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Mothers Stress experiences and effectiveness of Nurse Led Intervention on management of children with chronic kidney disease at Tertiary Care Centre" - A mixed method study, Chennai.

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ABSTRACT

Introduction

Chronic idney disease (CKD) in children is a serious global health concern, impacting not only the physical well-being of the affected children but also their emotional and social development. CKD results in the gradual decline of kidney function, impairing the body's ability to regulate fluids, electrolytes, and waste. While CKD is less prevalent in children than adults, its effects are profound, with an estimated prevalence of 1 to 3 per 1,000 children worldwide. Children with CKD face numerous health challenges, including poor appetite, fatigue, swelling, and high blood pressure, while caregivers—especially mothers—often experience high levels of stress as they navigate complex treatment regimens and emotional burdens. The support provided by healthcare professionals, particularly through nurse-led interventions, can play a crucial role in mitigating this stress. This study aims to explore the mothers stress experiences and assess the effectiveness of mindfulness meditation as a nurse-led intervention to alleviate stress in these caregivers.

Methods

A mixed-methods approach was employed for this study, combining both qualitative and quantitative research techniques. In the qualitative phase, un - structured interviews were conducted with mothers of children diagnosed with CKD to explore their stress experiences. The quantitative phase utilized the Parental Stress Scale to measure stress levels, along with demographic data collection. Mindfulness meditation sessions, led by trained nurses, were provided to a subgroup of the participants, and their stress levels were assessed before and after the intervention. The study ensured ethical compliance, with informed consent obtained from all

participants and privacy maintained throughout.

Results

The study found that mothers of children with CKD reported high levels of stress related to frequent medical appointments, emotional distress over their child's illness, and disruptions to daily life. The quantitative data from the Parental Stress Scale revealed that 65% of the participants experienced moderate to severe stress. Following nurse-led mindfulness meditation sessions, there was a significant reduction in stress levels, with 78% of participants reporting improved emotional well-being and better coping mechanisms. The qualitative interviews further highlighted the importance of emotional support, with many mothers expressing relief at having access to structured interventions and guidance from nurses.

Discussion

The findings of this study underscore the importance of addressing the emotional and psychological needs of mothers caring for children with CKD. Nurse-led mindfulness meditation emerged as an effective intervention for reducing maternal stress and promoting coping strategies. The holistic support provided by nurses, including practical assistance with care routines, education on disease management, and emotional counseling, was instrumental in enhancing the overall well-being of both mothers and their children. These results suggest that integrating such interventions into pediatric CKD care could have a positive impact on caregivers' mental health, thereby improving their ability to provide long-term care for their children. Further research with larger sample sizes and diverse populations is needed to confirm these findings and refine intervention strategies.

Keywords: *Caregiver stress, chronic kidney disease, maternal stress, mindfulness meditation, nurse-led interventions.*

INTRODUCTION

Chronic kidney disease (CKD) in children is a significant global health concern, impacting their growth, development, and overall quality of life [1]. CKD involves a gradual decline in kidney function, making it harder for the body to regulate fluids, electrolytes, and waste products. Although CKD is less common in children than in adults, with an estimated prevalence of 1 to 3 per 1,000 children, its effects on patients and their families are substantial. Chronic kidney disease (CKD) in children results in a gradual loss of renal function, compromising waste disposal, electrolyte balance, and general health. CKD in children can be caused by congenital abnormalities, inherited disorders, or acquired diseases, resulting in gradual renal function loss that impairs growth, development, and quality of life [2]. Symptom of pediatric CKD include poor appetite, fatigue, nausea, changes in urine, swelling, and high blood pressure [3]. Due to CKD's lifelong impact, mothers often face high levels of stress. Parents experience stress due to concerns about their child's health, the potential worsening of the condition, and the possibility of future treatments like dialysis or kidney transplants [4]. Stress can lead to anxiety, sadness, memory problems, and insomnia. It may result in unhealthy behaviors and strained relationships [5]. Effective management is crucial, as long-term stress boosts the risk of significant health conditions including heart disease and diabetes [6]. Mother with children with CKD experience continual stress as they navigate complex treatment programs, frequent medical appointments, and the emotional burden of their child's sickness [7]. Chronic kidney disease (CKD) is a long-term disorder that disrupts everyday life, reduces quality of life, increases the risk of illness, and raises healthcare expenses [8]. The condition is characterized by impaired kidney function (eGFR $\leq$60 mL/min per 1.73 m^2) or renal injury lasting at least three months [9]. CKD is divided into five stages based on eGFR, with stage 5, or end-stage kidney disease (ESKD), necessitating renal replacement therapy (RRT) to prolong life [10].

