

Hippocratica: Journal of Modern Medicine and Healthcare Practice
Vol 1 No 3 September 2026, Hal 100-113
ISSN: 3125-1501 (Print) ISSN: 3125-1498 (Electronic)
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Application of Puzzle Play Therapy to Reduce Pain Levels in Children After Appendectomy

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Article Info :
Received:
20-08-2026
Revised:
27-08-2026
Accepted:
21-09-2026

Abstract

Appendectomy can cause acute postoperative pain that restricts movement, disrupts rest, and increases distress in children. This study described changes in pain levels following puzzle play therapy among pediatric appendectomy patients at Citra Sari Husada Hospital, Karawang. A descriptive case study with a one-group pretest–posttest design included five children aged 7–10 years. Puzzle play therapy was provided twice daily, in morning and afternoon sessions lasting 30 minutes each, for three consecutive days. Pain intensity was assessed using the Wong-Baker FACES Pain Rating Scale before and after the intervention, and scores were compared descriptively. Initial scores ranged from 6 to 8, indicating moderate to severe pain. Final scores ranged from 3 to 4, corresponding to mild pain. Individual score reductions were 3, 4, 3, 4, and 4 points, yielding a calculated mean reduction of 3.6 points. Participants also exhibited less crying, greater cooperation during nursing care, improved rest, and increased willingness to move. These observations suggest that puzzle play may be a feasible supportive activity for children recovering from appendectomy. However, the small sample, lack of a comparison group, and undocumented concurrent analgesic use prevent attributing the changes solely to the intervention. Controlled studies are needed to evaluate effectiveness more rigorously.

Keywords: *Appendectomy, Distraction Therapy, Pediatric Nursing, Postoperative Pain, Puzzle Play Therapy.*

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INTRODUCTION

Acute appendicitis remains a clinically significant cause of emergency abdominal surgery in children, requiring timely assessment and appropriate treatment to prevent disease progression and associated complications. Contemporary clinical evidence identifies appendectomy as an established treatment option, with surgical management remaining relevant to both uncomplicated and complicated presentations of appendicitis (Salminen et al., 2025). Pediatric patients undergoing appendectomy may experience different postoperative recovery trajectories, particularly when disease severity and postoperative complications influence subsequent clinical management (Cramm et al., 2024). Beyond the surgical procedure, recovery involves the management of postoperative pain, which may restrict physical movement, interfere with rest, and increase discomfort during hospitalization. Postoperative pain management requires attention to acute nociceptive responses and the clinical implications of inadequately controlled pain following surgical interventions (Ishida et al., 2022). Nursing management of acute pain after appendicitis surgery has consequently become an important component of postoperative care, particularly in maintaining patient comfort and supporting recovery (Syokumawena et al., 2026). These clinical considerations establish the need for developmentally appropriate pain-management strategies that address the physiological and psychological experiences of children recovering from appendectomy.

Pediatric postoperative pain management increasingly incorporates nonpharmacological interventions as complementary measures alongside prescribed analgesic treatment. Pharmacological pain control remains clinically relevant, but postoperative management also requires attention to interventions that address discomfort without introducing additional medication-related exposure (Ishida et al., 2022). A systematic review of nonpharmacological nursing interventions for children undergoing surgery demonstrates the growing research interest in supportive approaches to

perioperative symptom management (Moll-Bertó et al., 2024). Among these approaches, distraction-based activities attempt to redirect children's attention from painful sensations toward alternative sensory, cognitive, or recreational experiences. Therapeutic play has been investigated in pediatric surgical care, including its relationship with children's pain and anxiety during the preoperative and postoperative periods (Metlek & Çağlar, 2024). Audiovisual distraction has also been examined as a nonpharmacological intervention for postoperative pain in children, supporting the relevance of attention-directed activities within pediatric nursing practice (Sanjaya, 2022).

Current evidence on therapeutic play reflects differences in intervention characteristics, clinical settings, developmental requirements, and the outcomes selected for evaluation. Play-based activities using Lego have been applied in the management of postoperative pain among children, indicating the clinical relevance of interactive recreational activities beyond passive distraction techniques (Kedaton et al., 2025). Puzzle-based play has also been investigated among hospitalized children, although the available study focused on anxiety associated with hospitalization rather than directly measuring postoperative pain (Putri & Miradwiyana, 2024). Another application of puzzle play as a pain-distraction activity involved children with cancer, representing a different clinical population and pain-related experience from children recovering after abdominal surgery (Zulaikha et al., 2021). Evidence concerning therapeutic play during circumcision further extends the literature on pediatric procedural care by examining pain and anxiety in relation to a specific surgical experience (Metlek & Çağlar, 2024). These studies indicate that therapeutic play encompasses several modalities whose applications cannot be treated as clinically equivalent solely because they involve recreational activities. Differences in pain origin, surgical procedures, psychological conditions, and developmental characteristics require closer examination before findings from one pediatric population can be applied to another.

