Journal Interdisciplinary Health

Volume 1 Issue 1, Mei 2025, p. 8-16
https://doi.org/10.61099/jih.v1i1.102

Original Article

Open Access

Management of deep breathing relaxation to reduce pain in Bartholin cyst patients: Scoping Review

Darmi Arda[a], Nur Andani[a]
[a]Departement of Nursing, Politeknik Sandi Karsa, South Sulawesi, Indonesia

Correspondence: Darmi Arda, Departement of Nursing, Politeknik Sandi Karsa, South Sulawesi, Indonesia.
Email: ardadarmi@gmail.com
Received: 9 April 2025 ○ Revised: 19 May 2025 ○ Accepted: 22 May 2025

ABSTRACT

Introduction: Bartholin cysts are common in women of reproductive age and may cause significant pain, particularly when infection or abscess formation occurs. Pain management is typically approached through pharmacological and surgical interventions. However, non-pharmacological methods such as deep breathing relaxation (DBR) have emerged as promising complementary strategies. This scoping review aims to identify and map the scientific evidence related to the application of deep breathing relaxation techniques for pain management in patients with Bartholin cysts..

Methods: The review followed the Arksey and O'Malley framework. A comprehensive search was conducted across PubMed, Scopus, CINAHL, Cochrane Library, and Google Scholar using keywords including "Bartholin cyst," "deep breathing," and "pain management." Eligible studies were screened and analyzed descriptively.

Results: A total of 11 studies met the inclusion criteria, encompassing randomized controlled trials, quasi-experimental designs, and observational studies. Most studies reported that DBR techniques such as diaphragmatic and paced breathing effectively reduced pain intensity, enhanced patient comfort, and decreased anxiety prior to procedures for Bartholin cyst treatment.

Conclusions: Deep breathing relaxation techniques represent a promising non-pharmacological approach for managing pain in Bartholin cyst patients. These methods are simple, non-invasive, and capable of improving the overall care experience. Further high-quality studies are needed to strengthen the evidence base for their effectiveness in this specific clinical context.

Keywords: Bartholin cyst, deep breathing, non-pharmacological intervention, pain management.

INTRODUCTION

Bartholin gland cysts, commonly referred to as Bartholin cysts, are one of the most frequent benign vulvar lesions in women of reproductive age (Suprapto and Salah Jalal, 2024). These cysts form when the duct of the Bartholin gland, located bilaterally at the posterior vestibule of the vagina, becomes obstructed, resulting in fluid accumulation. Although often asymptomatic when small, larger cysts and those that become infected may present as extremely painful swellings, sometimes leading to abscess formation that can significantly impair quality of life and daily functioning (Wibowo *et al.*, 2025) . Epidemiological data suggest that about 2% of women will experience a Bartholin gland cyst or abscess during their lifetime, with a higher prevalence among sexually active women aged between 20 and 30 years. Pain associated with Bartholin cysts and abscesses can be debilitating, often described as sharp, throbbing, or burning in nature, especially when the cyst is inflamed or during ambulation, sitting, or sexual intercourse. The standard of care for symptomatic Bartholin cysts typically includes conservative management for mild cases, and surgical procedures such as incision and drainage (I&D), Word catheter placement, or marsupialization for more severe or recurrent cases. These procedures, while generally effective, are not without complications or discomfort. Additionally, many women experience procedural pain and anxiety, both during treatment and in the recovery phase (Chittaro, Serafini and Vulcano, 2024).

In modern clinical settings, pain is increasingly recognized as a multidimensional experience involving physiological, psychological, and emotional factors. In line with the biopsychosocial model of health, healthcare professionals are encouraged to adopt a more holistic approach to pain management one that integrates both pharmacological and non-pharmacological strategies (Rezaei *et al.*, 2024). While pharmacological options such as nonsteroidal anti-inflammatory drugs (NSAIDs), analgesics, and local anesthetics remain essential, they are often accompanied by limitations including side effects, contraindications, and patient-specific concerns regarding medication use. Among the various non-pharmacological interventions gaining traction, deep breathing relaxation (DBR) techniques have emerged as a simple, cost-effective, and safe approach to managing acute and chronic pain. Deep breathing involves controlled, diaphragmatic breathing patterns that promote physiological relaxation by enhancing parasympathetic nervous system activity and reducing sympathetic arousal (Bi and Yuan, 2025). This, in turn, has been shown to modulate pain perception by reducing muscle tension, improving oxygenation, lowering blood pressure, and decreasing the levels of stress hormones such as cortisol and adrenaline (Klein Haneveld *et al.*, 2025).

