Clinical management of patients with breast cancer-related lymphedema: a best practice implementation project

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ABSTRACT

Background and aims: Breast cancer-related lymphedema (BCRL) is a burdensome complication of breast cancer that may significantly affect patients’ quality of life. Best evidence-based interventions should be applied to the clinical management of BCRL to provide the best care for patients. This project aimed to promote evidence-based practices in the management of patients with BCRL and to assess the impact of these changes on improving clinical outcomes in a large tertiary hospital.

Methods: The current evidence implementation project was conducted in the Breast Surgery Department of a tertiary hospital in China. Four audit criteria were developed for the baseline and follow-up audits. The project used the JBI’s Practical Application of Clinical Evidence System and the Getting Research into Practice audit and feedback tool to promote evidence-based healthcare into practice. Twenty patients with BCRL were assessed both in baseline and follow-up audits.

Results: The results of the baseline audit demonstrated that there was poor compliance with most of the audit criteria. Significant improvements were achieved in the four audit criteria in the follow-up audit compared with those in the baseline audit. The 55% of women with BCRL being offered complex decongestive therapy rose from 25 to 55%. Individualized exercise program implementation increased from 50% at baseline to 90% at follow-up. Compliance with resistance training being provided improved from 0 to 90%. Education of patients improved, with specific education about the benefits of exercise in the management of lymphedema increasing from 75 to 100%.

Conclusion: The current evidence-based implementation project for the clinical management of patients with BCRL was successfully conducted. However, patient outcomes and the sustainability of the audit criteria were not evaluated, which are needed in further studies.

Key words: best practice, breast cancer-related lymphedema, implementation project, management


What is known about the topic?
- BCRL as one of the most serious complications after breast cancer treatment has a tremendous impact on patients’ quality of life.
- Various treatments are found to be effective in reducing lymphedema; however, none of these can completely cure it.
- Optimal management strategies are necessary to alleviate lymphedema symptoms and improve patients’ quality of life.

What does this article add?
- Improving nursing staff’s knowledge and attitude toward evidence-based lymphedema practice contributed to increasing the compliance rate.
- An exercise program and a checklist were developed and implemented in this project to enable nursing staff to conduct recommended strategies more conveniently, therefore, bypassing some barriers.
- The increased number of lymphedema therapists and financial support may act as enablers to meeting best practice recommendations.

Background
Breast cancer has been identified as the most common cancer in women. With the increase in the 5-year survival rate, the quality of life of breast cancer survivors has aroused more concern in recent years. Breast cancer-related lymphedema (BCRL) is a...
burdensome complication of breast cancer that is associated with surgical interventions (sentinel or axillary lymph node dissection), adjuvant radiation therapy, chemotherapy, trauma and/or infection. These factors injure the lymphatic circulation of the upper extremity, leading to the accumulation of protein-rich lymphatic fluid within the interstitial space. The reported incidence of BCRL ranges from 0 to 94%, which varies depending on the diagnostic methods and diagnostic criteria, as well as the observation interval. Patients with BCRL may experience symptoms that mainly include chronic upper limb swelling, heaviness, stiffness, tightness, pain and tingling, which could affect patients’ abilities to perform activities of daily life and maintain employment and social roles. Beyond this, BCRL has a devastating influence on patients’ quality of life and can lead to a devastating impact on patients’ psychological function, such as increased depression, irritation and frustration. Both physiological and psychological function impairments lead to a devastating influence on patients’ quality of life. Therefore, more attention should be paid to the management of patients with BCRL.