METHODOLOGY

This study utilized a mixed-methods research design to explore the stress experienced by mothers of children with chronic kidney disease (CKD) and to evaluate the effectiveness of nurse-led mindfulness meditation interventions in reducing maternal stress. The study combined both qualitative and quantitative approaches to gain a comprehensive understanding of the issue.

Study Design

A mixed-methods study was conducted. The qualitative component involved in-depth interviews with mothers of children diagnosed with CKD, while the quantitative component included stress measurement through the Parental Stress Scale (PSS) before and after the mindfulness intervention. This design allowed for both subjective insights and measurable outcomes related to mothers stress levels and the impact of nurse-led interventions.

Participants

Participants were recruited from a pediatric nephrology clinic at a tertiary care hospital. The inclusion criteria were:

- Mothers of children with chronic kidney disease available during the study period.
- With at least one child diagnosed with CKD
- Children aged 3 to 12 years,
- Willing to participate in mindfulness meditation sessions.

Mothers who had pre-existing psychiatric conditions or were already receiving psychological therapy were excluded to ensure that the effects of the mindfulness intervention could be clearly evaluated.

Data Collection Procedures

Data were collected in two phases:

1. **Qualitative Data Collection**
   In the first phase, semi-structured interviews were conducted with 5 mothers. Each interview lasted 30–45 minutes and explored topics such as the emotional and psychological challenges of caring for a child with CKD, coping mechanisms, and perceived support from healthcare providers. Interviews were audio-recorded, transcribed verbatim, and analyzed thematically to identify common stressors and coping patterns.
2. **Quantitative Data Collection**
   In the second phase, 30 mothers were assessed using the Parental Stress Scale (PSS) before and after participating in nurse-led mindfulness meditation sessions. Baseline stress levels were measured using the PSS, which consists of 18 items scored on a Likert scale (1–5), with higher scores indicating greater stress. Demographic data, such as age, socioeconomic status, and duration of the child's illness, were also collected.

Intervention: Nurse-Led Mindfulness Meditation

A subset of the participants (n=30) underwent a mindfulness meditation program designed and conducted by trained nurses. The program lasted four weeks, with 20-minute session per day. The sessions included mindfulness practices such as breath awareness and body scans. Mothers were also encouraged to practice mindfulness at home for 20 minutes per day. Nurses provided additional emotional support and education about CKD and self-care strategies throughout the intervention period.

Data Analysis

- **Qualitative Analysis**
  The interview data were analyzed using thematic analysis. Transcripts were coded independently by two researchers to ensure reliability, and key themes related to maternal stress, coping mechanisms, and perceived support were identified and categorized.
- **Quantitative Analysis**
  Quantitative data were analyzed using SPSS software (version 25.0). Pre- and post-intervention stress scores were compared using paired t-tests to assess the effectiveness of the mindfulness meditation intervention. Descriptive statistics were used to summarize demographic information, while the relationship between demographic factors and stress levels was analyzed using Pearson's correlation coefficient. A significance level of $p<0.05$ was considered statistically significant.

Ethical Considerations

Ethical approval for the study was obtained from the institutional review board (IRB) of the hospital. Informed consent was obtained from all participants prior to data collection. Privacy and confidentiality were maintained by anonymizing interview transcripts and securing all data on password-protected devices. Participants were informed of their right to withdraw from the study at any time without any impact on their child's treatment.

Limitations

The study was limited by its relatively small sample size, which may not be representative of all mothers of children with CKD. Additionally, the four-week duration of the mindfulness meditation intervention may have been too short to fully capture its long-term effects on stress reduction.

This methodology aimed to thoroughly investigate the stress experienced by mothers and evaluate nurse-led interventions for reducing it, providing insights into the role of holistic care in pediatric CKD management.