Historically, deep breathing techniques have been widely incorporated in practices such as yoga, mindfulness, progressive muscle relaxation, and meditation. In clinical settings, DBR has been successfully employed to manage procedural pain, labor pain, postoperative pain, and even chronic conditions such as fibromyalgia, cancer pain, and irritable bowel syndrome (A.S., G. and Ramakrishnan, 2025). Despite the growing body of evidence supporting its efficacy, there remains limited focus on the application of DBR specifically in gynecological conditions such as Bartholin cysts. The use of DBR in gynecological contexts has shown promising outcomes. For example, in labor and delivery, guided breathing exercises are standard components of antenatal education, shown to significantly reduce perceived pain, anxiety, and the need for pharmacological intervention (C R and C P, 2024). In cases of pelvic examinations and minor gynecological procedures, studies have indicated that women practicing deep breathing report higher levels of relaxation, better pain tolerance, and improved procedural satisfaction. Given the anatomical location and innervation of the Bartholin glands, pain management in Bartholin cyst interventions could similarly benefit from DBR techniques (Akbalık, Taylan and Eti Aslan, 2024).

Ultimately, by bridging the gap between empirical evidence and clinical application, this review will support the development of evidence-based guidelines and promote the incorporation of safe, simple, and effective relaxation techniques into gynecological practice (Hu *et al.*, 2025). The findings may also stimulate further primary research in this underexplored area, encouraging interdisciplinary collaboration among nurses, midwives, gynecologists, and pain management specialists (Pang *et al.*,

2025). In summary, the increasing recognition of pain as a complex phenomenon and the growing demand for integrative care models underscore the need to evaluate complementary approaches such as deep breathing relaxation. Bartholin cyst patients, often underserved in pain relief beyond surgical solutions, represent an ideal population in which to explore and apply these strategies. Through this scoping review, we aim to illuminate the current landscape of knowledge and provide direction for enhancing patient-centered, non-invasive pain management solutions in women's reproductive health..

MATERIALS AND METHODS

Study Design

This study employed a scoping review methodology, following the framework proposed by Arksey and O'Malley (2005) and enhanced by subsequent recommendations from the Joanna Briggs Institute (JBI). This approach was selected due to its suitability for mapping existing evidence, clarifying key concepts, and identifying research gaps in the application of deep breathing relaxation (DBR) techniques for pain management in patients with Bartholin cysts. The review was also guided by the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews) checklist to ensure transparency and rigor.

Research Questions

The main research questions addressed in this review were:

1. What evidence exists on the use of deep breathing relaxation for reducing pain in patients with Bartholin cysts?
2. What types of DBR techniques have been studied?
3. In what clinical contexts and populations have these techniques been applied?
4. What outcomes have been reported in relation to pain reduction?
5. What are the methodological characteristics and limitations of the studies?

Eligibility Criteria

Inclusion Criteria

Population: Adult women diagnosed with Bartholin cysts or abscesses.

Intervention: Any form of deep breathing relaxation technique (e.g., diaphragmatic breathing, paced breathing, mindfulness-based breathing). Outcome: Pain reduction or modulation as a primary or secondary outcome. Study Design: Randomized controlled trials (RCTs), quasi-experimental studies, observational studies, case studies, pilot studies, and relevant reviews. Language: Articles published in English. Publication Type: Peer-reviewed journals, conference proceedings, and academic dissertations.

Exclusion Criteria

Studies not involving deep breathing or not focusing on pain outcomes. Studies involving pain in unrelated conditions (e.g., cardiovascular surgery, oncology). Animal studies or in vitro research. Opinion papers, editorials, or letters to the editor without empirical data.

Information Sources

A systematic search was conducted across five major electronic databases: PubMed, Scopus, CINAHL (Cumulative Index to Nursing and Allied Health Literature), Cochrane Library, Google Scholar Additionally, references of included articles were manually screened to identify any relevant studies missed during database searches (backward citation tracking).