The available literature reveals a distinction between evidence supporting therapeutic play for psychological outcomes and evidence examining its direct relationship with postoperative pain. Existing synthesis of nonpharmacological interventions in pediatric surgical nursing addresses a range of therapeutic approaches, but its broader scope does not independently establish the specific effects of puzzle play among children after appendectomy (Moll-Bertó et al., 2024). Research on puzzle play during hospitalization has primarily examined anxiety, leaving its relationship with postoperative pain insufficiently characterized within that clinical application (Putri & Miradwiyana, 2024). Investigations involving Lego-based activities have addressed postoperative pain in children, although the intervention differs from puzzle play in its activity structure and cognitive demands (Kedaton et al., 2025). Puzzle-based distraction has been applied to pain-related care among children with cancer, but that population differs from children experiencing acute pain after appendectomy (Zulaikha et al., 2021). The identifiable research gap therefore concerns the limited directly applicable evidence on puzzle play therapy for pain reduction specifically among pediatric patients recovering from appendectomy, rather than an absence of evidence concerning therapeutic play or nonpharmacological pain management generally.

The clinical relevance of this research is reinforced by preliminary information obtained at Citra Sari Husada Hospital, Karawang, where an interview with the head of the ward conducted during the January–May 2026 preliminary assessment indicated 342 patients who had undergone appendectomy during that period. This institutional figure establishes the reported volume of appendectomy cases but does not specify the proportion involving children or provide direct measurements of postoperative pain severity. The absence of these details prevents the preliminary caseload from being interpreted as evidence of the frequency or intensity of pain among pediatric patients. Clinical discussion of acute pain management after appendicitis surgery nevertheless identifies postoperative discomfort as a nursing concern requiring assessment and appropriate intervention (Syokumawena et al., 2026). Research on postoperative outcomes among children with complicated appendicitis further indicates that pediatric surgical recovery must be evaluated with attention to the specific characteristics of the treated population (Cramm et al., 2024). Postoperative pain-management literature also distinguishes the assessment and management of acute pain from broader recovery outcomes, supporting the need for an explicitly defined pain-related endpoint (Ishida et al., 2022). Against this clinical and evidentiary background, the proposed contribution is to examine puzzle play therapy in relation to pain levels following pediatric appendectomy, rather than extrapolating its effects from studies addressing hospitalization anxiety or pain in other clinical conditions.

The present research focuses on the application of puzzle play therapy as a nonpharmacological nursing intervention for children experiencing pain after appendectomy. Its primary objective is to examine pain levels in pediatric postoperative patients in relation to the administration of puzzle-based therapeutic activities. The investigation is directed toward the clinical relevance of an interactive, developmentally appropriate distraction activity for children recovering from abdominal surgery. Its proposed novelty lies in the specific combination of puzzle play therapy, pediatric post-appendectomy care, and pain intensity as the principal outcome, distinguishing the research focus from studies centered on hospitalization anxiety or different therapeutic-play modalities. This focus provides a basis for evaluating whether puzzle activities can contribute to postoperative nursing care without assuming that their effectiveness in other pediatric settings necessarily extends to appendectomy patients. The expected contribution is clinically relevant evidence concerning the application of puzzle play within pediatric postoperative pain management, with conclusions regarding pain reduction restricted to the observations and analytical procedures actually undertaken.

RESEARCH METHODS

A descriptive case-study approach with a one-group pretest–posttest design was employed to examine changes in postoperative pain following puzzle play therapy at Citra Sari Husada Hospital, Karawang. The study involved five children aged 6–12 years who experienced pain after appendectomy and met the established inclusion criteria, with each participant serving as an individual unit of assessment. Postoperative pain intensity was designated as the primary clinical outcome, consistent with the importance of systematic pain assessment in postoperative management (Ishida et al., 2022). Pain levels were measured before and after the intervention using the Wong-Baker FACES Pain Rating Scale observation sheet to maintain consistency in the assessment instrument across both measurement periods. Puzzle play was employed as the therapeutic activity, reflecting its application in pediatric hospital care, although previous investigations have primarily examined hospitalization-related anxiety rather than postoperative pain (Putri & Miradwiyana, 2024). The intervention was evaluated as a nonpharmacological component of pediatric nursing care, corresponding to the broader application of supportive interventions for children undergoing surgical procedures (Moll-Bertó et al., 2024).

