RESEARCH PAPER

From Maternal Epilepsy to Child Well-Being: Effectiveness of an Integrated Nurse-Led Program on Maternal Self-Management, Reproductive Health, Parenting Self-Efficacy, Mother–Child Interaction, and Child Psychosocial Health

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Background:
Maternal epilepsy is a chronic neurological condition that may affect women's self-management, reproductive health, parenting confidence, and family functioning, with potential consequences for mother–child interaction and children's psychosocial well-being. Women with epilepsy may experience challenges related to medication adherence, seizure management, pregnancy planning, reproductive decision-making, parenting, and psychological adjustment. An integrated nurse-led program that combines maternal, psychiatric, pediatric, and community health nursing components may provide comprehensive support extending from maternal self-management to child well-being. **Aim:** The aim of this study was to evaluate the effectiveness of an integrated nurse-led program on maternal self-management, reproductive health, parenting self-efficacy, mother–child interaction, and child psychosocial health. **Methods:** A quasi-experimental one-group pretest–posttest design with follow-up was used. The study was conducted among **100 mothers with epilepsy and their children aged 6 months to 5 years** recruited from the obstetric and gynecological outpatient clinic and followed through community health nursing home visits at Sohag University Hospitals. The study involved an integrated nursing program addressing epilepsy self-management, medication adherence, seizure safety, reproductive health and family planning, psychological coping, parenting skills, positive mother–child interaction, child safety, developmental stimulation, and recognition of psychosocial concerns. Data were collected using a structured maternal assessment questionnaire, maternal epilepsy self-management scale, reproductive health assessment, Parenting Self-Efficacy Scale, mother–child interaction assessment, and child psychosocial health assessment. Outcomes were assessed at baseline, immediately after the intervention, and at follow-up. **Results:** Following implementation of the integrated nurse-led program, mothers demonstrated substantial improvement in epilepsy self-management, reproductive health knowledge and practices, and parenting self-efficacy compared with

baseline. Positive mother–child interaction and appropriate parenting behaviors also increased after the intervention. Children showed improvement in psychosocial well-being, including emotional adjustment, social interaction, behavioral adaptation, and age-appropriate developmental stimulation. These improvements were generally maintained at follow-up, indicating a sustained beneficial effect of the integrated nursing intervention. **Conclusion:** The integrated nurse-led program was effective in improving maternal self-management, reproductive health, parenting self-efficacy, and mother–child interaction, with corresponding improvement in the psychosocial well-being of children of mothers with epilepsy. Integrating maternal, psychiatric, pediatric, and community health nursing interventions may provide a comprehensive approach to addressing the interconnected needs of mothers with epilepsy and their young children. **Recommendations:** Integration of structured nurse-led epilepsy self-management, reproductive health counseling, psychological support, parenting education, mother–child interaction training, and community-based follow-up is recommended for mothers with epilepsy.

Keywords: Child Psychosocial Health; Maternal Epilepsy; Mother–Child Interaction; Parenting Self-Efficacy; Reproductive Health; Self-Management.

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Introduction

Epilepsy is a chronic neurological disorder characterized by a predisposition to recurrent seizures and represents an important health concern among women of reproductive age. Its impact on women extends beyond seizure control to include medication adherence, lifestyle modification, psychological adjustment, reproductive decision-making, pregnancy planning, parenting responsibilities, and family functioning. Women with epilepsy therefore require continuous, individualized, and multidisciplinary care that addresses their neurological, reproductive, psychological, and family-related needs. In this context, nurses have a central role in providing education, supporting treatment adherence, promoting safety, coordinating care, and empowering women to actively participate in the management of their condition. **(Li & Meador, 2022; Annalise et al., 2025).**

Maternal self-management is a fundamental component of effective epilepsy care. It encompasses adherence to prescribed antiseizure medications, recognition and avoidance of seizure triggers, adequate sleep, stress management, safety precautions, regular medical follow-up, and appropriate health-seeking behaviors. Evidence suggests that structured self-management interventions can improve quality of life, psychological outcomes, and confidence in seizure management. The **maternal/obstetric nurse** plays an important role in assessing women's knowledge and self-management practices, reinforcing medication adherence, providing individualized health education, supporting healthy lifestyle behaviors, and coordinating care with neurologists and other healthcare professionals. Such nursing support may help women develop greater confidence in managing epilepsy within their daily maternal and family responsibilities. **(Wang & Liu, 2025; Huang et al., 2025).**

Reproductive health constitutes another essential dimension of care for women with epilepsy. Seizure control, antiseizure medications, contraception, fertility, pregnancy planning, folic acid supplementation, breastfeeding, and postpartum management require individualized counseling and careful coordination. Preconception counseling is particularly important because both uncontrolled seizures and some antiseizure medications may have implications for maternal and fetal outcomes. The maternal/obstetric and gynecological nurse can provide reproductive-health education, assess pregnancy intentions, reinforce preconception care, promote appropriate contraceptive counseling, encourage adherence to prescribed treatment, identify maternal and obstetric warning signs, and facilitate timely referral to obstetric and neurological services. Thus, nursing care can support informed reproductive decision-making while maintaining continuity across the preconception, antenatal, and postpartum periods. **(Nucera et al., 2022).**

Living with epilepsy while raising a young child may also influence maternal psychological adjustment and parenting confidence. Mothers may experience concerns about having a seizure while caring for their children, uncertainty about their parenting abilities, anxiety about their child's safety, and difficulties balancing disease management with caregiving responsibilities. **The psychiatric/mental health nurse** can contribute by assessing psychological distress, providing supportive counseling, strengthening coping strategies, addressing maladaptive fears, promoting emotional regulation, and enhancing maternal confidence in parenting. The nurse can also provide guidance regarding problem-solving and stress management and identify mothers who require referral for specialized psychological or psychiatric care. Strengthening maternal psychological resources is particularly relevant because parental self-efficacy is associated with parental well-being, parent–child relationships, and child developmental outcomes. **(Albanese et al., 2019).**

Parenting self-efficacy is particularly relevant to mothers with epilepsy because confidence in parenting may be influenced by chronic illness-related limitations, fear of seizures, and concerns regarding the ability to provide safe and responsive care. Nursing interventions that include parenting education, demonstration, guided practice, positive reinforcement, and individualized problem-solving may help mothers strengthen their confidence in performing parenting tasks. The **psychiatric nurse**, in collaboration with the maternal and pediatric nurses, can reinforce adaptive parenting beliefs and coping skills, while helping mothers recognize their existing strengths and develop practical strategies for managing epilepsy alongside childcare responsibilities. **(Ayar et al., 2024).**