RESULT

Chronic kidney disease (CKD) is a long-term disorder that has a substantial impact on everyday life, increases the risk of various health problems, reduces quality of life, and raises healthcare costs [11]. CKD is defined as impaired kidney function (eGFR ≤60 mL/min per 1.73 m^2) or evidence of renal damage for at least three months, regardless of the source[12]. CKD is divided into five stages depending on eGFR, with stage 5, also known as end-stage kidney disease (ESKD), necessitating renal replacement therapy (RRT) to prolong life [13]. According to 2024 data from the North American Pediatric Renal Transplant Cooperative Study (NAPRTCS) chronic renal insufficiency (CRI) database, 5,651 kids aged 2-17 have an estimated glomerular filtration rate (eGFR) of less than 75 mL/min per 1.73 m^2[14].A National Health and Nutrition Examination Survey (NHANES) looking at the prevalence of chronic kidney disease (CKD) in adolescents aged 12 to 18 years discovered that the rate of persistent albuminuria remained remarkably stable between 1988 and 2014, ranging from 3.29% to 3.26%[15]. However, throughout the most recent study period, the prevalence of both reduced and low eGFRs rose. Globally, the prevalence of CKD at stage II or lower in children is estimated to be between 18.5 and 58.3 per million [16]. Chronic kidney disease (CKD) grows increasingly common as people age, and it affects more adults than children [17]. In the pediatric population, CKD is more common in children over the age of six than in those under six [18]. In the NAPRTCS cohort, the percentages were 19% in children aged 0 to 1 year, 17% in those aged 6 to 12 years, 33% in children aged 2 to 5 years, and 31% in those over 12 years [19].

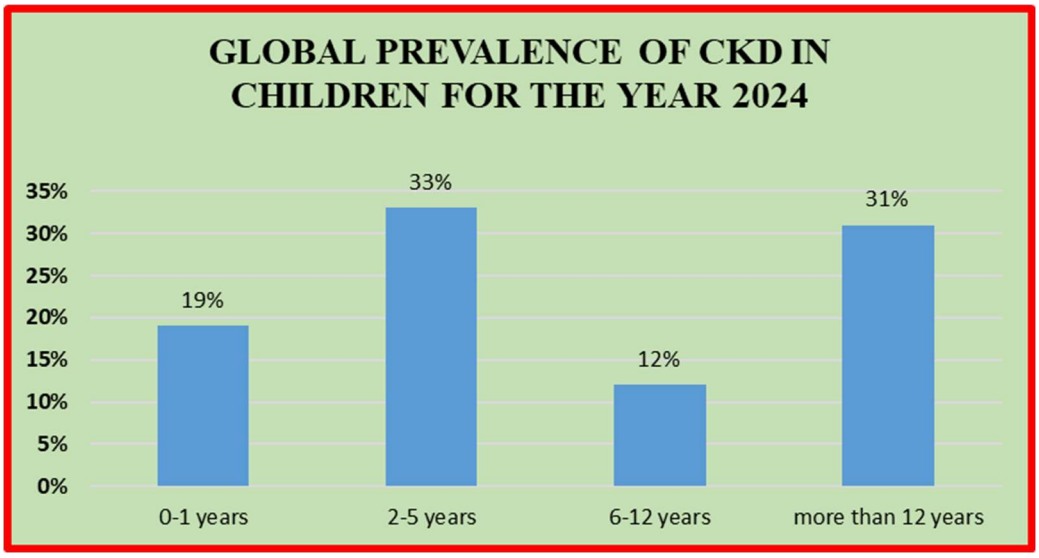

FIG.1.1. GLOBAL PREVALENCE OF CKD IN CHILDREN FOR THE YEAR 2024

The high prevalence of poor kidney function among Indian children and adolescents emphasizes the critical need for focused interventions and policies to address this increasing public health concern[20].According to the first nationwide survey, issued in 2024, approximately 4.9% of India's children and adolescents have poor renal function[21].Andhra Pradesh, followed by Telangana and West Bengal, had the most cases, while Tamil Nadu, Chhattisgarh, Rajasthan, and Kerala had the lowest prevalence Singh et al. (2024) identified a 4.9% prevalence of impaired kidney function (IKF) in children and adolescents aged 5 to 19 [22]. The prevalence was 5.6% for ages 5 to 9, 3.4% for ages 10 to 14, and 5.2% for ages 15 to 19. The average eGFR rate was 113.3 ± 41.4 mL/min/1.73 m² [23].