Puzzle play therapy was administered over three consecutive days, with two sessions conducted daily in the morning and afternoon, each lasting 30 minutes. Data collection involved interviews, observations, examinations, standard operating procedures, and documentation, while the Wong-Baker FACES Pain Rating Scale provided the recorded measurements for evaluating changes in pain intensity. The intervention incorporated interactive therapeutic play, an approach investigated in pediatric perioperative care for managing pain and anxiety, although the clinical procedures and treatment characteristics differed from those of appendectomy patients (Metlek & Çağlar, 2024). Data were analyzed descriptively by comparing pain scores obtained before and after puzzle play therapy for each participant, without a separate control group or inferential statistical testing. The analysis focused specifically on postoperative pain intensity, distinguishing its clinical outcome from hospitalization-related anxiety while maintaining relevance to previous applications of play-based interventions for postoperative pain in children (Kedaton et al., 2025). Interpretation was restricted to observed changes in pain scores among the five participants, since research on distraction-based postoperative pain management does not establish that puzzle play independently caused the observed changes in an uncontrolled assessment (Sanjaya, 2022).

RESULTS AND DISCUSSION

Pain Levels Before the Implementation of Puzzle Play Therapy

The baseline assessment at Citra Sari Husada Hospital, Karawang, in July 2026 documented postoperative pain characteristics among five children who had undergone appendectomy. The participants consisted of three boys and two girls aged between 7 and 10 years, representing the school-age population included in the case-study assessment. Before puzzle play therapy, Wong-Baker FACES Pain Rating Scale scores ranged from 6 to 8, indicating moderate to severe pain according to the classifications recorded in the study. Three participants were classified as experiencing moderate pain, whereas two participants presented with severe pain accompanied by pronounced behavioral manifestations. These baseline differences established the initial clinical conditions against which subsequent changes in pain scores could be descriptively examined. Postoperative pain assessment is a

fundamental component of surgical recovery because pain intensity and its associated manifestations influence the interpretation of patients' clinical conditions and nursing requirements (Ishida et al., 2022).

The baseline observations demonstrated differences in pain intensity, provoking factors, sensory descriptions, anatomical distribution, and temporal characteristics among the five participants. Participant A, a nine-year-old boy, reported moderate stabbing pain with a score of 6 around the lower-right abdominal incision, particularly during movement and coughing. Participant B, an eight-year-old girl, experienced severe continuous pain with a score of 8, describing stinging, throbbing, and burning sensations extending from the lower-right abdomen toward the incision. Participant C, a ten-year-old boy, reported intermittent burning and heavy pain with a score of 6, particularly when turning or changing position. Participant D, a seven-year-old girl, experienced severe persistent pain with a score of 8 across the lower-right abdomen, which intensified during physical contact and light activity. Participant E, a nine-year-old boy, reported moderate pain with a score of 7, characterized by intermittent pulling and cutting sensations around the surgical wound during activity and repositioning. These differences illustrate the relevance of multidimensional pain assessment rather than relying exclusively on a numerical score when evaluating postoperative discomfort (Jamal, 2022).

The pain characteristics recorded before the intervention indicated that abdominal movement and physical contact were prominent factors associated with discomfort among the participants. Movement-related pain was reported by Participants A, C, and E, while coughing and deep inspiration were particularly relevant to the experiences of Participants A and B. Participant D demonstrated sensitivity to touching the affected abdominal region, accompanied by continuous pain rather than the intermittent discomfort described by several other participants. Although the anatomical distribution remained concentrated around the lower-right abdomen and surgical incision, the reported sensory qualities varied from stabbing and burning to pressure, pulling, and throbbing. Clinical discussions of pediatric appendicitis identify the importance of evaluating abdominal symptoms and treatment-related conditions, supporting careful interpretation of postoperative complaints according to individual presentations (Pratama, 2022). Table 1 preserves the participant-level pain scores, PQRST characteristics, and observed manifestations documented before puzzle play therapy.

Table 1. Pain Levels Among Children Following Appendectomy Before Puzzle Play Therapy at Citra Sari Husada Hospital, Karawang, July 2026 (n = 5)

No.	ID	Sex	Age	Wong-Baker Score	Pain Level	Pain Characteristics (PQRST)	Manifestations
1	A	Male	9 yr	6	Moderate	P: Movement and coughing. Q: Stabbing. R: Lower-right abdominal incision. S: 6. T: Intermittent.	Grimacing; holding the wound; refusing movement; poor sleep.
2	B	Female	8 yr	8	Severe	P: Deep inspiration and coughing. Q: Stinging, throbbing, burning. R: Lower-right abdomen to incision. S: 8. T: Continuous.	Loud crying; restlessness; rigid posture; refusing examination.
3	C	Male	10 yr	6	Moderate	P: Turning or repositioning. Q: Burning, heavy. R: Lower-right abdominal incision. S: 6. T: Intermittent.	Tense expression; silence; refusing movement; restlessness.
4	D	Female	7 yr	8	Severe	P: Touch and light activity. Q: Heavy pressure. R: Entire lower-	Crying; repeatedly requesting mother; fear of wound

						right abdomen. S: 8. T: Persistent, continuous.	contact; poor sleep.
5	E	Male	9 yr	7	Moderate	P: Activity and repositioning. Q: Pulling, cutting. R: Wound and surrounding area. S: 7. T: Intermittent.	Grimacing; avoiding movement; rapid breathing; strained expression.

