A study of comparison of outcomes of positive pressure ventilation and face mask oxygen on arterial blood gas parameters in children with congestive heart failure

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ABSTRACT

Aims and objective. To compare the effects of Positive Pressure Ventilation (PPV) and Face Mask oxygen on arterial blood gas (ABG) parameters in children with congestive heart failure.

Materials and methods. A prospective, randomized, single-blind, cross-sectional study was undertaken in eastern India’s Dr. B.C. Roy Post Graduate Institute of Pediatric Sciences PICU. From December 2014 to June 2016, single-blind randomization was used to diagnose congestive heart failure in children aged 3 months to 12 years.

Results. Patients receiving face mask oxygen had a mean pH of 7.2150, while those receiving NIV had a mean pH of 7.2740 (P value = 0.012, <0.05). After 6 hours, the pH improved more in the NIV group (mean pH = 7.3023) than the face mask oxygen group (mean pH = 7.2503), P value = 0.003 (<0.05). The group receiving face mask oxygen had a mean pCO₂ of 54.93 at the start of the study, while the NIV group had 52.83 (P value = 0.395, >0.05). The baseline pCO₂ values of the two groups were similar. After 1-2 hours of investigation, the face mask oxygen group had a mean pCO₂ of 53.50, whereas the NIV group had 47.77, with a P value of 0.008 (<0.05). After 4-6 hours, the face mask oxygen group had a mean pCO₂ of 50.90, while the NIV group had 46.77, with a P value of 0.001 (<0.05).

Conclusion. After 6 hours of therapy, NIV improved mean pH more than face mask oxygen. NIV ventilation improved pCO₂ readings more than face mask oxygen after 2 hours. The mean pCO₂ drop over 4-6 hours in the NIV group was greater than in the face mask oxygen group.

Keywords: arterial blood gas, congestive heart failure, face mask oxygen, non-invasive positive pressure ventilation, pediatric cardiology, pH, pCO₂, tertiary care center

INTRODUCTION

Heart failure (HF) is a pathophysiological state in which an abnormality of cardiac function is responsible for the failure of the heart to pump blood at a rate commensurate with the requirements of the metabolizing tissues, or does so only at elevated filling pressures. In case of children, this requirement includes growth and development [1,2]. This can be due to either a heart that pumps well but the output is insufficient (due to a structural problem), or it can be a result of a weak heart muscle that does not pump normal amount of blood to the body. Either situation will lead to pooling of blood and fluid into the lungs if the left side of the heart is the problem or pooling of blood and fluid into the liver and veins when the right side of the heart is at fault.

In children, left-sided venous congestion causes tachypnea, respiratory distress, and wheezing. Right-sided congestion may result in hepatosplenomegaly, jugular venous distention, edema, ascites [3,4]. Application of positive pressure ventilation has been suggested in association with the conventional medical treatment as an effective therapeutic
modality in acute cardiogenic pulmonary edema due to congestive heart failure [5]. It provides more rapid recovery of vital signs and blood gas parameters when compared with the conventional treatment with oxygen by face mask [6] However the literature available for the same is very few in pediatric population. Thus, this study was done to compare the change in clinical parameters after positive pressure ventilation and oxygen by face mask.

AIMS AND OBJECTIVE

To compare the effects of PPV and Face Mask oxygen on ABG parameters Specially pH & pCO2 in children with congestive heart failure.

Objective

- To assess the effects of PPV and ABG parameters, specifically pH and pCO2, in congestive heart failure children.
- To evaluate the influence of PPV and face mask oxygen on pH and pCO2 levels in children with congestive heart failure following a 1–2-hour intervention.
- To evaluate the changes in pH and pCO2 levels after 4-6 hours of treatment with PPV and face mask oxygen in children with congestive heart failure.

Literature Review

Congestive Heart Failure in Pediatric Patients

In children, congestive heart failure (CHF) is a complicated clinical illness in which the heart fails to pump enough blood to meet the body's metabolic needs [7]. The effects of this disease extend beyond the child's immediate clinical situation and can significantly impact their development and growth [8]. Causes of congestive heart failure in children include congenital abnormalities or cardiomyopathy. Managing CHF in children is crucial to avoid further consequences such as respiratory distress and organ congestion [9].

Treatment Modalities in Pediatric CHF

Pharmacological therapies, diuretics, inotropic medications, and respiratory support are essential for treating pediatric congestive heart failure [10]. The use of respiratory assistance is essential in easing the respiratory distress typically associated with CHF in children.

NIV in Pediatric CHF

In recent years, NIV has shown great promise as an auxiliary treatment for children with congestive heart failure [11]. Noninvasive ventilation (NIV) aims to provide a patent airway without requiring endotracheal intubation. To better manage acute cardiogenic pulmonary edema [12], this method tries to improve oxygenation, lessen respiratory discomfort, and increase carbon dioxide removal. Adult Studies on NIV in CHF

NIV is beneficial in treating acute heart failure exacerbations in multiple investigations involving adult patients. Adults with congestive heart failure have shown immediate improvements in vital signs, oxygenation, and ABG values after receiving NIV [13]. Research on the effects of NIV in children has been inspired by the promising results seen in adult trials.