With regard to the management of BCRL, many efforts have been made by numerous professional organizations and consensus groups. First, the 2016 consensus document developed by the International Society of Lymphology recommended that clinical staff use nonoperative and operative treatments to manage BCRL. There are various nonoperative treatments including complex decongestive therapy (CDT), intermittent pneumatic compression (IPC), thermal therapy, low-level laser therapy and drug therapy (e.g. diuretics, benzopyrones and antimicrobials). Operative treatments mainly include lymphatic venous anastomoses, vascularized lymph node transplantation and liposuction. Second, the American Society of Breast Surgeons emphasized that CDT is the standard of care for BCRL, which consists of manual lymphatic drainage, compression bandaging, therapeutic exercises and skin care. Furthermore, research identified that exercise, such as aerobic, progressive resistance and weight lifting, is beneficial in the treatment of BCRL. Exercise ameliorates symptoms and improves the upper body strength of patients with BCRL because muscle pumps play a role in stimulating lymphatic transport and improving physical endurance and body strength. This is consistent with the recommendations made by the National Comprehensive Cancer Network (NCCN), which stated that physical activity and resistance training are not associated with the exacerbation of BCRL. Moreover, the NCCN guidelines suggested that oncology teams should attach importance to providing patients with BCRL with education about self-care management. Although there are many methods used in the treatment of BCRL, none of these treatments can completely cure it. The aim of lymphedema treatment is to remove the excess lymph, maintain upper arm volume and protect lymphedema from exacerbation. In China, various approaches based on traditional Chinese medicine theory, such as acupuncture, Chinese traditional medicine and acupoint massage, are used to manage BCRL. However, there is limited evidence to suggest that these approaches contribute to alleviating lymphedema symptoms, and further large-scale studies are needed.

Numerous studies have demonstrated that evidence-based practice (EBP) is the foundation of nursing practice, which can reduce healthcare costs and improve the quality of nursing practice and clinical outcomes. Nursing staff who provide care for patients based on experience, tradition or belief is far from enough. Therefore, it is essential to manage BCRL based on evidence to provide the best care for patients with BCRL.

The objective of this project was to promote EBPs based on a JBI evidence summary in the management of patients with BCRL, and utilize the JBI Practical Application of Clinical Evidence System (JBI PACES) model to conduct audit and feedback strategies. This implementation project was conducted in the Breast Surgery Department of Nanfang Hospital in Guangzhou city, PR China. Nanfang Hospital is the largest affiliated hospital of Southern Medical University, and has approximately 3000 beds. Therapies usually provided for patients with BCRL in the hospital mainly include CDT and IPC, and only patients with lymphedema of stage 2 or stage 3 were offered CDT. Furthermore, education about exercise, especially in relation to resistance exercise or weight lifting in this hospital is limited. Most of the patients with BCRL receive suboptimal management of their lymphedema in the ward. Therefore, it is vital for nursing staff to facilitate this EBP implementation project to improve the management of BCRL in the hospital.

**Aim and objectives**

The aim of this evidence implementation project was to improve compliance with evidence-based standards of care regarding clinical management of patients with BCRL and to assess the impact of these changes in improving clinical outcomes in a large tertiary hospital.

The specific objectives were as follows:

1. To determine current compliance with evidence-based criteria regarding the management of patients with BCRL through a baseline audit.
2. To improve nursing staff’s and patients’ knowledge regarding best practices for the management of patients with BCRL.
To improve compliance with evidence-based criteria regarding the management of patients with BCRL by undertaking a follow-up audit and evaluation.

Methods
The current evidence implementation project was conducted in the Breast Surgery Department with 30 hospital beds. The Breast Surgery Department is run by nine doctors and 15 nursing staff (two of the nursing staff are certified lymphedema therapists). The lymphedema therapy center in the department was established in 2018. Some patients with BCRL enrolled in this study were outpatients and others were inpatients who were undergoing chemotherapy or targeted therapy. The project used the JBI PACES and the Getting Research into Practice (GRiP) audit and feedback tool over a period of 4 months, from 1 May to 6 September 2019. The PACES and GRiP framework for promoting evidence-based healthcare involves three phases of activity:

1. Establishing a team for the project and undertaking a baseline audit based on criteria informed by the evidence.
2. Reflecting on the results of the baseline audit, and designing and implementing strategies to address noncompliance found in the baseline audit informed by the JBI GRiP framework.
3. Conducting a follow-up audit to assess the outcomes of the interventions implemented to improve practices, and identify future practice issues to be addressed in subsequent audits.

Ethical considerations
The current project was registered as a quality improvement activity within the hospital and therefore did not require ethical approval.