The findings presented in Table 1 demonstrate that participants with comparable pain-intensity classifications did not necessarily exhibit identical sensory or behavioral manifestations. Participants A and C both recorded scores of 6, yet their pain descriptions differed between stabbing sensations associated with coughing and burning or heavy sensations associated with positional changes. Participant E had a slightly higher recorded score of 7 and described pulling or cutting pain, accompanied by rapid breathing and reluctance to move. These observations indicate that numerical pain intensity represented only one dimension of the postoperative experiences documented in the case series. Research on nonpharmacological pain management following invasive procedures in children emphasizes the relevance of observable distress and developmentally appropriate supportive interventions when evaluating pediatric discomfort (Immawati et al., 2022). Studies of audiovisual distraction for postoperative pediatric patients also support the clinical relevance of assessing pain intensity before introducing attention-directed interventions (Sanjaya, 2022). The individual differences recorded among Participants A, C, and E establish the importance of interpreting subsequent score changes alongside their respective baseline characteristics.

More pronounced manifestations were observed among Participants B and D, who both recorded baseline pain scores of 8 and were classified as experiencing severe pain. Participant B exhibited loud crying, restlessness, a rigid body posture, and refusal of nursing examination, whereas Participant D repeatedly requested her mother's presence, avoided wound contact, and experienced disturbed sleep. These responses demonstrate that similar numerical scores were accompanied by different expressions of distress, particularly in relation to physical examination and the need for parental reassurance. Clinical investigations of postoperative pain-management approaches recognize distraction and relaxation as relevant components of supportive care, although their effectiveness depends on the intervention and patient population examined (Hijriana & Yusnita, 2023). Evidence concerning therapeutic play during pediatric surgical care also addresses emotional responses alongside pain, supporting the distinction between observable anxiety-related behaviors and directly reported pain intensity (Metlek & Çağlar, 2024). The available data do not establish whether the greater pain intensity reported by Participants B and D resulted from age, surgical characteristics, psychological factors, or other unmeasured clinical conditions.

Behavioral observations provided additional information about the participants' postoperative conditions beyond their Wong-Baker FACES scores. Grimacing, reluctance to move, and disturbed rest were documented in several cases, while crying, rigid posture, and avoidance of examination were more prominent among participants with severe recorded pain. Participant C remained relatively silent despite reporting moderate pain, illustrating that limited verbal or emotional expression should not automatically be interpreted as the absence of discomfort. The combination of pain scores and observable manifestations offers a more detailed description of individual postoperative experiences, although the observations do not establish independent physiological measures of nociceptive activity. A systematic review of nonpharmacological interventions in children undergoing surgery demonstrates the clinical relevance of considering pediatric pain and related perioperative outcomes when evaluating nursing interventions (Moll-Bertó et al., 2024). Research concerning pain management following appendicitis surgery similarly identifies acute postoperative discomfort as a condition requiring structured nursing assessment and appropriate management (Syokumawena et al., 2026). These findings support the use of consistent symptom documentation during subsequent intervention assessments without treating behavioral improvement as equivalent to a verified change in underlying pain mechanisms.

The baseline findings also provide a clinical basis for examining puzzle play as an adjunctive activity during postoperative nursing care. All five participants reported pain affecting movement, physical contact, or activity, indicating that ordinary postoperative interactions were associated with

discomfort before the intervention. Participants with severe pain additionally demonstrated behaviors that could interfere with nursing examinations or comfortable rest, although the records did not quantify the duration or frequency of these difficulties. Existing research on therapeutic play using Lego activities has examined postoperative pain among children, offering a relevant comparison for interactive play-based interventions while differing from the puzzle activity applied in the present investigation (Kedaton et al., 2025). Puzzle play has also been investigated in relation to hospitalization-associated anxiety, but evidence concerning anxiety cannot independently establish an analgesic effect among children recovering from appendectomy (Putri & Miradwiyana, 2024). The present baseline observations therefore provide the required reference measurements for examining changes following the scheduled puzzle-play sessions without assuming that the intervention would necessarily reduce pain.

Interpretation of the preintervention findings must remain consistent with the descriptive case-study design and the limited number of participating children. The five participants presented pain scores between 6 and 8, with individual descriptions confirming variability in pain quality, provoking circumstances, and behavioral manifestations. Although both participants with severe pain were younger than several participants with moderate pain, the small sample and absence of additional clinical measurements do not support an association between age and pain intensity. Research examining postoperative outcomes in children with complicated appendicitis illustrates the importance of distinguishing patient and clinical characteristics when interpreting pediatric surgical recovery, rather than attributing observed differences to a single demographic factor (Cramm et al., 2024). The baseline record did not provide sufficient information about analgesic administration, time elapsed since surgery, surgical technique, or previous pain experiences to determine their potential contributions to the recorded scores. These limitations restrict causal explanations but do not diminish the descriptive value of documenting pain intensity and observable discomfort before the intervention. The baseline measurements establish a consistent starting point for examining the subsequently recorded pain scores and behavioral changes following puzzle play therapy.

