients should be instructed to avoid exercise with the affected limb.

- True
- False

8. Which of the following is not included in Complete Decongestive Therapy (CDT)?

1. Manual lymph draining (MLD)

2. Compression bandages
3. Skincare
4. Pharmacology
5. Exercise

9. The gold standard for lymphedema management is:

- A. Intermittent Pneumatic Compression (IPC)
- B. Complete Decongestive Therapy (CDT)
- C. Manual Lymph Drainage (MLD)
- D. Microsurgical reconstructive procedures

10. Lymphaticovenous anastomosis (LVA) is a surgical procedure that

- A. Involves first injecting green dye into the patient to locate functioning lymph nodes such as the neck, abdomen, or groin, and transplanting it to an area with damaged lymph nodes, usually in the arm or leg.
- B. May be considered for patients with late-stage II and stage III lymphedema.
- C. Is a specialized intervention similar to liposuction used to remove fat cells and fluid?
- D. Redirects the lymph vessels to connect with nearby veins in the affected area of the body.

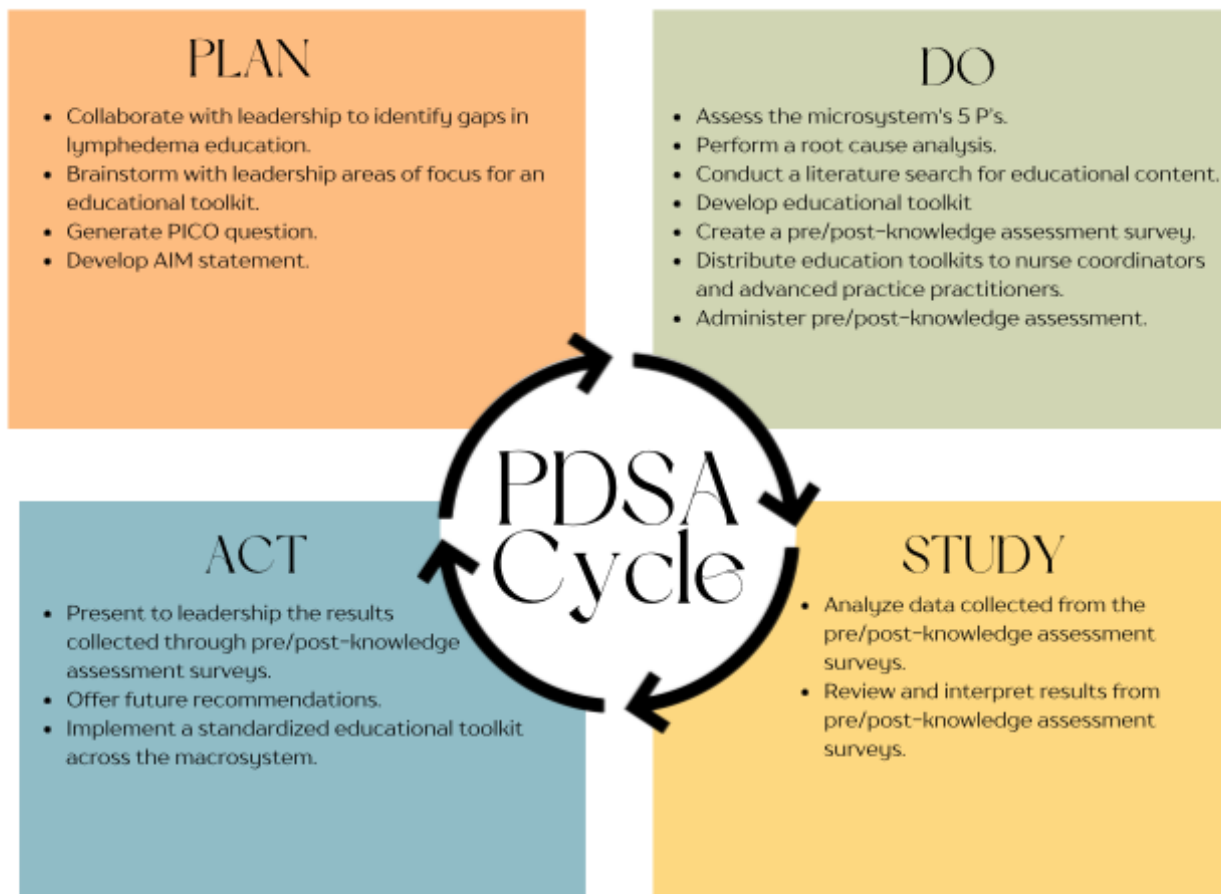
11. For the following statements, please state true or false.

Statement	True	False
A. Repetitive movements will increase circulation to help reduce swelling		
B. Deep breathing helps promote lymph flow		
C. Use a cold compress to help with swelling		
D. Use the sauna at the gym to promote circulation		
E. Avoid underwire bras		
F. Avoid going outside in the sun between the hours of 10 am – 4 pm		
G. Wear compression garments during air travel		

Answer Key: 1) False 2) All the Above 3) B. Stage I 4) C. Stage II 5) B. Lymphoscintigraphy 6) True 7) False 8) 4. Pharmacology 9) B. Complete decongestive Therapy (CDT) 10) D. Redirects the lymph vessels to connect with nearby veins in the affected area of the body 11) 11a. False 11b. True 11c. False 11d. False 11e. True 11f. True 11g. True

Appendix H

PDSA Cycle



Appendix I

Results