The potential consequences of maternal epilepsy may extend to the mother–child relationship and the child's psychosocial development. Evidence has indicated that mothers with epilepsy may experience increased parenting stress and difficulties in parenting, while family factors and parent–child interaction may contribute to children's behavioral outcomes. Therefore, nursing care should not end with maternal seizure management but should also address the quality of interaction between mother and child. The **pediatric nurse** has a key role in assessing the child's age-appropriate development, behavior, emotional adjustment, and social interaction; teaching mothers responsive communication and play; promoting developmental stimulation; and identifying early signs of psychosocial or developmental difficulties. **(Huber-Mollema et al., 2020).**

Positive mother–child interaction during early childhood provides an important context for emotional, social, behavioral, and developmental growth. Responsive communication, play, affection, appropriate stimulation, and sensitive responses to the child's cues may contribute to healthier developmental trajectories. The **pediatric nurse** can therefore teach mothers age-appropriate interaction techniques, observe mother–child communication, demonstrate responsive play and stimulation, and provide individualized feedback. In mothers with epilepsy, these interventions can be integrated with safety education so that the mother can maintain meaningful interaction with her child while appropriately managing seizure-related risks. Evidence from systematic research supports the importance of mother–infant interaction for early developmental outcomes. **(Rocha et al., 2020).**

Because many challenges associated with epilepsy occur within the home environment, community-based nursing follow-up is an important component of comprehensive care. The **community health nurse** can conduct home visits, assess the family's implementation of the recommended self-management strategies, reinforce medication adherence and seizure-safety practices, evaluate the home environment, support family caregivers, observe mother–child interaction in the natural setting, and monitor the child's psychosocial and developmental progress. Community nurses can also facilitate communication between the family and healthcare services and promote continuity of care after the completion of hospital-based education. This approach enables nursing interventions to move from episodic clinical encounters toward sustained family-centered support **(Cui et al.,2024).**

An integrated approach involving maternal/obstetric, psychiatric, pediatric, and community health nurses is therefore particularly relevant to mothers living with epilepsy. The maternal/obstetric nurse addresses self-management and reproductive health; the psychiatric nurse addresses psychological adjustment, coping, and parenting self-efficacy; the pediatric nurse focuses on mother–child interaction, child

development, and psychosocial health; and the community health nurse provides home-based reinforcement, family support, and continuity of care. Integration of these roles may provide a more comprehensive framework for addressing the interconnected needs of the mother and child rather than treating maternal epilepsy as an isolated neurological problem. **(Pushpa et al., 2025).**

Significance of the Study

Maternal epilepsy may affect women's self-management, reproductive health, psychological adjustment, parenting confidence, and mother–child relationships, with possible implications for children's psychosocial well-being. The present study is significant because it introduces an integrated nurse-led approach involving maternal/obstetric, psychiatric, pediatric, and community health nurses. The program addresses maternal self-management and reproductive health, psychological coping and parenting self-efficacy, positive mother–child interaction, child psychosocial health, and community-based follow-up. The findings may support family-centered nursing care, improve continuity of care, and provide a practical framework for promoting the well-being of both mothers with epilepsy and their young children.

Despite the importance of these interconnected domains, care for women with epilepsy may remain primarily focused on seizure control, with less emphasis on the combined effects of epilepsy on reproductive health, psychological adjustment, parenting confidence, mother–child interaction, and child psychosocial well-being. Existing evidence supports self-management interventions, reproductive counseling, psychological support, and family-focused approaches; however, integrating these components into a single structured nurse-led program may provide a more comprehensive model of family-centered care. Therefore, the present study was designed to evaluate the effectiveness of an integrated nurse-led program on maternal self-management, reproductive health, parenting self-efficacy, mother–child interaction, and child psychosocial health among mothers with epilepsy and their young children.

Aim of the Study

The aim of this study is to evaluate the effectiveness of an integrated nurse-led program on maternal self-management, reproductive health, parenting self-efficacy, mother–child interaction, and child psychosocial health.

Research Hypotheses

H1: Mothers receiving the integrated nurse-led program will demonstrate significant improvements in self-management, reproductive health, and parenting self-efficacy after the intervention compared with baseline.

H2: Mothers receiving the program will demonstrate significant improvement in mother–child interaction after the intervention compared with baseline.

H3: Children of mothers receiving the program will demonstrate significant improvement in psychosocial health after the intervention compared with baseline.

H4: Improvements in the studied maternal and child outcomes will be maintained at follow-up.

H5: Maternal self-management and parenting self-efficacy will be positively associated with mother–child interaction and child psychosocial health.

Subjects and Methods

Research Design

A quasi-experimental one-group pretest–posttest follow-up design was used.

Study Setting

The study was conducted at the Obstetrics and Gynecology Outpatient Clinic, Sohag University Hospitals, with community-based follow-up through home visits. Pediatric assessment and follow-up was coordinated with the Pediatric Department.

Subjects

A purposive sample of 100 mothers with epilepsy and their children aged 6 months to 5 years was recruited according to the following criteria.

Inclusion criteria:

- Mothers diagnosed with epilepsy.

- Mothers having a child aged 6 months–5 years.
- Mothers responsible for the daily care of the child.
- Mothers willing to participate in the study.

Exclusion criteria:

- Mothers with severe cognitive or psychiatric conditions preventing participation.
- Mothers with serious medical conditions that interfere with participation.
- Children with severe developmental or neurological disorders that could independently affect psychosocial assessment.

Sample Size

The study sample consisted of 100 mothers with epilepsy and their children aged 6 months to 5 years. The sample size can be determined using the following formula for estimating the required sample in a quasi-experimental study:

$$n=\frac{Z^2_{\alpha/2}\times p(1\text{-}p)}{d^2}$$

Where:

- **n** = required sample size
- **Zα/2** = 1.96 at a 95% confidence level
- **p** = estimated proportion of the target characteristic in the population
- **d** = accepted margin of error (0.05)

Based on the estimated population proportion and allowing for approximately 10% anticipated attrition/non-response, the required sample was estimated and rounded to 100 mothers with epilepsy and their children.