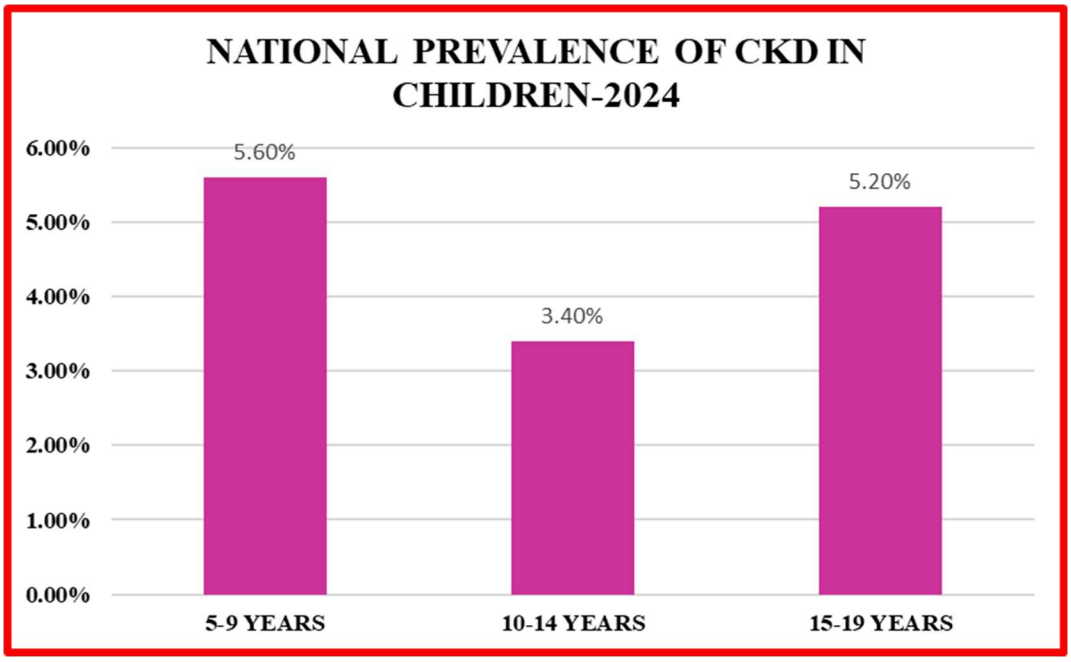

FIG.1.2. NATIONAL PREVALENCE OF CKD IN CHILDREN-2024

Chronic kidney disease (CKD) is the sixth most common cause of death in Tamil. According to a preliminary study from the Directorate of Public Health and Preventive Medicine based on a survey done in February 2022, roughly one in every five Tamil Nadu residents had high kidney parameters[24].This demonstrates the critical need to improve awareness about CKD in the state[25].Data from the Institute of Child Health and Hospital for Children in Chennai-08 show that from 01/04/2022 to 31/03/2023, there were 345 new instances of chronic renal disease, with 224 male children and 121 female children. There were 2389 follow-up cases, including 1409 male and 980 female children [26].