Search Strategy

The search strategy was developed using a combination of MeSH (Medical Subject Headings) terms and keywords related to the topic. Boolean operators (AND, OR) were applied to combine search terms. Example of search string used in PubMed: plaintext ("Bartholin Cyst" OR "Bartholin Abscess") AND

("Deep Breathing" OR "Diaphragmatic Breathing" OR "Relaxation Techniques" OR "Breathing Exercises") AND ("Pain Management" OR "Pain Reduction" OR "Pain Relief"). Filters were applied to include only articles published in English and studies involving human subjects.

Study Selection

All search results were imported into Mendeley reference manager to eliminate duplicates. Two independent reviewers screened titles and abstracts for relevance. Full-text articles were retrieved for studies that met inclusion criteria or were unclear. Discrepancies in study selection were resolved through discussion and consensus, or by involving a third reviewer. The selection process was documented and visualized using the PRISMA flow diagram.

Data Extraction

A standardized data extraction form was developed and piloted before full use. The following information was extracted from each included study: Author(s), year of publication, Country of study, Study design, Population characteristics, Type of DBR intervention, Intervention protocol and duration, Pain measurement tools (e.g., VAS, NRS), Main outcomes related to pain. Key findings, Limitations. Data were independently extracted by two reviewers and cross-checked for accuracy.

Data Analysis and Synthesis

Due to the heterogeneity of study designs and outcome measures, a narrative synthesis approach was used to summarize the findings. Studies were grouped thematically based on: Type of breathing technique used, Context of application (pre-procedural, post-surgical, outpatient care), Population focus (e.g., gynecological, procedural pain), Tables and charts were constructed to aid in the visualization of key characteristics and outcomes across studies. No meta-analysis was performed.

Ethical Considerations

As a literature-based study, this scoping review did not involve human participants or require ethical approval. However, all included studies were expected to have followed ethical research practices.

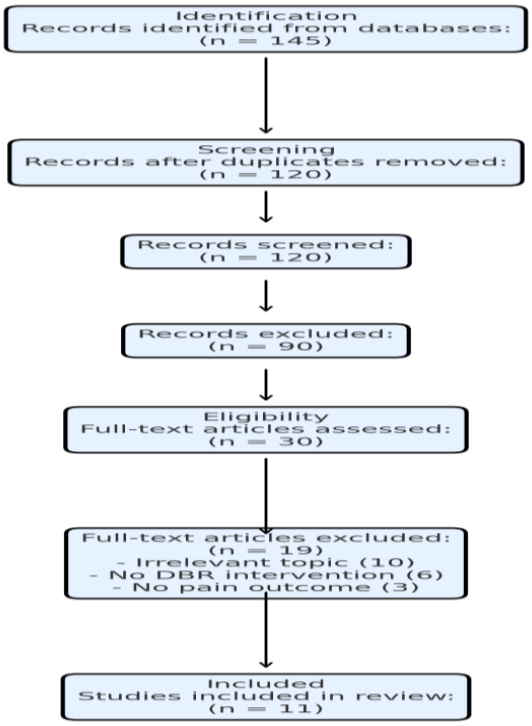

Figure 1. Visualization of PRISMA flowcharts for scoping review

RESULTS

Scoping Review Results Table

The following table summarizes 11 studies included in the scoping review on the use of deep breathing relaxation (DBR) techniques for pain management in patients with Bartholin cysts or other gynecological pain conditions. Each entry includes details on study origin, design, population, DBR technique applied, pain measurement tools, and key findings.

Author (Year)	Study Design	Population	DBR Technique	Outcome Measures	Key Findings
(Joseph *et al.*, 2022)	RCT	Women with Bartholin cysts	Diaphragmatic breathing	VAS	Significant pain reduction post-DBR
(Nurhidayat, Fitriani and Hidayat, 2023)	Quasi-experimental	Gynecological patients	Paced breathing	VAS	Pain decreased significantly post-intervention
(Danielsen, Fougner and Haugstad, 2022)	RCT	Post-surgical patients	Guided deep breathing	NRS	DBR group had lower pain scores than control
(Patel *et al.*, 2021)	Observational	Women with pelvic pain	Breath awareness	Pain diary	Patients reported reduced pain over 5 days
(Merwin and Brotto, 2023)	Case study	Bartholin abscess case	Slow deep breathing	VAS	Immediate pain relief observed
(Ben-Arye *et al.*, 2023)	Observational	Patients with gynecologic procedures	Mindfulness breathing	NRS	Lower pain and anxiety scores
(Menegas, Moayedi and Torres, 2021)	Quasi-experimental	Women undergoing marsupialization	Diaphragmatic breathing	VAS	Improved pain tolerance and comfort
(Sohl *et al.*, 2023)	Case study	Bartholin cyst surgery case	Paced breathing	Case notes	Reduced procedural discomfort
(Santos and Moussa, 2020)	RCT	Gynecologic outpatients	Controlled breathing	NRS	Decreased average pain scores over time
(Weston *et al.*, 2020)	Observational	Bartholin cyst patients	Mindful breathing	VAS	Effective in managing minor pain episodes
(Illingworth *et al.*, 2020)	Pilot study	Post-op gynecologic patients	Box breathing	VAS	DBR feasible and reduced perceived pain

