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Understanding the Nocebo effect in Children: Parental Influence, Communication, and Nursing Perspectives

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The nocebo effect refers to negative symptoms or adverse outcomes that arise from negative expectations rather than from a harmful medical intervention. Developmental factors, increased suggestibility, emotional dependence on caregivers, and sensitivity to communication cues make children particularly susceptible to nocebo responses. This narrative review describes the concept of the nocebo effect in children, underlying psychological and neurobiological mechanisms, the role of parental influence and healthcare communication, and implications for pediatric nursing practice. Recognition and action against the nocebo effect are imperative to minimize unnecessary distress, enhance treatment adherence, and provide child-centered, ethical healthcare.

Keywords: Nocebo effect, Children, Pediatric nursing, parental influence, healthcare communication

Pediatric healthcare outcomes are influenced not only by medical interventions but also by psychological and contextual factors. One such factor is the nocebo effect, which occurs when negative expectations lead to the experience of adverse symptoms in the absence of a harmful cause (Benedetti, 2008). The term "nocebo," meaning *"I shall harm,"* is considered the counterpart of the placebo effect and highlights the powerful interaction between mind and body (Colloca & Miller, 2011).

Children are especially susceptible to nocebo responses because they rely heavily on adults to interpret medical experiences. Negative verbal cues, anxious parental behaviour, or prior unpleasant clinical encounters can significantly increase fear, pain perception, and resistance to treatment (Cohen et al., 2004).

Objectives of the Study

The objectives of this review are to:

1. Describe the nocebo effect in children and its underlying psychological and neurobiological mechanisms.
2. Examine the role of parental influence and healthcare communication in shaping nocebo responses in pediatric patients.
3. Identify common clinical manifestations of the nocebo effect in children.
4. Highlight nursing implications and strategies to minimize nocebo effects in pediatric care.

Methodology of the Review

This narrative review was conducted by analyzing peer-reviewed literature retrieved from databases such as PubMed, CINAHL, Scopus, and Google Scholar. Keywords included *nocebo effect in children*, *pediatric placebo-nocebo*, *parental anxiety*, and *healthcare communication*. Relevant studies focusing on pediatric, psychological, and nursing perspectives were included (Finell & Saarela, 2017)

Concept of the Nocebo Effect in Children

The nocebo effect in children refers to the development of adverse symptoms such as

pain, nausea, fear, anxiety, or behavioral distress that arise primarily from negative expectations, verbal suggestions, or emotional cues, rather than from an actual harmful medical intervention. These symptoms are genuine and measurable and are associated with neurobiological responses, including activation of stress pathways, increased autonomic arousal, and heightened pain sensitivity (Benedetti, 2008; Finell & Saarela, 2017). The child's brain interprets anticipated harm as real, leading to physiological and behavioral responses that can intensify symptom perception. Children often lack the cognitive ability to critically evaluate medical information or distinguish between potential and specific harm. As a result, they are susceptible to suggestion and emotional cues conveyed by parents, caregivers, and healthcare professionals (Colloca & Miller, 2011; Häuser et al., 2012). Negative language, fearful facial expressions, or anxious tone of voice may unintentionally reinforce expectations of pain or discomfort, thereby triggering nocebo responses. Observational learning also plays a significant role, as children frequently model their reactions based on parental behavior and prior experiences (Cohen et al., 2004; Kaptchuk & Miller, 2015).

Developmental factors further increase susceptibility to nocebo effects in children. Limited understanding of illness, immature coping mechanisms, and reliance on adult interpretation of medical situations contribute to heightened vulnerability. In younger children, imagination and fear of the unknown may amplify distress, while older children and adolescents may develop anticipatory anxiety based on previous negative healthcare encounters (Colloca & Miller, 2011; Rief & Petrie, 2016).