Phase 1: Team establishment and baseline audit
To conduct this project, a team was initially established. The project team (six members in total) consisted of the project leader, the Director of the Nursing Department of the Hospital, a core staff of The Nanfang Nursing Centre for Evidence-based Practice: A JBI Centre of Excellence, the head nurse and a clinical nurse in the Breast Surgery Department, and a postgraduate student. Each member had their roles and responsibilities. All members and their positions, roles or responsibilities are detailed in Table 1.

The audit criteria for this project were derived from a JBI evidence summary.21 Before conducting the baseline audit, a meeting which lasted about 2 h was held to discuss the sample size and data collection approach for each audit criterion. To measure the compliance of each audit criterion, forms and flowcharts were developed, including a checklist for nursing staff, an exercise program and a knowledge assessment questionnaire for patients with BCRL (these resources are available in the Chinese language, contact the corresponding author for further details). The checklist consisted of essential disease information, lymphedema staging, the four audit criteria relevant to the management of BCRL and its requirements, nurse-in-charge and the time of evaluation. The evidence-based exercise program included types of exercise, time (duration of exercise),

Table 1. Team establishment

<table>
<thead>
<tr>
<th>Team member</th>
<th>Position</th>
<th>Role/Responsibility</th>
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<tbody>
<tr>
<td>Project leader</td>
<td>Member of nursing department of Nanfang Hospital</td>
<td>Developed the protocol, designed strategies, forms, data analysis and report</td>
</tr>
<tr>
<td>Member 1</td>
<td>Director of nursing department of Nanfang Hospital, leader of The Nanfang Nursing Centre for Evidence-based Practice: A JBI Centre of Excellence</td>
<td>Project guidance, led the change according to the clinical audit in the project, project supervision</td>
</tr>
<tr>
<td>Member 2</td>
<td>Core staff member of The Nanfang Nursing Centre for Evidence-based Practice: A JBI Centre of Excellence</td>
<td>Provided guidance for the project, assisted with the implementation of strategies, quality control</td>
</tr>
<tr>
<td>Member 3</td>
<td>Head nurse of the Breast Surgery Department, certified lymphedema therapist</td>
<td>Provided professional training to all nursing staff and ensured evidence-based BCRL management practices were implemented in the ward</td>
</tr>
<tr>
<td>Member 4</td>
<td>Clinical nurse in Breast Surgery Department, certified lymphedema therapist</td>
<td>Organized educational materials and provided education for patients with BCRL</td>
</tr>
<tr>
<td>Member 5</td>
<td>Postgraduate student</td>
<td>Data collection from the clinical department</td>
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</table>

BCRL, breast cancer-related lymphedema.
contraindications, frequency and intensity, which was
developed by team members. This exercise
program was essential for nursing staff to provide
exercise instructions to patients with BCRL. Furthermore, in relation to the questionnaire, a structured
search of the literature was carried out to determine
the content for the questionnaire. Exercise
knowledge and the benefits of exercise were included in
the questionnaire. The questionnaire consisted of 10
questions, and the score of the questionnaire ranged
from 0 to 10.

A baseline audit was conducted from 1 May to 5 June
2019. Twenty patients with BCRL were assessed. JBI
PACES was used to analyze the data. Table 2 shows
the evidence-informed audit criteria used in the project
(baseline and follow-up audits) together with a descrip-