Pain Levels After the Implementation of Puzzle Play Therapy

Postintervention assessment at Citra Sari Husada Hospital, Karawang, documented changes in pain intensity among five children following appendectomy who received puzzle play therapy over three consecutive days. The intervention was administered twice daily, during morning and afternoon sessions lasting 30 minutes each, with pain intensity evaluated using the Wong-Baker FACES Pain Rating Scale. The recorded observations demonstrated a progressive reduction in pain scores across the intervention period, although individual trajectories differed according to the initial severity of postoperative discomfort. By the final assessment, all five participants had pain scores ranging from 3 to 4, corresponding to the mild pain category reported in the study. These findings were accompanied by observable improvements in physical comfort, emotional expression, willingness to move, and cooperation during nursing care. Research examining therapeutic play during pediatric perioperative care supports the clinical relevance of play-based activities for addressing pain and anxiety, although the procedures and patient characteristics differ from those associated with appendectomy (Metlek & Çağlar, 2024).

Individual pain trajectories revealed differences in the magnitude and timing of changes across the three intervention days. Participant A, a nine-year-old boy, recorded scores of 5, 5, and 3, indicating an unchanged score between the first and second days followed by a decrease on the third day. Participant B, an eight-year-old girl, demonstrated a progressive decline from 7 on the first day to 5 on the second day and 4 on the third day. Participant C, a ten-year-old boy, exhibited a consistent decrease from 5 to 4 and subsequently to 3 across the observation period. Participant D, a seven-year-old girl, recorded scores of 6, 5, and 4, while Participant E, a nine-year-old boy, demonstrated a reduction from 6 to 5 and finally to 3. These observations indicate that lower pain scores were recorded over the intervention period despite differences in individual patterns, supporting the descriptive assessment of changes in postoperative discomfort. Evidence concerning nonpharmacological nursing interventions for pediatric surgical patients emphasizes the importance of evaluating observed outcomes within the specific intervention and clinical population rather than assuming equivalent responses across different therapeutic approaches (Moll-Bertó et al., 2024).

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The final pain assessments demonstrated that participants who initially experienced moderate or severe postoperative pain subsequently recorded scores within the mild category. Participants A, C, and E reached a Wong-Baker FACES Pain Rating Scale score of 3, whereas Participants B and D recorded a final score of 4. The difference between these final measurements was consistent with the participants' initial pain distributions, since Participants B and D had reported severe baseline pain with scores of 8. Although the recorded trajectories suggest progressive improvement, the absence of a comparison group prevents the changes from being attributed exclusively to puzzle play therapy. Previous applications of interactive play activities for postoperative pain in children provide a relevant clinical comparison, although differences in therapeutic materials and surgical populations limit direct equivalence (Kedaton et al., 2025). Table 2 reproduces the original daily scores, final pain classifications, and documented behavioral changes for each participant.

Table 2. Pain Levels Among Children Following Appendectomy After Puzzle Play Therapy at Citra Sari Husada Hospital, Karawang, July 2026 (n = 5)

No.	Participant	Sex	Age	Wong-Baker Score Day 1	Wong-Baker Score Day 2	Wong-Baker Score Day 3	Pain Level	Behavioral Changes
1	Child A	Male	9 years	5	5	3	Mild	Appeared relaxed, no grimacing, willing to move slowly, and sleeping more comfortably.
2	Child B	Female	8 years	7	5	4	Mild	Stopped crying, appeared calmer, cooperated with care, and was willing to turn from side to side.
3	Child C	Male	10 years	5	4	3	Mild	Slept more comfortably, spoke more actively, moved slowly, and displayed a more relaxed facial expression.
4	Child D	Female	7 years	6	5	4	Mild	Stopped crying, tolerated brief separation from mother, accepted examination, and appeared more comfortable.
5	Child E	Male	9 years	6	5	3	Mild	More relaxed, breathing more regularly, willing to engage in light play, and no longer showing a tense expression.

The observations presented in Table 2 demonstrate a downward pattern in reported pain intensity throughout the three-day intervention period. On the first day, recorded scores ranged from 5 to 7, indicating that participants continued to experience postoperative discomfort during the initial

phase of therapeutic play. By the second day, four participants had lower scores than on the first day, while Participant A retained the same score of 5. The third-day assessment recorded reductions in all five participants relative to their second-day measurements, with final values of 3 or 4. This pattern indicates that the changes were not identical across participants, particularly regarding the timing of score reduction and the final intensity reported. Research examining audiovisual distraction for postoperative pain in children provides related evidence concerning attention-directed interventions, although differences in delivery methods prevent direct comparisons of intervention effects (Sanjaya, 2022). The repeated measurements provide descriptive evidence of changes during the intervention period but do not distinguish the contribution of therapeutic play from spontaneous postoperative recovery or concurrent clinical management.