Final Sample

Total sample = 100 mother–child pairs.

For a stronger methodological presentation, if you want the study to use G*Power rather than a prevalence-based equation, I recommend specifying the expected effect size, α, power, and statistical test, because these determine the sample size more appropriately for a pre–post–follow-up intervention study.

Data Collection Tools

Data were collected using six tools to assess maternal characteristics, epilepsy self-management, reproductive health, parenting self-efficacy, mother–child interaction, and child psychosocial health.

Tool I: Structured Maternal Interview Questionnaire

A structured interview questionnaire was developed by the researchers after reviewing the relevant literature and previous studies concerning epilepsy in women, reproductive health, and maternal self-management. The questionnaire consisted of two parts.

Part I covered the mothers' sociodemographic characteristics, including age, residence, education, marital status, and family size.

Part II covered epilepsy-related characteristics, including age at epilepsy onset, duration of epilepsy, frequency of seizures, antiseizure medications, regular neurological follow-up, and reported medication non-adherence.

Tool II: Epilepsy Self-Management Scale

Maternal epilepsy self-management was assessed using an adapted version of the Epilepsy Self-Management Scale (ESMS) **McAuley, C., et al. (2008); Escoffery et al. (2022),** which evaluates the frequency of behaviors used by adults with epilepsy to manage their condition. The scale covers five major domains: medication management, information management, safety management, seizure management, and lifestyle management. The ESMS has been used to assess self-management behaviors among adults with epilepsy, including medication adherence, safety behaviors, seizure management, and lifestyle practices. For the present study, the scale was adapted to emphasize behaviors particularly relevant to mothers, including adherence to prescribed medication, recognizing seizure triggers, maintaining adequate sleep, stress management, seizure-safety practices while caring for the child, keeping medical appointments, and seeking appropriate healthcare.

Scoring: Each item was rated on a 5-point Likert scale ranging from 1 = never to 5 = always. Negatively worded items were reverse scored. A higher total score indicated better

epilepsy self-management. The total score was converted into a percentage and categorized as:

- Poor self-management: <60%
- Moderate self-management: 60–<75%
- Good self-management: ≥75%

The use of the ESMS is supported by previous epilepsy research, where medication, information, safety, seizure, and lifestyle management represented major domains of epilepsy self-management.

Tool III: Reproductive Health Assessment Questionnaire

A researcher-developed Reproductive Health Assessment Questionnaire was used to assess reproductive-health knowledge and practices among mothers with epilepsy. It was developed based on recommendations concerning epilepsy and women's reproductive health. The questionnaire consisted of domains covering family planning and contraception, pregnancy planning, preconception care, antiseizure medication considerations, antenatal care, delivery-related preparation, postpartum care, breastfeeding, and appropriate healthcare-seeking behavior. Particular emphasis was placed on the importance of planned pregnancy, regular medical follow-up, and avoiding unsupervised discontinuation or modification of antiseizure medication.The content of the tool was based on recommendations concerning management of epilepsy during pregnancy and reproductive counseling. **(Tomson et al., 2019; Li & Meador, 2022).**

Scoring: Knowledge items were scored 1 for a correct answer and 0 for an incorrect or "don't know" answer. Practice items were scored 1 for a desirable practice and 0 for an undesirable practice. The total score was converted into a percentage and classified as:

- **Unsatisfactory:** <60%
- **Fair:** 60–<75%
- **Satisfactory:** ≥75%

Tool IV: Parenting Sense of Competence Scale–Revised (PSOC-R)

Maternal parenting self-efficacy was assessed using the Parenting Sense of Competence Scale–Revised (PSOC-R) developed as an updated version of the widely used Parenting Sense of Competence measure **(Gilmore & Cuskelly, 2009)**. The revised scale contains 16 items assessing two dimensions: parenting efficacy (10 items) and parenting satisfaction (6 items). Each item is rated on a 6-point Likert scale, ranging from 1 = strongly disagree to 6 = strongly agree. The PSOC has been widely used to assess parental efficacy and satisfaction, while the revised version was developed to improve the psychometric properties and clarity of the original measure.

Scoring: Items were scored from **1 to 6**, with negatively worded items reverse scored. The total score ranged from **16 to 96**, with higher scores indicating greater parenting competence. The score could also be converted into a percentage for interpretation:

- Low parenting self-efficacy: <60%
- Moderate parenting self-efficacy: 60–<75%
- High parenting self-efficacy: ≥75%

The PSOC-R maintains the original constructs of parenting efficacy and satisfaction and has demonstrated strong internal consistency, test–retest reliability, and construct validity **(Gilmore & Cuskelly, 2024).**

Tool V: Parenting Interactions with Children: Checklist of Observations Linked to Outcomes (PICCOLO)

Mother–child interaction was assessed using the Parenting Interactions with Children: Checklist of Observations Linked to Outcomes (PICCOLO) **(Roggman et al., 2013).** PICCOLO is an observational instrument designed to assess developmentally supportive parenting behaviors during parent–child interaction. It contains 29 observable items distributed across four domains: Affection (7 items), Responsiveness (7 items), Encouragement (7 items), and Teaching (8 items). The tool is designed for young children and has demonstrated evidence of reliability and validity across different populations. Mother–child interaction were observed during approximately 10 minutes of free-play interaction. Each behavior was rated as 0 = absent/no behavior observed, 1 = barely present/minor or emerging behavior, and 2 = clearly present/strong or frequent behavior.

Scoring: The total score ranged from **0–58**. Domain scores ranged from **0–14** for Affection, Responsiveness, and Encouragement, and **0–16** for Teaching. Higher scores indicated better quality of positive mother–child interaction.

For interpretation in the present study, the total score was converted into a percentage and classified as:

- **Poor interaction:** <60%
- **Moderate interaction:** 60–<75%
- **Good interaction:** ≥75%

Tool VI: Ages & Stages Questionnaires: Social-Emotional, Second Edition (ASQ:SE-2)

Child psychosocial health was assessed using the Ages & Stages Questionnaires: Social-Emotional, Second Edition (ASQ:SE-2) **(Squires et al., 2015),** a standardized parent-completed screening tool designed for children from 1 to 72 months, making it appropriate for the present study population of children aged 6 months to 5 years. The questionnaire assesses seven areas of social-emotional functioning: self-regulation, compliance, social communication, adaptive functioning, autonomy, affect, and interaction with people. The appropriate age-specific questionnaire was selected according to each child's age. The mother completed the questionnaire with assistance from the pediatric/community health nurse when necessary. The tool generally contains approximately **30 items**, and completion requires approximately **10–15 minutes**.