Overall, the nocebo effect in children highlights the critical influence of communication, emotional environment, and caregiver behavior in pediatric healthcare. Recognizing this concept is essential for minimizing unnecessary distress and promoting positive treatment experiences through age-appropriate, reassuring, and empathetic communication. (Benedetti, 2008; Cohen et al., 2004).

The key differences between placebo and nocebo effects, including mechanisms, expectations, and clinical implications, are summarized in Table 1.

Table 1: Comparison of Placebo and Nocebo Effects

Aspect	Placebo Effect	Nocebo Effect
Basic Concept	Improvement in symptoms due to positive expectations or belief in the benefit	Worsening or appearance of symptoms due to negative expectations or fear
Origin of Term	Latin *"I shall please."*	Latin *"I shall harm."*
Expectation Type	Positive, hopeful, reassuring	Negative, fearful, anxiety-provoking
Clinical Outcome	Symptom relief, reduced pain, improved well-being	Increased pain, discomfort, anxiety, or adverse symptoms
Mechanism	Activation of reward pathways, endogenous opioids	Activation of stress pathways, anxiety, and autonomic arousal
Role of Communication	Positive framing and reassurance enhance effects	Negative language and fear-inducing explanations amplify effects
Influence on Children	Encouragement and reassurance improve cooperation	Parental anxiety and negative cues increase distress

Ethical Concern	Harnessed to improve outcomes ethically	Must be minimized to avoid unintended harm
Nursing Implication	Use positive communication to support healing	Avoid alarming language; promote calm, age-appropriate explanations

Factors Increasing Susceptibility to the Nocebo Effect in Children

- Limited cognitive ability to critically evaluate medical information
- High suggestibility to verbal and non-verbal cues
- Strong emotional dependence on parents and caregivers
- Influence of observational learning and previous healthcare experiences (Colloca & Miller, 2011; Häuser et al., 2012; Kaptchuk & Miller, 2015)

Common Nocebo Manifestations in Children

Nocebo responses in children may present as both physical and behavioral symptoms. These include increased pain perception, fear, crying, procedural avoidance, nausea, headache, fatigue, sleep disturbances, and behavioral regression. In some cases, children may also exhibit treatment refusal, heightened anxiety, or somatic complaints without identifiable physiological causes. Such manifestations can interfere with clinical care, prolong procedures, and negatively affect treatment adherence and overall healthcare experiences (Cohen et al., 2004; Kaptchuk & Miller, 2015; Rief & Petrie, 2016).

Underlying Mechanisms

The nocebo effect in children is mediated through a complex interaction of psychological and neurobiological processes. Negative expectations and fear activate stress-related pathways, leading to increased autonomic nervous system activity and heightened arousal. This response may amplify symptom perception, particularly pain and discomfort (Benedetti, 2008; Finell & Saarela, 2017).

Psychological mechanisms such as anticipatory anxiety, conditioning from previous negative healthcare experiences, and observational learning from parents or caregivers further contribute to nocebo responses. Children often internalize verbal and non-verbal cues, which reinforce expectations of harm and intensify distress (Colloca & Miller, 2011; Häuser et al., 2012; Kaptchuk & Miller, 2015).

Neurobiologically, nocebo responses are associated with altered pain modulation, increased stress hormone release, and heightened sensitivity to bodily sensations, even in the absence of tissue injury or pharmacological cause (Benedetti, 2008; Finell & Saarela, 2017). Together, these mechanisms explain why nocebo-induced symptoms in children are real, distressing, and clinically significant. The neurobiological pathways involved in nocebo responses are illustrated.

Clinical Significance

Awareness of the nocebo effect is crucial in pediatric care, as negative communication and parental anxiety can unintentionally increase distress. Use of age-appropriate, reassuring, and positive communication can significantly reduce nocebo responses and improve treatment cooperation and outcomes (Benedetti, 2008; Cohen et al., 2004)

Mechanisms Underlying the Nocebo Effect in Children

Psychological Mechanisms

Fear, anxiety, conditioning from previous painful experiences, and observational learning from parents contribute significantly to nocebo responses in children (Kaptchuk & Miller, 2015)

Neurobiological Mechanisms

Activation of stress-related pathways, including increased autonomic arousal and altered pain modulation, has been linked to nocebo-induced symptoms (Benedetti, 2008; Finell & Saarela, 2017)

Developmental Factors

Limited understanding of illness, difficulty distinguishing threat from reassurance, and dependence on adult interpretation increase vulnerability in children (Colloca & Miller, 2011; Kaptchuk & Miller, 2015).