Behavioral observations documented alongside the pain scores indicate changes in participants' physical responses and cooperation during postoperative care. Participant A, who initially exhibited grimacing, wound protection, reluctance to move, and sleep disturbance, appeared more relaxed, no longer grimaced, and became willing to mobilize slowly. Participant B demonstrated a reduction in crying and body rigidity, accompanied by greater cooperation during nursing examinations and wound care. Participant C displayed improved interaction with nurses and family members, more comfortable sleep, and a relaxed facial expression compared with his initial condition. Participant D no longer exhibited persistent crying, tolerated brief separation from her mother, accepted physical examination, and appeared more comfortable during nursing activities. Previous research on puzzle play therapy for hospitalized children has examined its relationship with anxiety and emotional responses, providing a relevant comparison for behavioral improvements without establishing that anxiety reduction necessarily represents direct postoperative analgesia (Putri & Miradwiyana, 2024).

Participant E also exhibited changes in behavior, including more regular breathing, reduced facial tension, greater relaxation, and willingness to engage in light recreational activities with family members. The observed behavioral changes across participants were consistent with their lower recorded pain scores, although the available data did not quantify psychological distress, physiological stress responses, or changes in functional mobility using separate standardized instruments. Therapeutic play may provide an activity that redirects attention toward enjoyable tasks and supports children's engagement during hospitalization, but the present observations cannot establish the physiological mechanisms responsible for pain reduction. Previous work describing puzzle play as a distraction activity among children with cancer provides a related clinical application, although the underlying pain conditions and patient characteristics differ from those following appendectomy (Zulaikha et al., 2021). Research on play-based approaches to hospitalization-related anxiety similarly indicates the potential relevance of structured recreational activities for emotional adjustment during pediatric care (Mulyanti et al., 2022). Neither endogenous analgesic activity nor changes in nociceptive transmission were measured in the five participants, preventing direct confirmation of the proposed distraction-related mechanisms. The behavioral findings should therefore be interpreted as concurrent observations of improved comfort rather than independent evidence that puzzle play produced a specific physiological analgesic response.

Differences in final pain scores provide additional information about the relationship between initial symptom intensity and subsequent observations. Participants B and D, who recorded the highest baseline scores of 8, each reached a final score of 4, representing a four-point reduction while retaining slightly higher pain intensity than the remaining participants. Participants A and C decreased from baseline scores of 6 to final scores of 3, whereas Participant E decreased from 7 to 3, indicating lower final pain scores among those initially classified as having moderate pain. These findings suggest that the intervention period was associated with improvement across different initial pain classifications, although the small number of participants prevents conclusions regarding differential responses according to age, sex, or baseline pain intensity. Clinical literature on postoperative pain management emphasizes the importance of repeated symptom evaluation because pain intensity and recovery characteristics may change during the postoperative period (Ishida et al., 2022). The descriptive observations did not include sufficient information on analgesic administration, surgical technique, or time since surgery to determine whether these factors contributed to the differences in individual pain trajectories.

The observed reduction in postoperative pain scores indicates a clinically relevant pattern that warrants further examination within pediatric nursing practice. Interactive activities such as puzzle play

can be incorporated into supportive care without replacing the assessment, medication, and clinical monitoring required for children recovering from abdominal surgery. Research involving therapeutic play during pediatric surgical care has examined both pain-related and emotional outcomes, supporting continued evaluation of developmentally appropriate recreational activities as potential adjuncts to conventional care (Metlek & Çağlar, 2024). However, the five-participant case-study design, absence of a control group, and lack of documented information concerning concurrent analgesic treatment limit the interpretation of the observed improvements as treatment-specific effects. The three-day assessment established that pain scores decreased and observable comfort improved during the period in which puzzle play therapy was administered, but it did not isolate the intervention from other components of postoperative recovery. Additional clinical investigation would be required to assess whether comparable changes occur under standardized treatment conditions and whether improvements persist beyond the observed intervention period. The postintervention findings provide a descriptive basis for comparing individual pretest and posttest scores and examining the magnitude of recorded pain reduction in the subsequent analysis.

Differences in Pain Levels Before and After Puzzle Play Therapy

Comparison of preintervention and postintervention assessments demonstrated a consistent reduction in recorded pain intensity among the five children who received puzzle play therapy following appendectomy at Citra Sari Husada Hospital, Karawang. Before the intervention, Wong-Baker FACES Pain Rating Scale scores ranged from 6 to 8, with three participants classified as experiencing moderate pain and two participants experiencing severe pain. Following three consecutive days of puzzle play therapy, all participants recorded lower pain scores ranging from 3 to 4, corresponding to the mild pain category documented in the study. The individual score reductions ranged from 3 to 4 points, indicating improvement across participants despite differences in their initial postoperative conditions. These findings demonstrate a consistent descriptive pattern of reduced pain intensity during the intervention period, although the observational design does not establish an independent therapeutic effect. Previous research on postoperative pain management recognizes repeated pain assessment as essential for evaluating symptom progression and determining the clinical relevance of supportive interventions (Ishida et al., 2022).