Table 2. Audit criteria, sample and measurement method

<table>
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<tr>
<th>Audit criterion</th>
<th>Sample</th>
<th>Method used to measure % compliance with best practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women with breast cancer-related lymphedema are offered CDT</td>
<td>20 Patients with breast cancer-related lymphedema in the Breast Surgery Department in a tertiary hospital were checked at baseline and during follow-up data collection</td>
<td>Measured by nursing documents. This criterion was considered met if the following occurred: Patients were evaluated with an objective measure (e.g. arm circumference) and patient-reported outcomes to determine the lymphedema staging, as noted in the nursing documents. Patients with lymphedema of stage 0 were focused on surveillance. The discretionary use of compression therapy garments and MLD were recommended to protect the affected arms, as noted in the nursing documents. Patients with lymphedema of stages 1–3 were offered CDT in the nursing documents, which consisted of MLD, compression bandaging, therapeutic exercise and skin care. Measured by asking patients if they have an individualized exercise program (answer yes/no) and conducting a practical test to determine whether patients have mastered the exercises. This criterion was considered met if the following occurred: A preexercise evaluation was carried out prior to exercise commencement in the nursing documents; to ensure that there were no medical conditions that would limit the exercise. The recommended evaluation mainly included assessment of arm/shoulder mobility and cardiopulmonary disease and whether the patient experiences extreme fatigue, anemia or ataxia. The exercise program for patients developed by health professionals based on evidence was in the nursing documents, and included aerobic exercise, shoulder/arm/elbow joint exercises and resistance training. Patients with breast cancer-related lymphedema were advised to wear compression garments during exercise, as noted in the nursing documents. Patients answered yes and conducted recommended exercise. Measured by nursing documents. This criterion was considered met if the following occurred: A preexercise evaluation was carried out prior to exercise commencement, as noted in the nursing documents. Patients with a clinical diagnosis of stable lymphedema (i.e. no need for lymphedema therapy within the past 3 months, no recent limb infections requiring antibiotics, no change in limb circumference &gt;10%, no change in the ability to perform activities of daily living) were advised to conduct progressive resistance training 2–3 days per week, as noted in the nursing documents. Measured by nursing documents. Measured by asking patients if they have been provided with education related to the benefits of exercise (answer yes/no). This criterion was considered met if the following occurred: Education related to the benefits of exercise in the management of lymphedema was provided for patients, as noted in the nursing documents. Patients answered yes and were clear about the benefits of exercise.</td>
</tr>
<tr>
<td>Women with breast cancer-related lymphedema have an individualized exercise program</td>
<td>20 Patients with breast cancer-related lymphedema in the Breast Surgery Department in a tertiary hospital were checked at baseline and during follow-up data collection</td>
<td></td>
</tr>
<tr>
<td>The individualized exercise program includes resistance training</td>
<td>20 Patients with breast cancer-related lymphedema in the Breast Surgery Department in a tertiary hospital were checked at baseline and during follow-up data collection</td>
<td></td>
</tr>
<tr>
<td>The health professional has provided patient education related to the benefits of exercise in the management of lymphedema</td>
<td>20 Patients with breast cancer-related lymphedema in the Breast Surgery Department in a tertiary hospital were checked at baseline and during follow-up data collection</td>
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CDT, complex decongestive therapy; MLD, manual lymphatic drainage.
tion of the sample and approach to measuring compliance with best practices for each audit criterion.

**Phase 2: Design and implementation of strategies to improve practices (Getting Research into Practice)**

Following the baseline audit, the second phase was conducted. According to the baseline audit results, the team members identified the gaps and barriers between current practices and best practice recommendations of this implementation project. Two face-to-face meetings lasting an hour each were held in the ward. The first meeting was the process of discussion and identification of the existing and potential barriers, such as how to develop the individualized exercise program. The main contents of the second meeting were the development of strategies to overcome the barriers, such as evidence-based approach was approved to develop the exercise program. In addition, any issues or confusion about the barriers and strategies were discussed immediately via telephone and WeChat (Tencent Holdings Limited Corp, version 6.6.2, Guangzhou, China) PowerPoint (Microsoft Corp, version 14, Washington State, American). The JBI GRiP framework was utilized to inform key stakeholders, gather opinions and allocate the available resources to promote implementation changes. Phase 2 was carried out between 6 June and 31 July 2019.

The GRiP strategies are shown in the Results section of this implementation report.

**Phase 3: Follow-up audit post implementation of the change strategy**

The follow-up audit was conducted from 1 August to 6 September 2019. The audit criteria and approaches, which were the same as those in the baseline audit, were used to measure the outcomes after implementing EBPs and to identify new practice problems that need to be addressed in future audits. The follow-up audit included 20 patients with BCRL, and the results were entered into JBI PACES to examine any changes relative to the results in the baseline audit. The patients with BCRL were also required to answer the questionnaire about exercise to evaluate the effectiveness of this implementation project.