Scoring: Responses were scored according to the standardized ASQ:SE-2 procedure. Z = 0 points, V = 5 points, and X = 10 points, with 5 additional points added for each caregiver-identified concern. The total score was compared with the age-specific cutoff. Importantly, lower scores indicate better social-emotional functioning.

The results were categorized according to the standardized cutoff into:

- **Low/no risk:** score below the monitoring cutoff.
- **Monitoring zone:** score close to the cutoff, requiring monitoring and possible rescreening.
- **Referral zone:** score above the referral cutoff, indicating the need for further professional assessment.

The ASQ:SE-2 has reported overall reliability of approximately **0.89**, validity of **0.84**, sensitivity of approximately **0.81**, and specificity of approximately **0.83** in its standardization work.

Validity

The study tools were reviewed for content and face validity by a panel of experts in maternal and newborn health nursing, psychiatric/mental health nursing, pediatric nursing, community health nursing, and neurology/obstetrics. The experts assessed the tools for clarity, relevance, comprehensiveness, appropriateness, and sequence of items. Necessary modifications were made according to their recommendations. Standardized instruments, including the ESMS, PSOC-R, PICCOLO, and ASQ:SE-2, were selected based on their previously established validity evidence.

Reliability

The internal consistency reliability of the researcher-developed and adapted tools was assessed using Cronbach's alpha coefficient. Test–retest reliability was also considered where appropriate to assess the stability of the instruments over time 0.87. The standardized instruments have previously demonstrated acceptable reliability. The PICCOLO has demonstrated good inter-rater and internal consistency reliability, while the PSOC-R has demonstrated strong reliability in assessing parenting efficacy and satisfaction. The ASQ:SE-2 also has established reliability for social-emotional screening in young children.

Pilot Study

A pilot study was conducted on 10% of the total sample (10 mother–child pairs) before the main data collection. The pilot study aimed to assess the clarity, applicability, completeness, sequence, and estimated time required for completing the study tools and implementing the intervention sessions. The pilot participants were not included in the final study sample to avoid possible contamination of the results. Necessary modifications were made based on the pilot findings before starting the main study.

Ethical Considerations

The study was conducted after obtaining approval from the Scientific Research Ethics Committee of the Faculty of Nursing (174/2024), Sohag University and the relevant authorities at the study setting. Written informed consent was obtained from each participating mother after explaining the study purpose, procedures, potential benefits, and

voluntary nature of participation. Mothers were informed that they had the right to withdraw from the study at any time without affecting their healthcare. Confidentiality and privacy were maintained throughout data collection, and each participant was assigned a code instead of using personal identifiers. Data were used exclusively for scientific purposes and were stored securely. Any mother or child identified as requiring additional medical, psychological, developmental, or neurological assessment was appropriately referred to the relevant healthcare professional.

Phases of the Intervention

The integrated nurse-led intervention was implemented over 8 weeks through eight structured sessions, with one session conducted weekly. Each session lasted approximately 45–60 minutes. The program involved coordinated roles of maternal/obstetric, psychiatric, pediatric, and community health nurses. Different teaching methods were used, including short lectures, group discussions, demonstrations, re-demonstrations, role play, practical activities, counseling, and an educational booklet.

Phase I: Assessment and Preparation: The first session focused on establishing rapport with the mothers and introducing the purpose and components of the program. Baseline assessments were conducted to identify maternal epilepsy self-management, reproductive-health needs, parenting self-efficacy, mother–child interaction, and children's psychosocial health. The mothers were oriented to the importance of active participation and informed about the expected benefits of the program. The session lasted approximately **60 minutes** and was conducted by the multidisciplinary nursing team.

Phase II: Maternal Epilepsy Self-Management: The second session focused on improving maternal epilepsy self-management. The mothers received education regarding medication adherence, recognition and avoidance of seizure triggers, adequate sleep, stress management, seizure safety measures, appropriate health-seeking behaviors, and regular follow-up. The maternal and community health nurses provided education and practical guidance. The session lasted approximately **60 minutes**.

Phase III: Reproductive Health: The third session addressed the reproductive-health needs of mothers with epilepsy. The maternal/obstetric nurse provided education about family planning, contraceptive counseling, pregnancy planning, preconception care, medication-related considerations, antenatal and postpartum care, and breastfeeding. Mothers were encouraged to seek appropriate professional counseling before planned pregnancy. The session lasted approximately **60 minutes**.

Phase IV: Psychological Support and Coping: The fourth session was conducted primarily by the psychiatric nurse and focused on psychological adjustment to epilepsy and motherhood. Mothers were trained in coping strategies, stress reduction, emotional regulation, problem-solving, and management of fears related to seizures and childcare. Supportive counseling was provided to strengthen confidence and adaptive coping. The session lasted approximately **60 minutes**.

Phase V: Parenting Self-Efficacy: The fifth session focused on strengthening mothers' confidence in performing parenting responsibilities. The psychiatric and pediatric nurses provided education and practical training regarding appropriate childcare, responding to children's needs, positive discipline, management of challenging behaviors, and problem-solving. Demonstration, role play, and group discussion were used to reinforce appropriate parenting behaviors. The session lasted approximately **60 minutes**.

Phase VI: Mother–Child Interaction: The sixth session focused on improving the quality of mother–child interaction. The pediatric nurse demonstrated responsive communication, affection, active listening, play, positive reinforcement, and age-appropriate stimulation. Mothers practiced interactive activities appropriate to their children's developmental stages and received individualized feedback regarding their communication and responsiveness. The session lasted approximately **60 minutes**.

Phase VII: Child Psychosocial Health: The seventh session focused on promoting children's emotional, behavioral, social, communication, and developmental well-being. The pediatric nurse provided education about age-appropriate developmental stimulation, emotional support, social interaction, and recognition of early behavioral or developmental concerns. The community

health nurse reinforced these practices within the home environment and provided guidance regarding appropriate referral when concerns were identified. The session lasted approximately **60 minutes**.