CKD CHILDREN	NEW		OLD		TOTAL	
	MCH	FCH	MCH	FCH	MCH	FCH
01.04.2022- 31.03.2023	224	121	1185	859	1409	980

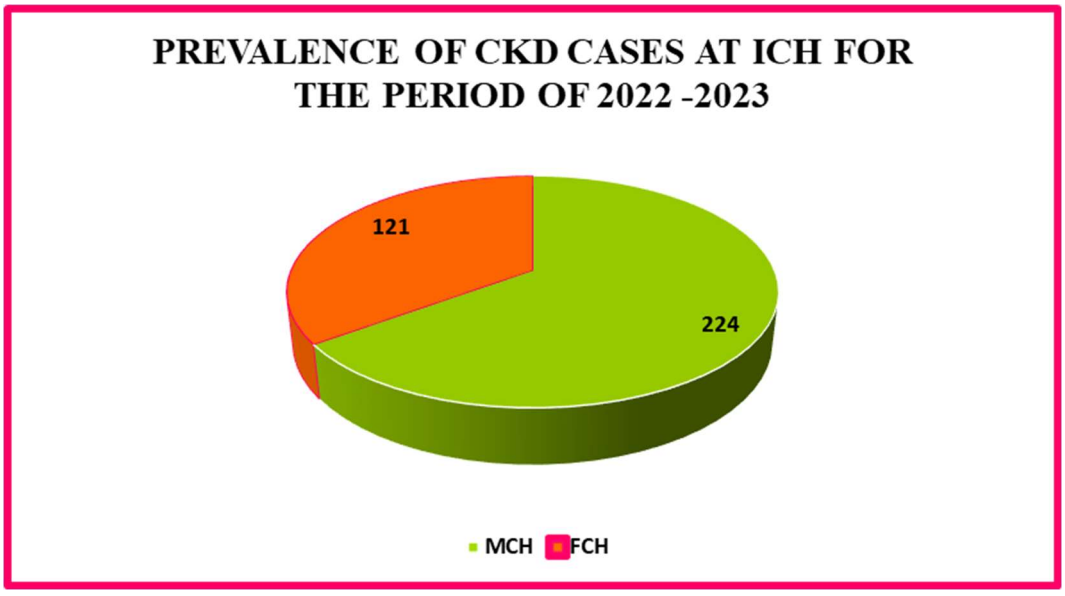

FIG.1.3. PREVALENCE OF CKD CASES AT ICH FOR THE PERIOD OF 2022-2023

Chronic kidney disease (CKD) in children is a major global health concern, with prevalence estimates ranging from one to three per 1,000 children, depending on geography and underlying health factors [27]. The global incidence of end-stage renal disease (ESRD) in children ranges from 5 to 15 cases per million children per year, with the United States accounting for roughly 8.4 cases [28]. Less than 5% of people with end-stage kidney disease (ESKD) are children, adolescents, or young adults, and 10-year survival rates range from 70% to 85% [29]. Children with CKD provide special challenges to healthcare providers since they require treatment for both renal impairment and a variety of extrarenal symptoms [30]. ESRD dramatically affects life expectancy, with children on dialysis dying 30 to 150 times more often than their healthy classmates [31]. Children with CKD and their caregivers, especially moms who frequently serve as primary caretakers, confront various obstacles [32]. Nurse-led interventions are critical for giving support and relieving stress for these mothers [33]. Nurses can provide educational sessions to empower moms with information about their child's illness, treatment options, and management tactics, thereby lowering worry and building a sense of control [34]. Nurse