**Results**

**Phase 1: Baseline audit**

The results regarding compliance with each audit criterion of the baseline audit are presented in Fig. 1. The highest level of compliance was for criterion 4 (the health professional has provided patient education related to the benefits of exercise in the management of lymphedema), with a compliance rate of 75%. Criterion 2 showed that 50% of patients with BCRL were provided an individualized exercise program. However, criterion 1 showed low compliance, with 25% of patients with BCRL being offered CDT. Furthermore, none of the patients with BCRL had an exercise program that included resistance training (criterion 3).

![Figure 1](image-url)
During the baseline audit, the questionnaire for patients with BCRL was used to assess the knowledge level regarding exercise. As a result, the patients with BCRL scored an average of 4.3 out of 10 (43%). The results indicated that although some patients had an individualized exercise program, they lacked critical knowledge regarding exercise for BCRL.

**Phase 2: Strategies for Getting Research into Practice**

In this phase, four barriers were identified, and a series of strategies based on available resources were executed to address these barriers to improve outcomes. The results of the GRIP implementation are presented in Table 3.

The first barrier was that stakeholders refused to change the current situation and implement the project. To address this barrier, a 2-h meeting was held in the ward. The meeting was divided into two parts. The first part of the meeting was delivered by a clinical nurse who had conducted an evidence-based implementation project in the Department of Radiotherapy, to share her experience and illustrate the benefits of EBPs. The second part of the meeting was designed to communicate with the stakeholders and talk about their concerns. Furthermore, the project was funded by the Nursing Department of the hospital to stimulate nursing staff to change their attitude about the project. In addition, to increase stakeholders’ awareness and confidence regarding EBP, education about the knowledge of evidence-based nursing was conducted by team members with a PowerPoint (version 14; Microsoft Corp., Redmond, Washington, U.S.A.) presentation and electronic materials.

Lack of exercise guidelines to provide patients with BCRL was identified as the second barrier. Therefore, the team members developed an exercise program based on prior evidence, including guidelines, expert consensus, and JBI evidence summaries, taking advantage of the network resources of the Southern Medical University Library and JBI Library. Specifically, expert consultation for the process of developing the exercise program and the content of the exercise program was performed, with the help of the lymphedema specialist head nurse. Finally, the exercise program mainly included the following:

1. A preexercise evaluation was conducted prior to exercise commencement for patients with BCRL.

**Table 3. Getting Research into Practice matrix**

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Strategy</th>
<th>Resources</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholders refused to change the current situation and implement the project</td>
<td>Communicate with the stakeholders, talk about their concerns and illuminate the importance of this implementation project</td>
<td>Leadership of the nursing manager of the hospital</td>
<td>Stakeholders show good compliance with the audit and the implementation project was conducted smoothly</td>
</tr>
<tr>
<td>Lack of exercise guidelines with an individualized exercise program to provide to patients with BCRL</td>
<td>Develop an exercise program based on evidence</td>
<td>The policy of the hospital to support the evidence-based practice project</td>
<td>Patients with BCRL have been provided with individualized exercise program based on the developed exercise program</td>
</tr>
<tr>
<td>Lack of knowledge of managing BCRL and a new procedure in the management of BCRL</td>
<td>Education regarding the management of BCRL</td>
<td>The network resources of Southern Medical University Library and JBI Library</td>
<td>Nursing staff’s knowledge of the management of BCRL was improved, and the procedure was applied to the management of BCRL</td>
</tr>
<tr>
<td>Limited time and heavy workload made it difficult for nursing staff to perform the suggested practices</td>
<td>Simplify the procedure to fit into nurse staff’s schedule</td>
<td>Leadership of the nursing manager of the hospital and head nurse in the ward</td>
<td>The heavy workload of nursing staff was alleviated and the compliance with best practices was increased</td>
</tr>
<tr>
<td></td>
<td>Recruit postgraduate student to help implement the project</td>
<td>Training for the postgraduate student</td>
<td></td>
</tr>
</tbody>
</table>

**References**

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Patients with medical contraindications, such as experiencing extreme fatigue (a score of 7–10 on a 0–10 numeric rating scale), anemia (low red blood cells) and ataxia, should not be encouraged to exercise.