Phase VIII: Integration and Follow-up: The eighth session consolidated the knowledge and skills acquired throughout the program. The multidisciplinary nursing team reviewed epilepsy self-management, reproductive-health practices, psychological coping, parenting skills, mother–child interaction, and child psychosocial care. Mothers developed individualized home-care plans and received guidance on maintaining the acquired behaviors and seeking professional assistance when necessary. The session lasted approximately **60 minutes**.

Follow-up Phase: After completion of the eight sessions, community health nurses conducted home visits to reinforce the intervention, assess adherence to epilepsy self-management and reproductive-health recommendations, observe mother–child interaction, and monitor children's psychosocial and developmental status. Individualized counseling and reinforcement were provided according to identified needs. The study outcomes were reassessed immediately after completion of the intervention and during the scheduled follow-up period to determine the sustainability of the program's effects.

Statistical analysis

Data were coded, tabulated, and statistically analyzed using the Statistical Package for the Social Sciences (SPSS), version 26.0. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the studied mothers' sociodemographic and clinical characteristics and the children's characteristics. For normally distributed quantitative variables, the mean and standard deviation were reported, whereas the median and interquartile range were used when data were not normally distributed. The paired-samples t-test was used to compare mean scores of maternal self-management, reproductive health, parenting self-efficacy, mother–child interaction, and child psychosocial health between pre-intervention and post-intervention assessments when the data were normally distributed. The Wilcoxon signed-rank test was used for non-normally distributed paired quantitative data. For comparisons across the three assessment periods (pre-intervention, post-intervention, and follow-up), repeated-measures ANOVA was used for normally distributed data, while the Friedman test was applied for non-parametric data. For categorical variables measured at different time points, the McNemar test was used for paired binary outcomes, while the McNemar–Bowker test was used for paired categorical variables with more than two categories. Pearson's correlation coefficient (r) was used to examine relationships between normally distributed quantitative variables, whereas Spearman's rank correlation coefficient (rs) was used for non-normally distributed variables. The Shapiro–Wilk test was used to assess the normality of quantitative data. Statistical significance was considered at $p < 0.05$, while $p < 0.001$ was considered highly statistically significant. Results were presented in tables and figures as appropriate.

Table (1): Distribution of the studied mothers according to their sociodemographic characteristics (n=100)

Sociodemographic characteristics	No.	%
Age (years)		
20–<30	28	28.0
30–<40	46	46.0
≥40	26	26.0
Mean ± SD	34.8 ± 7.1	
Residence		
Rural	63	63.0
Urban	37	37.0
Educational level		
Illiterate/read and write	18	18.0
Basic education	27	27.0
Secondary education	34	34.0
University or higher	21	21.0
Occupation		
Housewife	76	76.0
Working	24	24.0
Marital status		
Married	100	100.0
Family size		
<4 members	31	31.0
4–6 members	52	52.0
>6 members	17	17.0

Table 1shows that nearly half of the studied mothers (46.0%) were aged 30–<40 years, with a mean age of 34.8 ± 7.1 years. The majority lived in rural areas (63.0%) and were housewives (76.0%). Regarding education, secondary education was the most frequently reported level (34.0%), followed by basic education (27.0%). All studied mothers were married, and more than half (52.0%) belonged to families consisting of 4–6 members.

Table (2): Distribution of the studied mothers according to their epilepsy-related characteristics (n=100)

Epilepsy-related characteristics	No.	%
Age at epilepsy onset		
<15 years	24	24.0
15–<25 years	39	39.0
≥25 years	37	37.0
Duration of epilepsy		
<5 years	18	18.0
5–<10 years	37	37.0
≥10 years	45	45.0
Seizure frequency during previous 6 months		
No seizures	18	18.0
1–2 seizures	47	47.0
≥3 seizures	35	35.0
Antiseizure medication		
Monotherapy	68	68.0
Polytherapy	32	32.0
Regular neurological follow-up		
Yes	61	61.0
No	39	39.0
Reported medication non-adherence		
Yes	42	42.0
No	58	58.0

In table (2): The findings indicate that 39.0% of mothers had developed epilepsy between 15 and <25 years of age, while 45.0% had been living with epilepsy for 10 years or more. Almost half of the mothers (47.0%) reported one to two seizures during the preceding six months. Monotherapy was reported by 68.0% of the mothers. Although 61.0% reported regular neurological follow-up, 42.0% reported medication non-adherence.

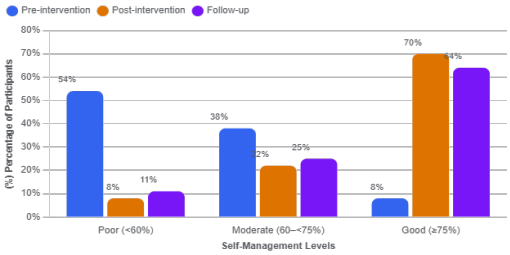


Figure (1): Distribution of the studied mothers according to their overall epilepsy self-management level throughout the intervention (n=100)

Figure (1)**:** Portrays that before implementation of the program, more than half of the mothers (54.0%) had poor epilepsy self-management, whereas only 12.0% had a good level. Following the intervention, the proportion with good self-management increased markedly to 67.0%, while poor self-management decreased to 8.0%. At follow-up, the improvement was largely maintained, with 61.0% demonstrating good self-management and only 11.0% remaining in the poor category.

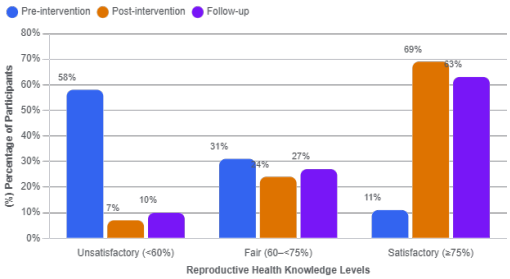


Figure (2): Distribution of the studied mothers according to reproductive health level throughout the intervention (n=100)

Figure (2) demonstrates a clear improvement in reproductive health following the program. Before the intervention, 58.0% of mothers had an unsatisfactory level compared with only 7.0% post-intervention. The proportion achieving a satisfactory level increased from 13.0% before the program to 72.0% after implementation and remained relatively high at follow-up (66.0%).