can also create supportive care systems that include counseling, peer support groups, and tools for discussing experiences and coping methods[35]. Nurses can provide practical assistance with care routines, medication management, and appointments to help moms cope [36]. By fostering a compassionate and understanding environment, nurses may help moms build coping skills, recognize their own needs, and prioritize self-care, thereby increasing their psychological well-being [37]. Children with CKD and their caregivers, especially moms who frequently serve as primary caretakers, confront various obstacles [38]. Nurse-led interventions are critical for giving support and relieving stress for these mothers [39]. Nurses can provide educational sessions to empower moms with information about their child's illness, treatment options, and management tactics, thereby lowering worry and building a sense of control [40]. Nurses can also create supportive care systems that include counseling, peer support groups, and tools for discussing experiences and coping methods [41]. Nurses can provide practical assistance with care routines, medication management, and appointments to help moms cope [42]. By fostering a compassionate and understanding environment, nurses may assist moms in developing coping mechanisms, recognizing their own needs, and prioritizing self-care, ultimately enhancing their psychological health [43]. In summary, nurse-led interventions address both the clinical and emotional aspects of CKD management, providing holistic support that reduces maternal stress and enhances the quality of life for both mothers and their children [44]. Stress can have serious adverse effects on mental and physical health, including reduced immune response, high blood pressure, rapid heartbeat, and digestive issues like irritable bowel syndrome and stomach aches [45]. Long-term caring responsibilities may also increase the risk of chronic diseases such as diabetes, heart disease, and hypertension [46]. Care givers are vulnerable to mental and emotional stress, worry, and desperation, which can lead to emotional tiredness and cognitive decline, impairing memory and decision-making abilities [47]. Common coping mechanisms include disregarding self-care, social isolation, and, in certain cases, substance misuse. Because of the serious long-term health consequences of these stressors, caregivers should seek help, practice self-care, and make use of available services [48]. Managing chronic kidney disease (CKD) necessitates stringent dietary rules, regular medical visits, and drug administration, which can result in physical tiredness and burnout. Balancing these responsibilities with professional commitments can be especially difficult for mothers, often leading to feelings of loneliness and isolation as a result of their inability to maintain social contacts and participate in routine activities. Meditation is a set of mental activities aimed to concentrate attention and induce calm, so aiding in the management of physiological responses to stress [49]. Mindfulness meditation is based on ancient traditions that emphasize nonjudgmental observation of thoughts, feelings, and bodily sensations. Its goal is to cultivate heightened awareness and focused attention. Body scans, breath meditation, and writing are all practices that can help you reduce stress, increase emotional regulation, focus, and feel better in general. The progression to renal failure is not the only serious health consequence of CKD. Ruby Patel et al. (2023) discovered that parental stress affects the quality of life in children with kidney failure [50]. Providing psychological assistance to children with chronic renal disease and their caregivers can improve their overall health-related quality of life. Dalia Abdel Moneim Mahmoud et al. (2021) discovered that parents of children with chronic kidney failure suffered from moderate depression (53.3%), mild depression (30%), and severe depression (16.7%). The emotional burden of raising a chronically unwell kid has a substantial impact on the well-being and care provided by mothers. Oluseyi A. Adejumo et al. (2019) discovered a higher level of depression in female caregivers of end-stage renal patients. Supporting caregivers can enhance patient outcomes, as moms of children with CKD frequently experience mental distress and burnout [51]. This study was inspired by observations of moms with children suffering from chronic kidney disease. Nurses play an important role, and analyzing their interventions might help families receive better support and coping methods [52]. Studying mothers' stress and nurse-led interventions is critical for improving quality of life and health outcomes in families living with pediatric CKD. The paper investigates mothers' stress levels when treating children with chronic renal illness and evaluates the efficacy of nurse-led mindfulness meditation in lowering stress and enhancing care [53].

DISCUSSION

Nurses play a varied role in assisting moms of children with chronic kidney disease (CKD), which is critical for stress reduction. Nurses provide emotional support by fostering a caring environment in which moms can freely

express their concerns about their child's health. They assist women in identifying helpful resources, like as support groups, counseling services, and educational materials, to help them cope with stress [54]. Encouraging self-care is also critical; nurses emphasize the importance of mothers' well-being in providing excellent care. Nurses notice indicators of acute stress or mental health crises and direct patients to relevant mental health providers [55].

Nurses take a family-centered approach, involving the entire family in care discussions to ensure that moms feel supported throughout their child's medical journey [56]. They act as liaisons. Nurses play an important role in reducing stress for moms of children with chronic kidney disease (CKD) by offering emotional support in a caring setting where mothers can voice their concerns [57]. They assist mothers in identifying services such as support groups and counseling, as well as encouraging self-care to improve their well-being. In cases of acute stress, nurses detect symptoms and recommend moms to mental health professionals [58]. Nurses use a family-centered approach to care discussions, ensuring that moms feel supported throughout their healthcare journey [59]. The coordinate care across healthcare teams, offer stress management skills, and do regular follow-ups to assess moms' emotional well-being. Nurses also encourage peer support and personalize interventions to moms' needs after conducting extensive assessments [60]. Advocate for policy improvements that recognize caregivers. The literature review is divided into three sections. Section A investigates the stress experiences of women caring for children with chronic kidney disease (CKD), focusing on research by Anjum et al. (2023) and Tahira Aryum et al. (2023), which reveal topics such as emotional impact, coping techniques, and financial difficulties. Stephanie Smith et al (2022) found gaps in healthcare support, underlining the need for more effective interventions [61].

CONCLUSION

The study created a research tool with qualitative and quantitative elements after reviewing the literature and consulting with experts. Qualitative interviews were conducted to investigate the stress experiences of mothers with children with chronic kidney disease (CKD), while the quantitative phase examined stress levels using the Parental Stress Scale and demographic data was also collected. Experts confirmed the tool's validity and found it to be highly reliable. Ethical norms protected participant privacy. Key findings focused on the emotional impact of diagnosis, coping strategies, and changes in family dynamics. Mindfulness meditation emerged as a possible intervention. Future study should use a variety of samples and approaches to better help these moms and their children.

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