Individual comparisons revealed that Participants A and C, who initially reported moderate pain with scores of 6, experienced three-point reductions and reached final scores of 3. Participants B and D, both classified as experiencing severe pain with initial scores of 8, demonstrated four-point reductions and recorded final scores of 4. Participant E experienced a four-point reduction from an initial score of 7 to a final score of 3, representing one of the largest individual decreases observed in the case series. None of the participants exhibited unchanged or increased pain scores between the baseline and final assessments, indicating a uniform direction of change across the five cases. Research examining audiovisual distraction among pediatric postoperative patients provides related evidence concerning the application of attention-directed interventions to pain management, although the therapeutic modality differs from puzzle play (Sanjaya, 2022). Studies addressing nonpharmacological interventions for pain following invasive procedures in children also support the clinical relevance of developmentally appropriate activities designed to reduce discomfort (Immawati et al., 2022). The observed reductions therefore warrant consideration as clinically relevant descriptive findings rather than evidence of statistically established treatment effectiveness.

The comparison of individual scores provides a more detailed assessment of postoperative pain changes than the final pain classifications alone. Participants with initially severe pain experienced reductions of four points, while those with moderate baseline pain demonstrated decreases of either three or four points. These differences indicate that lower pain scores were recorded across different initial severity categories, without establishing whether baseline intensity influenced the magnitude of subsequent improvement. Research on therapeutic play during pediatric surgical care has examined changes in pain and emotional outcomes, providing a relevant framework for interpreting play-based interventions while recognizing differences between surgical procedures (Metlek & Çağlar, 2024). The absence of a comparison group and inferential statistical analysis prevents the observed changes from being attributed exclusively to puzzle play therapy. Table 3 reproduces the original preintervention scores, postintervention scores, pain classifications, individual differences, and reported mean reduction for the five participants.

Table 3. Comparison of Pain Levels Before and After Puzzle Play Therapy Among Children Following Appendectomy at Citra Sari Husada Hospital, Karawang, July 2026 (n = 5)

No.	ID	Before Score	Pain Level	After Score	Pain Level	Difference (Δ)	Mean Reduction
1	A	6	Moderate	3	Mild	3	3.4
2	B	8	Severe	4	Mild	4	3.4
3	C	6	Moderate	3	Mild	3	3.4
4	D	8	Severe	4	Mild	4	3.4
5	E	7	Moderate	3	Mild	4	3.4

The findings presented in Table 3 demonstrate that every participant experienced a reduction in recorded postoperative pain intensity during the three-day period of puzzle play therapy. The baseline measurements reflected different levels of discomfort, whereas the final measurements showed a narrower distribution of pain scores within the mild category. The repeated downward pattern suggests that the participants experienced less discomfort at the end of the observation period, although the extent to which puzzle play contributed to this change remains uncertain. Research examining distraction and relaxation techniques in postoperative patients supports the potential relevance of nonpharmacological interventions for symptom management, while differences in clinical populations and intervention procedures limit direct comparisons (Hijriana & Yusnita, 2023). A systematic review of nonpharmacological nursing interventions among children undergoing surgery similarly identifies supportive approaches as an important area of pediatric perioperative care (Moll-Bertó et al., 2024). Nevertheless, the consistency of score reductions across five participants should not be interpreted as statistical evidence of effectiveness because the study did not include a control group, random allocation, or inferential hypothesis testing. The clinical interpretation must remain restricted to the observed changes in pain intensity and associated behavioral manifestations documented during the intervention period.

The numerical results also require careful interpretation because the mean reduction reported in the original table is not fully consistent with the individual score differences. Table 3 reports a mean reduction of 3.4 points for each participant, whereas the recorded differences of 3, 4, 3, 4, and 4 points yield an arithmetic mean reduction of 3.6 points. The original values have been retained in the table to preserve the submitted research record, but this discrepancy should be distinguished from the verified individual measurements. The baseline scores yield a mean of 7.0, while the final scores yield a mean of 3.4, confirming that the difference between these two means is 3.6 points. This descriptive change indicates a lower average recorded pain intensity following the intervention period without establishing the statistical significance or independent causal contribution of puzzle play therapy. Previous research applying therapeutic play to postoperative pain in children provides a relevant basis for evaluating changes in pain scores, although differences in intervention activities and study designs prevent direct equivalence with the present findings (Kedaton et al., 2025).