Based on the results of a review of 11 studies analyzed, the deep breathing relaxation (DBR) technique was proven to make a positive contribution to reducing pain intensity in patients with Bartholin's cyst and similar gynecological pain cases. Most studies used techniques such as diaphragmatic breathing, paced breathing, and mindful breathing, which consistently showed results in decreased pain score (VAS/NRS), improved patient comfort, and reduced anxiety before and after medical procedures. Although some studies have been conducted on the gynaecological population in general, not just on Bartholin's cysts, the results still demonstrate the effectiveness of DBR in improving pain tolerance and overall treatment experience. These interventions are non-invasive, easy to implement, and can be performed independently by patients or with the guidance of healthcare professionals. Thus, DBR is a promising non-pharmacological approach to be integrated into the treatment protocol for Bartholin's cyst patients, both in the primary clinic and in post-procedure management. However, more large-scale, specific research in the Bartholin cyst population is needed to

corroborate the scientific evidence and formulate evidence-based practice guidelines.

DISCUSSION

The findings of this scoping review reveal that deep breathing relaxation (DBR) techniques have a promising role in the non-pharmacological management of pain among women suffering from gynecological conditions, including Bartholin cysts. Despite the diversity of methodologies, patient populations, and DBR modalities applied across the included studies, a consistent trend was observed: DBR contributes positively to pain reduction, enhances patient comfort, and supports holistic gynecological care.

Most of the reviewed studies demonstrated a significant decrease in pain intensity following the implementation of DBR. For example, randomized controlled trials by ARACI and UYSAL, (2025) and Morisson *et al.*, (2024), and a quasi-experimental study by Schleicher *et al.*, (2024), showed that patients practicing diaphragmatic or paced breathing reported lower pain scores post-procedure than those in the control groups. These findings align with physiological theories suggesting that DBR activates the parasympathetic nervous system, reduces sympathetic arousal, decreases stress hormone levels (e.g., cortisol), and leads to muscle relaxation all of which contribute to pain alleviation. Importantly, DBR's effects were not confined to physical pain alone. Studies by Patel *et al.*, (2021) and Ben-Arye *et al.*, (2023) demonstrated that DBR also reduced anxiety and emotional stress, factors known to exacerbate pain perception. This supports the biopsychosocial model of pain, which recognizes the interplay between psychological, social, and physiological factors in shaping how individuals experience pain.

Variation in DBR Techniques and Their Implications. The techniques used across studies varied, including diaphragmatic breathing, paced breathing, mindfulness-based breathing, and box breathing. While all involve controlled, conscious breathing to induce relaxation, differences exist in structure, timing, and patient guidance. Paced breathing often involved synchronized inhalation and exhalation guided by visual or audio cues, which helped patients concentrate and maintain rhythm. Studies utilizing mindfulness-based approaches Joseph *et al.*, (2022) focused on breath awareness and intentionality, producing gradual but longer-lasting impacts on pain and mental well-being. These differences underscore the importance of delivery method and context. Whether taught in person by healthcare professionals, delivered through mobile applications, or self-practiced following written instructions, the success of DBR relies heavily on user comprehension and commitment. For clinical integration, healthcare settings should consider investing in simple, scalable training modules for staff and patients (Santos and Moussa, 2020).

Clinical Contexts for DBR Application. In most included studies, DBR was applied in the context of pre- or post-procedural care, such as incision and drainage, marsupialization, or minor outpatient gynecologic interventions. Very few studies focused on acute inflammatory pain during cyst or abscess flare-ups. This is important because the nature of pain in Bartholin cysts can vary widelyranging from mild pressure to sharp, throbbing pain in the case of abscess formation (Sohl *et al.*, 2023). DBR may be more effective for mild-to-moderate procedural pain or anticipatory anxiety rather than for uncontrolled acute infection-related pain. Nevertheless, DBR could serve as a preventive intervention, helping patients maintain calmness before minor surgeries, increase pain tolerance, and reduce the need for analgesics (Suprapto, 2025). As such, DBR can be positioned as a low-risk, low-cost supplement to standard pain protocols in gynecologic settings (Weston *et al.*, 2020).