(2) The types of exercise consisted of aerobic exercise, resistance exercise and joint exercise, with a goal of 150 min of moderate-intensity or 75 min of vigorous-intensity aerobic exercise and 2–3 days per week of resistance exercise sessions (8–10 muscle groups, 8–10 repetitions, two sets) at moderate-to-vigorous intensity. Joint exercises involved the joints of the shoulder, elbow, wrist and finger at least three times a day (15 min per session).

The third barrier identified was a lack of knowledge of managing BCRL and a new procedure in the management of BCRL. To address this, group discussions were conducted to formulate a clear procedure in the management of BCRL. Furthermore, a checklist in accordance with four audit criteria and a flowchart based on the procedure were developed, making it more convenient and easier for nursing staff to manage BCRL. Given that the procedure and the knowledge of managing BCRL were different from before, nursing staff were provided with training about the new procedure, and knowledge for managing BCRL and using the checklist.

The last barrier involved was limited time, and heavy workloads made it difficult for nursing staff to perform the suggested practices. To overcome this barrier, the procedure was simplified as much as possible to fit the nursing staff’s schedule and each nurse in the ward had a clear division of labor. Furthermore, the project team involved a postgraduate student to help the nursing staff conduct the project, such as collecting the data.

**Phase 3: Follow-up audit**
Figure 2 demonstrates the compliance during the follow-up audit compared with the baseline audit. There were significant improvements in compliance regarding the best practices criteria except for criterion 1. For criterion 1, only 55% of women with BCRL were offered CDT. The compliance rate for individualized exercise program reached 90% (criterion 2). Furthermore, criterion 3 showed a great improvement in that 90% of women with BCRL were provided with an individualized exercise program that included resistance training. Moreover, all patients with BCRL received education related to the benefits of exercise in the management of BCRL, and the compliance rate increased to 100% (criterion 4).

There were great improvements made in this project regarding not only putting best evidence into practice, but also increasing the exercise knowledge level of patients with BCRL. The 10-item questionnaire for BCRL patients was used again to assess the exercise knowledge, and the average score increased from 4.3 (43%) to 7.4 (74%).

**Discussion**
The current project aimed to conduct an evidence-based implementation project to improve the management of
patients with BCRL. The JBI PACES and GRIP frameworks were used to facilitate putting the best evidence into practice in this 4-month implementation project. Although the compliance rates in the baseline audit were poor, significant improvements were achieved for most audit criteria after conducting the project. These improvements were reflected in the follow-up audit: 100% compliance for one criterion while the others achieved 90, 90 and 55%. Furthermore, a new procedure in the management of BCRL was set up, and patients with BCRL were provided with treatments based on the best evidence.

The project was successful in promoting the application of exercise interventions. In previous studies, there was a misconception that patients with BCRL should limit the use of the affected arm, and they were advised to avoid any strenuous exercise to protect their arms. Prior to implementing this project, resistance exercise interventions were not provided for patients with BCRL in the ward in consideration of patient safety. With more recent developments in the research, this view has changed. It has been reported that exercise is an effective intervention for patients with BCRL, and an individual exercise program may improve their mood, fitness and quality of life. Weightlifting or resistance exercise, which is regarded as a supplemental treatment, is beneficial in the management of BCRL. Thus, based on the particular situation of the patients with BCRL, nursing staff offered individualized exercise program that included resistance training and were based on the exercise program developed by the team members. It was found that developing this exercise program was an effective strategy to improve nurses’ acceptance of audit criteria. In the follow-up audit, the compliance rates for criteria 2 and 3 had greatly increased, but not all patients had been provided with an individualized exercise program that included resistance training on account of the heavy workload that the nursing staff faced.

Education related to the benefits of exercise is an important way to raise patient awareness of exercise. For criterion 4, all patients were provided with education related to the benefits of exercise, which was also a key point for improving patient adherence to exercise. Furthermore, education related to not only the benefits of exercise, but also knowledge of exercise itself was provided to the patients with BCRL to improve the level of knowledge. Meanwhile, a questionnaire was used to assess the effectiveness of the education about exercise.