Several psychological and attentional processes may contribute to the changes observed during puzzle play therapy, although none were independently measured in the present assessment. Puzzle activities require visual attention, spatial recognition, hand coordination, and cognitive engagement, potentially redirecting children's attention away from discomfort associated with postoperative incisions. The application of puzzle play as a distraction activity among children with cancer provides a related clinical example, but its findings cannot directly establish effectiveness in children experiencing acute pain after appendectomy (Zulaikha et al., 2021). Interactive play may also offer a familiar recreational experience during hospitalization, potentially supporting emotional comfort and reducing attention to distressing clinical circumstances. Research on puzzle-based therapeutic play for hospitalized children has primarily examined anxiety-related outcomes, indicating that emotional responses and pain intensity should be treated as related but distinct clinical variables (Putri & Miradwiyana, 2024). Improvements in relaxation, cooperation, and willingness to move were observed alongside lower pain scores, but these manifestations were not assessed using independent standardized psychological or functional instruments. Claims concerning changes in endogenous analgesic activity,

nociceptive transmission, or specific neurological mechanisms would therefore exceed the evidence generated by the descriptive case-study design.

The observed improvement in pain scores must also be considered alongside the natural progression of postoperative recovery and other aspects of hospital treatment. The assessment covered three consecutive days following appendectomy, during which pain intensity may change as tissue recovery progresses and routine clinical management continues. Information concerning analgesic type, dosage, administration timing, surgical approach, and postoperative recovery interval was not sufficiently documented to determine the influence of these factors on individual pain trajectories. Research examining postoperative outcomes among children with complicated appendicitis illustrates the importance of clinical characteristics when interpreting recovery following surgical treatment (Cramm et al., 2024). Nursing investigations concerning acute pain after appendicitis surgery also indicate that postoperative symptom management involves clinical assessment and supportive care beyond a single nonpharmacological intervention (Syokumawena et al., 2026). The absence of a comparison group prevents differentiation between changes associated with puzzle play and those potentially attributable to medication, spontaneous recovery, or other aspects of nursing care.

The findings provide preliminary descriptive evidence that puzzle play therapy can be incorporated into postoperative nursing activities while children's pain intensity and behavioral responses are monitored. Its application over three consecutive days was accompanied by reductions in recorded pain scores among all five participants, supporting further examination of puzzle-based distraction as a possible adjunct to conventional postoperative care. Literature concerning therapeutic play in pediatric surgical settings provides a clinical rationale for evaluating recreational activities as components of supportive nursing interventions without replacing established analgesic management (Metlek & Çağlar, 2024). The contribution of the present assessment lies in documenting individual pain-score trajectories among children after appendectomy, a population distinct from those examined in studies of hospitalization-related anxiety and other pediatric pain conditions. However, the limited number of participants, single-hospital setting, short observation period, and absence of controlled comparisons restrict the generalizability and causal interpretation of the findings. Subsequent investigations should incorporate larger samples, appropriately designed comparison groups, documented analgesic regimens, and standardized assessment intervals to determine whether puzzle play produces additional pain reduction beyond routine postoperative recovery. Until such evidence is available, puzzle play therapy should be regarded as a potentially useful supportive nursing activity associated with reduced pain scores in the observed cases, rather than as an independently verified analgesic intervention.

CONCLUSION

The application of puzzle play therapy at Citra Sari Husada Hospital, Karawang, was associated with reduced postoperative pain levels among five children aged 7–10 years following appendectomy. Before the intervention, Wong-Baker FACES Pain Rating Scale scores ranged from 6 to 8, indicating moderate to severe pain, whereas final scores ranged from 3 to 4 and were classified as mild pain. Each participant experienced a reduction of 3–4 points following three consecutive days of puzzle play therapy administered twice daily for 30 minutes per session. The individual score differences yielded an arithmetic mean reduction of 3.6 points, although the original summary table reported 3.4 points. Behavioral observations also indicated reduced crying, improved cooperation during nursing examinations, greater willingness to move, and increased comfort during rest. These findings demonstrate consistent descriptive improvements in postoperative pain intensity and observable comfort during the intervention period, without establishing that puzzle play therapy independently caused the recorded changes.

Puzzle play therapy represents a potentially applicable nonpharmacological nursing intervention that may complement conventional postoperative pain management through structured, developmentally appropriate recreational activities. Its clinical relevance lies in providing children with an engaging activity while supporting continued assessment of pain intensity, emotional responses, and physical comfort during recovery. Nevertheless, the findings are limited by the small sample of five participants, the single-hospital setting, the absence of a control group, and the lack of documented control for concurrent analgesic treatment. The three-day observation period and descriptive analytical approach also restrict conclusions concerning sustained pain reduction, statistical effectiveness, and

broader clinical applicability. Future investigations should incorporate larger participant groups, standardized pain-assessment intervals, documented analgesic regimens, longer follow-up periods, and controlled experimental designs to evaluate the additional contribution of puzzle play therapy to postoperative pain management. Until stronger comparative evidence becomes available, the observed reductions should be interpreted as preliminary clinical findings supporting further investigation rather than definitive evidence of therapeutic effectiveness.

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