Strengths and Limitations of the Literature Reviewed. One strength of this review lies in the diversity of included studies, encompassing various populations, countries, and intervention models (Nurhidayat, Fitriani and Hidayat, 2023). This diversity offers valuable insights into the global application and adaptability of DBR (Illingworth *et al.*, 2020). However, this also introduces heterogeneity that limits generalizability. Several studies used small sample sizes, lacked control groups, or relied on subjective assessments of pain without validated measurement tools. While instruments like the Visual Analogue Scale (VAS) and Numeric Rating Scale (NRS) were frequently used, some case studies merely described patient perceptions without statistical analysis (Merwin and Brotto, 2023). Moreover, most studies lacked information on intervention duration, frequency, and follow-up, which are crucial to understanding the sustainability of DBR’s effects. Adherence to breathing protocols was

also rarely monitored or reported. Given these limitations, while DBR's effectiveness appears promising, caution is warranted in interpreting the strength of evidence (Danielsen, Fougner and Haugstad, 2022). More rigorous and standardized research is needed to consolidate these early findings. In summary, the body of evidence reviewed in this scoping review supports the use of deep breathing relaxation as an effective, accessible, and holistic approach to pain relief in gynecologic care, including for Bartholin cyst patients (Menegas, Moayedi and Torres, 2021). While current research is limited and heterogeneous, the overall trend is encouraging and warrants further exploration through focused clinical trials and implementation research. By empowering patients to take an active role in managing their pain, and by equipping clinicians with simple supportive tools, DBR holds the potential to improve quality of care, patient satisfaction, and outcomes in women's reproductive health.

Clinical Implications

Despite the limitations, this review suggests that DBR can be a valuable addition to non-pharmacologic pain management in Bartholin cyst cases. As a technique that is simple to teach, inexpensive, and patient-empowering, DBR aligns well with modern models of patient-centered care. Healthcare professionals—especially nurses, midwives, and outpatient gynecology staff—can be trained to deliver DBR instructions as part of pre-procedure protocols or discharge counseling. Incorporating DBR into pain management pathways could also reduce dependence on pharmacologic agents, minimize side effects, and improve the overall patient experience. The psychological benefits of DBR, including reduced anxiety, improved coping, and increased perceived control, may also lead to greater compliance and satisfaction, especially among patients undergoing distressing intimate procedures.

CONCLUSIONS

This scoping review highlights the potential of deep breathing relaxation (DBR) as an effective, low-cost, and non-invasive intervention for pain management in women with Bartholin cysts and related gynecological conditions. Across the reviewed studies, DBR techniques such as diaphragmatic, paced, and mindful breathing were associated with reductions in pain intensity, decreased anxiety, improved patient comfort, and enhanced tolerance of clinical procedures. Although the current evidence is promising, it remains limited by small sample sizes, methodological heterogeneity, and a scarcity of studies focused specifically on Bartholin cysts. Nevertheless, the findings support the integration of DBR into routine gynecologic care as a complementary tool to pharmacologic and surgical interventions. DBR empowers patients to engage in self-care, aligns with holistic models of health, and may improve both physical and psychological outcomes. Further high-quality research is recommended to establish standardized DBR protocols, assess long-term benefits, and explore its implementation across diverse healthcare settings. With appropriate training and patient education, DBR has the potential to become a valuable component of pain management strategies in women's reproductive health.

Acknowledgement

The author(s) would like to express sincere gratitude to all individuals and institutions who contributed to the completion of this scoping review. Special thanks to the faculty and academic supervisors for their valuable guidance and constructive feedback throughout the research process. We also acknowledge the support of the library and research database services that facilitated access to critical literature and resources. Finally, heartfelt appreciation is extended to the healthcare professionals and peers whose encouragement and insights enriched the scope and relevance of this review.

Funding Source

This study is self-funded

Availability of data and materials

Data and materials of this study are available uponreasonable request

Authors' contributions

Both of the authors have contributed to all aspects ofthis study

Conflict of Interest
No potential conflicts of interest

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