Table (3): Mean scores of the studied mothers' epilepsy self-management domains throughout the intervention (n=100)

Self-management domains	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	Follow-up Mean ± SD	F*	p-value

Self-management domains	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	Follow-up Mean ± SD	F*	p-value
Medication adherence	14.2 ± 3.8	20.7 ± 2.6	19.8 ± 2.9	96.42	<0.001*
Seizure management and safety	12.8 ± 3.5	19.4 ± 2.7	18.6 ± 2.8	88.17	<0.001*
Lifestyle management	13.1 ± 3.7	19.1 ± 2.8	18.2 ± 3.0	79.64	<0.001*
Healthcare utilization	11.9 ± 3.4	17.8 ± 2.5	17.1 ± 2.7	91.35	<0.001*
Total self-management	52.0 ± 11.2	77.0 ± 8.6	73.7 ± 9.1	104.26	<0.001*

*Repeated-measures ANOVA.
*Statistically significant at p<0.05.

Table (3): All self-management domains showed substantial improvement after the intervention. The total mean score increased from 52.0 ± 11.2 before the program to 77.0 ± 8.6 post-intervention and remained relatively high at follow-up (73.7 ± 9.1). The highest improvement was observed in medication adherence and seizure management/safety. Repeated-measures ANOVA demonstrated statistically significant differences across the three measurements for all domains and the total score (p<0.001).

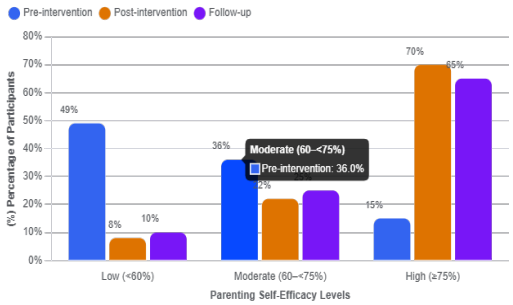


Figure (3): Distribution of the studied mothers according to parenting self-efficacy throughout the intervention (n=100)

In Figure (3): Nearly half of the mothers (49.0%) had low parenting self-efficacy before the intervention, while only 13.0% had a high level. Following the program, the high-level category increased to 68.0% and was maintained at 62.0% at follow-up.

Table (4): Mean scores of parenting self-efficacy dimensions throughout the intervention (n=100)

Parenting self-efficacy dimensions	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	Follow-up Mean ± SD	F*	p-value
Efficacy	31.6 ± 6.8	43.9 ± 5.1	42.1 ± 5.5	87.42	<0.001*
Satisfaction	19.8 ± 4.7	26.4 ± 3.8	25.2 ± 4.0	64.37	<0.001*
Total PSOC-R score	51.4 ± 10.2	70.3 ± 8.1	67.3 ± 8.7	92.16	<0.001*

In Table 4: Both efficacy and satisfaction dimensions improved significantly following the intervention. The total parenting self-efficacy score increased from 51.4 ± 10.2 before the program to 70.3 ± 8.1 after the program, with a sustained mean of 67.3 ± 8.7 at follow-up. The significant F value indicates that the observed changes across the three assessments were statistically significant (p<0.001).

Table (5): Mean scores of mother–child interaction domains according to PICCOLO throughout the intervention (n=100)

PICCOLO domains	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	Follow-up Mean ± SD	F*	p-value
Affection	8.1 ± 2.6	11.7 ± 1.8	11.1 ± 2.0	72.31	<0.001*
Responsiveness	7.9 ± 2.7	11.8 ± 1.7	11.2 ± 1.9	84.26	<0.001*
Encouragement	7.4 ± 2.8	11.3 ± 1.9	10.7 ± 2.1	76.48	<0.001*
Teaching	8.0 ± 3.0	12.9 ± 2.0	12.1 ± 2.3	91.52	<0.001*
Total	31.4 ±	47.7 ±	45.1	96.	<0.0

PICCOLO domains	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	Follow-up Mean ± SD	F*	p-value
PICCOLO score	9.2	6.1	± 7.0	74	01*

*Repeated-measures ANOVA.

Table 5 reveals improvement in all observed mother–child interaction domains after the program. The total PICCOLO score increased from 31.4 ± 9.2 at baseline to 47.7 ± 6.1 post-intervention and remained relatively high at follow-up (45.1 ± 7.0). Teaching and responsiveness demonstrated particularly marked improvement. The differences across the three measurements were statistically significant (p<0.001).

Table (6): Distribution of children according to overall psychosocial health risk using ASQ:SE-2 throughout the intervention (n=100)

Child psychosocial health status	Pre-intervention No. (%)	Post-intervention No. (%)	Follow-up No. (%)	McNemar-Bowker test	p-value
Low/no concern	27 (27.0)	69 (69.0)	64 (64.0)		
Monitoring zone	34 (34.0)	23 (23.0)	26 (26.0)		
Referral zone	39 (39.0)	8 (8.0)	10 (10.0)	69.48	<0.001*

*Statistically significant at p<0.05.

In Table (6): Before the intervention, 39.0% of children were classified within the referral zone and 34.0% were in the monitoring zone, whereas only 27.0% had low/no psychosocial concern. Following the intervention, the proportion with low/no concern increased to 69.0%, while the referral-zone proportion decreased to 8.0%. At follow-up, the improvement remained evident, with 64.0% in the low/no-concern category and 10.0% in the referral zone. The change was statistically significant (p<0.001).

Table (7): Correlation between maternal outcomes and child psychosocial health at post-intervention assessment (n=100)

Variables	Child psychosocial health score (r)	p-value
Maternal epilepsy self-management	-0.482	<0.001*
Reproductive health	-0.318	0.001*
Parenting self-efficacy	-0.536	<0.001*
Mother–child interaction	-0.614	<0.001*

*Statistically significant at p<0.05.

In Table (7): The findings demonstrate statistically significant relationships between maternal outcomes and child psychosocial health. Higher maternal epilepsy self-management and parenting self-efficacy were associated with lower ASQ:SE-2 scores, indicating fewer psychosocial concerns. The strongest association was observed between mother–child interaction and child psychosocial health ($r = -0.614$, $p<0.001$), followed by parenting self-efficacy ($r = -0.536$, $p<0.001$).