Despite great improvements achieved in the management of BCRL, gaps between current practices and best practice recommendations were found in this project. BCRL has an adverse effect on survivors who receive breast cancer treatments. Although CDT is regarded as the gold-standard, conservative treatment for patients with BCRL, not all patients in the ward were treated with CDT. For criterion 1, the compliance rate increased from 25 to 55%, rather than 100%. Several reasons that impeded this best practice were identified. First, there were only two lymphedema therapists in the ward, and one of them was also the head nurse of the ward, they were too busy to provide CDT for each patient with BCRL. Second, economic issues were found to be an important factor affecting patient adherence to CDT. Research has suggested that greater BCRL severity is connected with a low socioeconomic position, making the affordability of BCRL care a critical concern. In China, given that CDT is not covered by health insurance, many patients with BCRL, especially patients with limited financial resources, do not have access to CDT treatment. Third, this implementation project was conducted in a tertiary hospital that has the lymphedema therapy center in Guangzhou city. These two lymphedema therapists in this hospital need to provide treatment for patients with BCRL from Guangzhou city as well as patients from other areas. CDT involves a two-phase treatment (intensive treatment and maintenance phase), and 2 or more weeks of daily therapist-delivered treatment is seen as necessary to decongest the swollen arm in the intensive treatment phase. Consequently, patients from other areas had difficulties traveling for a long period every week from home to the hospital to receive CDT. Last, Guangzhou city has a subtropical monsoon climate and a hot summer. Increased discomfort through the use of bandages decreased the treatment completion rate of patients with BCRL in the summer. Therefore, it was the greatest challenge for the nursing staff to implement EBPs, which should be resolved in the future.

There were some limitations in this implementation project. First, the sample size of patients involved in the project was small, because of the low incidence rate of BCRL. Sentinel node biopsy is carried out by doctors to reduce the incidence rate of BCRL, and nursing staff have attached importance to the prevention of lymphedema in the hospital. Second, the time period for this implementation project was relatively short. Third, patient outcomes, such as lymphedema symptoms, limb volume and quality of life, were not evaluated. Whether the patients with BCRL actually undertake BCRL management interventions recommended by the best evidence is unclear. In the future, more research should be conducted to enhance the quality of BCRL care and measure the effect of the entire BCRL management program.

Through the project, it was found that evidence-based best practices could help nursing staff manage
BCRL with a scientifically validated and effective method. Future directions for promoting best practices highlighted by the project as priorities include changing nursing staff’s attitude to the evidence-based implementation project and providing training to newly joined nursing staff. It was important to make it clear to the nursing staff that this implementation project was devoted to providing optimal management for patients with BCRL instead of a research project or extra work. Furthermore, a checklist based on the audit criteria for the nursing staff has contributed to increasing the compliance rate, and this checklist will be added to the electronic nursing record that nurses must complete during the management of patients with BCRL. Education played a vital role in increasing the level of awareness and knowledge regarding exercise, which will become a part of the nursing services provided in the ward. In the future, additional strategies, such as increasing the number of certified lymphedema therapists, will be developed to provide CDT to more patients. Meanwhile, we hope that health insurance can expand coverage to include CDT and financial assistance will be provided for patients with BCRL to reduce their economic burden. Finally, regular follow-up audits will be performed in the ward to evaluate the sustainability of this project.

Conclusion
In summary, the objectives of this quality improvement project were realized. This project demonstrated that EBPs could help improve clinical practice behavior. Patients with BCRL were managed with the best evidence through the identified audit criteria. A series of strategies were taken to improve the compliance rates. Furthermore, a checklist and an exercise program have been established to help nursing staff provide care for patients with BCRL. Through education, patient awareness of exercise and nursing staff awareness of BCRL management have improved. The project was successful in increasing knowledge in BCRL management and providing future direction for sustaining EBP changes. Future plans and ideas are in place and have been discussed. In addition, patient outcomes will be included in further implementation projects to assess the effect of the management of BCRL. Further audits will need to be carried out to maintain practice change and ensure that the project is supported and maintained.

Acknowledgements
The authors would like to thank the staff in the JBI to develop an evidence summary based on the topic and the Nursing Department of the hospital for funding this implementation project (NO, 2019 EBNb007). In addition, the authors would like to thank the staff and patients involved in this project.

Conflicts of interest
There are no conflicts of interest in this implementation project.

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