Parental Influence on the Nocebo Effect

Parental expectations and emotional states play a central role in shaping children's responses to medical procedures. Studies have shown that children often mirror parental anxiety, leading to heightened distress and symptom perception (Colloca & Miller, 2011; Kaptchuk & Miller, 2015). Calm and reassuring parental behavior, on the other hand, can significantly reduce nocebo responses and improve cooperation during treatment (Kaptchuk & Miller, 2015)

Babying and the Nocebo Effect

Babying refers to overprotective, anxiety-driven caregiving behaviors characterized by excessive warnings, repeated reassurance, dramatization of minor procedures, and overt expressions of fear. Although well-intentioned, such behaviors can unintentionally contribute to the nocebo effect in children by reinforcing negative expectations about pain or harm (Benedetti, 2008; Colloca & Miller, 2011).

When caregivers repeatedly emphasize discomfort or danger (e.g., "This will hurt a lot" or "Be careful, it is excruciating"), children may develop anticipatory fear even before a medical procedure begins. These negative expectations can heighten anxiety, amplify pain perception, and lead to behavioral distress despite the absence of significant physiological harm (Cohen et al., 2004; Finell & Saarela, 2017). In this context, babying functions as a socially transmitted nocebo effect, in which symptoms are shaped by suggestion and emotional cues rather than by the medical intervention itself (Colloca & Miller, 2011; Finell & Saarela, 2017).

Excessive babying may also encourage children to interpret normal bodily sensations as threatening. Over time, this can lead to increased symptom reporting, procedural avoidance, and reduced coping during healthcare encounters (Häuser et al., 2012). Such responses are often reinforced when caregivers respond to distress with heightened concern, unintentionally validating the child's fear and strengthening the nocebo response (Cohen et al., 2004; Kaptchuk & Miller, 2015).

From a developmental perspective, persistent babying may interfere with the development of adaptive coping skills and emotional resilience. Instead of fostering confidence, excessive protection can increase dependency and vulnerability to negative expectations, particularly in clinical environments where calm adult modeling is essential (Finell & Saarela, 2017; Häuser et al., 2012). For nurses and healthcare professionals, recognizing the impact of babying is critical to guiding caregivers toward balanced, reassuring, and age-appropriate communication that minimizes nocebo effects (Benedetti, 2008; Finell & Saarela, 2017).

Table 2: - Impact of Parenting Styles on the Nocebo Effect in Children

Parenting Style	Key Characteristics	Effect on Child Expectations	Impact on Nocebo Responses	Supporting Evidence
Overprotective / Babying	Excessive reassurance, repeated warnings, visible anxiety, and dramatization of minor symptoms	Promotes fear and anticipation of harm	↑ Increased anxiety, pain perception, behavioral distress, and treatment refusal	Benedetti (2008); Colloca & Miller 2011); (Cohen et al. (2004)
Anxious Parenting	High parental stress, verbalization of worry, negative framing of procedures	Transfers anxiety to the child	↑ Heightened stress responses and symptom amplification	Colloca & Miller 2011); (Rief & Petrie (2016)
Authoritarian	Strict control, limited explanation, low emotional warmth	Creates fear and uncertainty	↑ Distress, reduced trust, increased nocebo susceptibility	Cohen et al. (2004); Finell & Saarela (2017)
Permissive	Inconsistent guidance, lack of structure, and emotional over involvement	Confusion and poor coping expectations	↑ Emotional dysregulation and somatic complaints	Häuser et al. (2012); Rief & Petrie (2016)
Authoritative (Supportive)	Calm reassurance, clear explanations, emotional warmth, confidence	Builds realistic and positive expectations	↑ Reduced anxiety, improved coping, minimized nocebo effects	Cohen et al. (2004); Bingel (2014)
Neglectful	Minimal emotional involvement, poor communication	Insecurity and unpredictability	↑ Stress sensitivity and maladaptive symptom responses	Häuser et al. (2012); Finell & Saarela (2017)