Table (8): Correlation between maternal self-management, parenting self-efficacy, and mother–child interaction at post-intervention assessment (n=100)

Variables	Parenting self-efficacy r	Mother–child interaction r	p-value
Maternal self-management	0.574	0.491	<0.001*
Parenting self-efficacy	—	0.638	<0.001*

*Statistically significant at p<0.05.

In Table (8): A statistically significant positive relationship was observed between maternal self-management and parenting self-efficacy ($r=0.574$, $p<0.001$). Maternal self-management was also positively correlated with mother–child interaction ($r=0.491$, $p<0.001$).

Furthermore, parenting self-efficacy demonstrated a strong positive correlation with mother–child interaction (r=0.638, p<0.001). These findings suggest that improvements in mothers' ability to manage epilepsy were accompanied by greater parenting confidence and more positive interaction with their children.

Table (9): Comparison of the studied mothers' and children's overall outcomes before and after the integrated nurse-led program (n=100)

Outcome	Pre-intervention Mean/level	Post-intervention Mean/level	Follow-up Mean/level	p-value
Epilepsy self-management	52.0 ± 11.2	77.0 ± 8.6	73.7 ± 9.1	<0.001*
Reproductive health	55.8 ± 12.4	79.6 ± 9.2	75.8 ± 10.1	<0.001*
Parenting self-efficacy	51.4 ± 10.2	70.3 ± 8.1	67.3 ± 8.7	<0.001*
Mother–child interaction	31.4 ± 9.2	47.7 ± 6.1	45.1 ± 7.0	<0.001*
Child psychosocial health	Higher concern	Lower concern	Lower concern	<0.001*

*Statistically significant at p<0.05.

Table (9): Overall, the integrated nurse-led program was associated with significant improvement in all major maternal outcomes and a reduction in child psychosocial concerns. Improvements were most pronounced immediately after the intervention and remained evident at follow-up, although a slight reduction from post-intervention values was observed. The persistence of improvement at follow-up supports the potential value of continued community-based reinforcement and multidisciplinary nursing follow-up.

Discussion

Maternal epilepsy represents a complex health condition that extends beyond seizure control and may influence women's self-management, reproductive health, psychological well-being, parenting confidence, and the quality of mother–child relationships. Women with epilepsy may experience additional concerns related to medication adherence, seizure safety, pregnancy planning, contraception, and caregiving responsibilities, making continuous and individualized support particularly important. Current evidence emphasizes the need for coordinated care that addresses the neurological, reproductive, psychological, and social dimensions of epilepsy in women of childbearing age **(Li & Meador, 2022; Tomson et al., 2019).** In addition, parental self-efficacy and responsive parent–child interaction are important determinants of family and child well-being **(Albanese et al., 2019; Rocha et al., 2020).** Therefore, the present study evaluated an integrated nurse-led program combining maternal/obstetric, psychiatric, pediatric, and community nursing interventions to improve maternal self-management and reproductive health, strengthen parenting self-efficacy and mother–child interaction, and promote child psychosocial health among mothers with epilepsy and their young children.

The present study revealed that nearly half of the studied mothers were aged 30–<40 years, with a mean age of 34.8 ± 7.1 years, and that the majority lived in rural areas and were housewives. This distribution may reflect the reproductive and caregiving responsibilities commonly experienced by women with epilepsy, particularly in settings where mothers remain the primary caregivers for young children. The predominance of rural residence may also indicate potential challenges related to access to specialized neurological, reproductive, and psychosocial services. These findings are consistent with **Desta et al., (2022)**, who emphasized that women with epilepsy require coordinated care across neurological, reproductive, and psychosocial domains. Similarly, **Khan et al. (2025)** reported that women living with epilepsy experience reproductive-health concerns that may interact with social circumstances and access to appropriate information and services.

The current findings showed that less than half of mothers had epilepsy for ≥10 years, while more than two-fifths reported medication non-adherence. This highlights the importance of sustained self-management support rather than focusing solely on acute seizure control.

Notably, the relatively high proportion of mothers reporting a long disease duration may increase the cumulative burden of treatment, childcare responsibilities, and concerns about seizure safety. **These results align** with **Mombekov et al. (2026)**, who identified medication adherence, seizure management, lifestyle regulation, and healthcare utilization as core components of epilepsy self-management. **Furthermore, they are** supported by **Jannah et al. (2026**), who found that structured self-management education significantly improves patient-centered outcomes among individuals with epilepsy.

The present study demonstrated a marked improvement in epilepsy self-management following the integrated nurse-led program. Before the intervention, more than half of the mothers had poor self-management, whereas after the intervention the majority achieved a good level, and this improvement remained evident at follow-up. The significant difference across the three assessments suggests that structured nursing education, reinforcement, individualized counseling, and community follow-up contributed to improvements in medication adherence, seizure safety, lifestyle management, and healthcare utilization.

These findings align with **Ahmed et al. (2024)**, who emphasized that effective epilepsy self-management encompasses medication adherence, seizure control behaviors, lifestyle modifications, and the appropriate utilization of healthcare services. Similarly, **Gebril et al. (2023)** reported that self-management education significantly improves outcomes among individuals with epilepsy. The current results further highlight the advantage of delivering this intervention through an **integrated nursing model**, which reinforces education across both clinical settings and community follow-ups.

The improvement observed in medication adherence and seizure-safety behaviors is particularly important because mothers with epilepsy may face additional safety concerns while caring for young children. **Godara et al. (2024)** emphasized the importance of individualized counseling, treatment adherence, and careful management of epilepsy in women of reproductive age. The present results are therefore compatible with established recommendations emphasizing education and coordinated follow-up. However, the magnitude of improvement in the current study may differ from previous studies because the intervention specifically targeted mothers and incorporated reproductive, parenting, and community-health components rather than addressing epilepsy management alone.

The present study showed a substantial improvement in reproductive health, with the proportion of mothers achieving a satisfactory level increasing considerably after the intervention and remaining relatively high at follow-up. This improvement may be attributed to the program's emphasis on family planning, contraception, preconception counseling, medication-related considerations, pregnancy planning, antenatal care, breastfeeding, and postpartum health.

The finding agrees with **Annalise et al. (2025)**, whose systematic review highlighted that women with epilepsy frequently report unmet needs related to reproductive health, pregnancy planning, contraception, and information about epilepsy medications. It is also consistent with **Siqin et al. (2024),** who recommended individualized counseling and coordinated management for women with epilepsy during the reproductive period. The current study may have produced greater improvement because reproductive-health education was integrated into a broader nurse-led program and reinforced through follow-up rather than delivered as a single educational encounter.