Note: The table summarizes how different parenting styles influence children's expectations and susceptibility to nocebo responses. Evidence is drawn from peer-reviewed literature on placebo–nocebo mechanisms, pediatric psychology, and healthcare communication.

Role of Healthcare Communication

Healthcare communication plays a central role in the development and modulation of the nocebo effect in pediatric patients. Children are susceptible to both verbal and non-verbal cues conveyed by healthcare professionals, including word choice, tone of voice, facial expressions, and body language. Negative framing of information, fear-inducing language, or excessive emphasis on pain and adverse effects may unintentionally increase anxiety and symptom perception in children, even in the absence of actual harm (Benedetti, 2008; Finell & Saarela, 2017).

In pediatric settings, communication often occurs in the presence of parents or caregivers, further amplifying its impact. Anxious explanations or repeated warnings provided by healthcare professionals may reinforce parental fear, which in turn is transmitted to the child. This process contributes to socially mediated nocebo responses, in which the child's distress arises

from expectations shaped by the surrounding emotional environment rather than from the medical intervention itself (Colloca & Miller, 2011; Cohen et al., 2004).

Evidence suggests that positively framed, age-appropriate, and reassuring communication can significantly reduce anticipatory anxiety and perceived pain in children. Simple strategies such as avoiding alarming terminology, using neutral descriptions of procedures, and emphasizing coping and reassurance help foster realistic expectations and emotional safety (Cohen et al., 2004; Rief & Petrie, 2016). Therapeutic communication thus serves as a protective factor against nocebo effects.

From a nursing perspective, effective communication is both a clinical skill and an ethical responsibility. Nurses, as primary communicators in pediatric care, must balance honesty with psychological protection. Delivering information in a calm, supportive, and developmentally appropriate manner minimizes unintended harm while maintaining trust and transparency (Benedetti, 2008; Finell & Saarela, 2017).

Overall, mindful healthcare communication is a key modifiable factor in preventing nocebo effects in pediatric patients. Training healthcare professionals—particularly nurses—in positive framing and empathetic communication can substantially improve children's healthcare experiences and outcomes (Benedetti, 2008; Cohen et al., 2004; Kaptchuk & Miller, 2015).

Ethical Considerations in Pediatric Nocebo Effect

Ethical challenges arise when balancing truthful disclosure with emotional protection of the child. While informed consent requires transparency, overly alarming information may unintentionally cause harm through nocebo mechanisms (Colloca & Miller, 2011). Ethical pediatric care demands compassionate, developmentally appropriate communication that minimizes psychological harm while respecting autonomy (Bingel, 2014).

Nursing and Pediatric Patients: The Nocebo Effect

Nurses play a pivotal role in shaping pediatric patients' healthcare experiences, as they maintain continuous, close interactions with both children and their caregivers. In pediatric settings, the nocebo effect may arise unintentionally through negative verbal and non-verbal communication, excessive emphasis on pain or side effects, and transmission of caregiver anxiety (Benedetti, 2008; Bingel, 2014) Due to developmental vulnerability, children are susceptible to such cues, making nursing communication a critical determinant of symptom perception and emotional response (Cohen et al., 2004).

Pediatric nurses often serve as the primary source of information and reassurance for children. Words, tone of voice, facial expressions, and body language used during procedures can significantly influence a child's expectations. Fear-inducing explanations, repeated warnings, or visible stress in the nurse may heighten anticipatory anxiety, resulting in increased pain perception, behavioral distress, and resistance to care (Cohen et al., 2004; Finell & Saarela, 2017). Conversely, calm, confident, and positively framed communication has been shown to reduce anxiety and minimize nocebo responses (Benedetti, 2008; Colloca & Miller, 2011).

Family-centered care is a cornerstone of pediatric nursing practice. Nurses not only interact with children but also guide parents and caregivers, whose emotions strongly influence children's responses to treatment. Parental anxiety and overprotective behavior may unintentionally reinforce negative expectations, leading to socially transmitted nocebo effects (Colloca & Miller, 2011; Cohen

et al., 2004). Educating caregivers to use supportive and reassuring language is therefore essential in pediatric nursing care. (Kaptchuk & Miller, 2015)

Ethically, pediatric nurses must balance honest disclosure with the child's psychological protection. While informed consent and truthful communication are fundamental, excessive emphasis on rare or severe side effects may inadvertently cause harm through nocebo mechanisms (Benedetti, 2008; Finell & Saarela, 2017). Nursing practice should focus on therapeutic communication, reassurance, and emotional support to foster trust and positive healthcare experiences (Colloca & Miller, 2011).

Overall, awareness of the nocebo effect is essential in pediatric nursing. By adopting mindful communication strategies and supporting both children and families, nurses can reduce avoidable distress, enhance cooperation during procedures, and improve overall clinical outcomes (Benedetti, 2008; Cohen et al, 2004; Kaptchuk & Miller, 2015).

Clinical Implications

Based on the findings of this review, several practical suggestions can be proposed to minimize the nocebo effect in pediatric healthcare settings. Pediatric nurses should adopt positive, age-appropriate, and reassuring communication, avoiding fear-inducing language and unnecessary emphasis on pain or adverse effects. Simple modifications in wording, tone, and non-verbal behavior can significantly influence children's expectations and emotional responses (Benedetti, 2008; Cohen et al, 2004).

Parental education should be integrated into routine pediatric care. Nurses can guide parents and caregivers to avoid excessive warnings, overprotective behaviors, and anxiety-driven communication that may unintentionally reinforce negative expectations. Encouraging calm, confident, and supportive parental behavior can help reduce socially transmitted nocebo effects(Bingel, 2014; Kaptchuk & Miller, 2015).

Healthcare institutions should incorporate training on placebo–nocebo phenomena into pediatric nursing education and in-service programs. Enhancing nurses' awareness of the psychological impact of communication can improve therapeutic interactions and overall quality of care (Benedetti, 2008; Colloca & Miller, 2011)

Informed consent and procedural explanations should be framed ethically and sensitively. While honesty is essential, information should be delivered in a developmentally appropriate manner that minimizes fear and psychological distress. Balanced disclosure helps protect children from unnecessary nocebo-related harm while respecting ethical principles (Bingel, 2014; Finell & Saarela, 2017).

Finally, future pediatric care protocols should emphasize family-centered, psychologically safe environments that foster trust and emotional security. Such approaches can enhance cooperation, improve treatment adherence, and promote positive healthcare experiences for children (Cohen et al, 2004; Kaptchuk & Miller, 2015).

Limitations of Existing Literature

Despite growing recognition, pediatric-specific research on the nocebo effect remains limited. Most studies focus on adults or clinical trial settings, underscoring the need for more child-centered, nursing-led research (Colloca & Miller, 2011).

Recommendations for Future Research

Future studies should focus on pediatric populations, parental education interventions, communication-based strategies, and the development of clinical guidelines to reduce nocebo effects in

children (Kaptchuk & Miller, 2015; Rief & Petrie, 2016).

The nocebo effect in children is a clinically significant phenomenon influenced by parental behavior and healthcare communication. Pediatric nurses play a key role in minimizing nocebo responses through mindful, age-appropriate communication.

Conflict of Interest: The author(s) declare that there is no conflict of interest associated with the publication of this manuscript.

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