The current study demonstrated a statistically significant improvement in parenting self-efficacy. Before the program, approximately half of the mothers had low parenting self-efficacy, whereas the majority achieved a high level following the intervention, with improvement maintained at follow-up. This finding may be explained by the program's focus on practical parenting skills, problem-solving, positive discipline, responding appropriately to children's needs, and management of maternal concerns related to seizures and childcare.

The present result is consistent with **Fang et al. (2021)**, who demonstrated that parental self-efficacy is closely associated with parent and child well-being. The findings also support the rationale for incorporating psychological nursing support into interventions for mothers with chronic neurological conditions. However, direct comparisons with epilepsy-specific parenting studies should be made cautiously because much of the existing literature examines parental self-efficacy in broader populations rather than mothers with epilepsy specifically.

The present findings showed significant improvement in all PICCOLO domains, including affection, responsiveness, encouragement, and teaching. The total interaction score increased substantially after the intervention and remained relatively high during follow-up. This improvement may have resulted from the pediatric nursing component, which emphasized responsive communication, active listening, affection, play, positive reinforcement, and developmentally appropriate stimulation.

These findings are consistent with **Rocha et al. (2020)**, who reported that the quality of mother–infant interaction is associated with child developmental outcomes and emphasized the importance of responsive maternal behaviors. The present findings also support the inclusion of practical mother–child activities rather than relying exclusively on didactic education. A possible difference from previous research is that the current intervention specifically addressed the challenges of maternal epilepsy, including seizure-related anxiety and concerns about caring for a young child.

The current study revealed a marked reduction in psychosocial concerns among the children following the intervention. The proportion of children classified in the referral zone decreased after the intervention, with the improvement largely maintained at follow-up. This result may be related to the combined effect of improved maternal self-management, increased parenting confidence, enhanced mother–child interaction, and early recognition of children's emotional, behavioral, and social concerns.

The findings are compatible with **Huber-Mollema et al. (2019),** who emphasized that family-related factors are important in the behavioral development of children of mothers with epilepsy. The present results extend this perspective by demonstrating that an intervention directed toward maternal capabilities and family interaction may be accompanied by improvement in child psychosocial indicators. However, because ASQ:SE-2 is a developmental psychosocial screening instrument rather than a diagnostic psychiatric assessment, the findings should be interpreted as changes in psychosocial risk or concern rather than evidence of definitive psychiatric improvement.

The current study demonstrated significant associations between maternal self-management, parenting self-efficacy, mother–child interaction, and child psychosocial health. In particular, better mother–child interaction and higher parenting self-efficacy were associated with fewer psychosocial concerns among children. These relationships suggest that maternal functioning and the quality of the caregiving environment may represent important factors in children's psychosocial well-being.

This finding is consistent with **Grasaas et al. (2025**), who reported a relationship between parental self-efficacy and child well-being, and with **de Oliveira et al. (2023),** who emphasized the importance of mother–child interaction for child development. Similarly, **Rodenburg et al. (2019)** indicated that family factors may influence behavioral outcomes among children of mothers with epilepsy. The present study therefore supports a family-centered nursing perspective in which improving maternal functioning may have implications beyond the mother herself.

Overall, the findings demonstrated statistically significant improvements in maternal self-management, reproductive health, parenting self-efficacy, mother–child interaction, and child psychosocial health after implementation of the integrated nurse-led program, with most gains maintained at follow-up. These results suggest that addressing maternal epilepsy through a multidisciplinary nursing framework may provide benefits that extend beyond seizure-related care to reproductive, psychological, parenting, relational, and child-related outcomes.

The findings are broadly supported by **Pushpa et al. (2025)**, who reported beneficial effects of nurse-led interventions on epilepsy-related quality of life and medication management. They are also consistent with **Huang et al. (2025)**, who demonstrated the value of structured self-management education for people with epilepsy. However, the present study differs from many previous epilepsy interventions because it combined maternal epilepsy management with reproductive-health education, psychological support, parenting training, mother–child interaction activities, pediatric monitoring, and community-based follow-up. Therefore, the current findings support the potential usefulness of an integrated family-centered nursing model, while the one-group quasi-experimental design

limits the ability to attribute all observed changes exclusively to the intervention.

Conclusion

Based on the findings of the present study, the present study concluded that the integrated nurse-led program was effective in improving maternal self-management and reproductive health, enhancing parenting self-efficacy and mother–child interaction, and reducing psychosocial concerns among children of mothers with epilepsy. Significant improvements were observed across the post-intervention assessment, with most gains maintained at follow-up. The findings also demonstrated significant relationships between maternal self-management, parenting self-efficacy, mother–child interaction, and child psychosocial health, supporting the importance of a family-centered and multidisciplinary nursing approach for mothers with epilepsy and their young children.

Recommendations

Based on the findings of the present study, the following recommendations are suggested:

- Integrating nurse-led epilepsy self-management education into routine follow-up services for women with epilepsy, with emphasis on medication adherence, seizure safety, lifestyle modification, and appropriate healthcare utilization.
- Providing structured reproductive-health counseling for women with epilepsy, particularly regarding contraception, preconception planning, pregnancy, antiseizure medications, breastfeeding, and postpartum care.
- Incorporating psychological and parenting support into epilepsy nursing care to strengthen coping skills, parenting self-efficacy, and confidence in managing children's needs.
- Implementing pediatric nursing assessment and early psychosocial screening for children of mothers with epilepsy to identify emotional, behavioral, social, and developmental concerns at an early stage.
- Strengthening community health nursing follow-up, including home visits, reinforcement of health education, monitoring of maternal self-management, and support for positive mother–child interaction.
- Promoting multidisciplinary collaboration among maternal/obstetric, psychiatric, pediatric, community health, and neurological care providers to ensure continuity and family-centered care.
- Developing culturally appropriate educational booklets and digital resources addressing epilepsy self-management, reproductive health, parenting, seizure safety, and child psychosocial well-being.
- Conducting future randomized controlled and multicenter studies with larger samples and longer follow-up periods to confirm the effectiveness and sustainability of integrated nurse-led programs.

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