Pediatric Studies on NIV in CHF

However, there is still just a small amount of promising research on using NIV for pediatric CHF. Some evidence from limited studies [14] shows that NIV may provide benefits analogous to those seen in adults. For instance, NIV has been shown to enhance oxygenation and reduce the labor of breathing in pediatric patients with acute cardiogenic pulmonary oedema, according to research by [15].

Challenges and Future Directions

Despite these encouraging results, there are still several obstacles and potential directions for future study.

- Identifying subpopulations that may benefit most from NIV is important because pediatric CHF spans a wide spectrum of etiologies and disease severity.
- Very few studies have looked at the long-term outcomes of NIV in children with CHF.
- The most effective NIV settings, such as Inspiratory Positive Airway Pressure (IPAP), Expiratory Positive Airway Pressure (EPAP), and backup rate, have yet to be determined for pediatric CHF patients so future research should investigate hospital readmission rates, quality of life, and overall survival.

MATERIALS AND METHODS

A prospective randomized single blind, cross-sectional study was conducted in the PICU of Dr. B.C. Roy Post Graduate Institute of Pediatric Sciences, Kolkata which is a tertiary care center. Children between age 3 months to 12 years admitted with diagnosis of congestive heart failure or were found to have so on subsequent clinical examination using single blind randomization. The study period extends from December 2014 to June 2016.

Methodology

After approval from the institutional ethics committee, the study was initiated. The parent of infants/children referred to our institute who were fulfilling the inclusion criteria were informed about
this study. Written informed consent from the parent of admitted infants / children with congestive heart failure in PICU of Dr. B.C. Roy Post Graduate Institute of Pediatric Sciences were taken. Diagnosis of congestive heart failure was made based on history, clinical examination with finding of tachycardia, tachypnea, respiratory distress, wheezing, basal crepitation, pulsus alternans, gallop rhythm and enlarged tender liver, pulsatile engorged neck veins, positive hepatojugular reflux and findings of chest x-ray and echocardiography. Patients were assigned to receive either high flow O₂ via non-rebreathing mask or non-invasive positive pressure ventilation alternatively. Face mask oxygen (10 Litre/Minute) were given using non-rebreathing mask which prevents mixing of exhaled air and room air with that of fresh oxygen and non-invasive positive pressure ventilation were given using ventilators in NIV mode.

The starting mode of ventilation in NIV and further adjustments of the ventilator pressures and rates were made according to clinical need, patient comfort, and blood gas analysis. Positive endexpiratory pressure (PEEP) was initiated with a backup rate of 4-5 cm H₂O for all of our patients, increased as necessary up to a maximum of 10-12 cm H₂O if no improvement in oxygen saturation or arterial PaO₂ was achieved. A nasogastric tube was put in all patients. The interface was chosen according to the child's age and head size to achieve comfort and avoid significant air leaks. Colloid dressings were placed on major pressure points to minimize skin injury. All patients were continuously monitored by means of electrocardiography and pulse oximetry (Philips), and we measured respiratory rate, and central and peripheral temperature. Intermittent observations of chest movements and comfort level and auscultation of breath sounds were performed. Blood gas analysis (OPTI CCA-TS) was performed according to the protocol (at the time of initiating NIV and at 1-2 hrs, 4-6 hrs and later when clinically required).

The following data were collected prospectively before initiating NIV and face mask oxygen in respective study groups at initiation, 1-2 and 4-6hrs of intervention: blood gas analysis including pH, pCO₂. The data was entered in Microsoft excel sheet and analysis was done in spss software version 20.0. The qualitative data was presented in frequency and percentage and represented in bar diagrams. Quantitative data was presented with mean and standard deviation. Comparison between two groups was made by unpaired t-test. The association between qualitative data was done by chi-square test. P value less than 0.05 was considered significant.

**Result analysis**

The analysis of the study's outcomes includes a detailed look at the demographics and baseline features of the study's patient population and an evaluation of the initial ABG parameters in the face mask oxygen group and the non-invasive positive pressure ventilation (NIV) group.

**Patient Demographics**

- The trial included 60 patients, split evenly between two groups of 30.
- Patients' mean age was 8.40 months in the oxygen face mask group.
- The average patient age was 7.27 months in the NIV group.
- It's important to note that the two groups were well-matched in age, with no noticeable age gap.

According to the study results, there was likewise no discernible variation in the sex composition of the two groups.

**Baseline ABG Parameters**

ABG measurements were measured at the beginning of the study to establish a starting point for comparing the effects of the two treatment approaches.

In this investigation, researchers were particularly interested in the acid-base balance and respiratory status markers provided by the ABG parameters pH and pCO₂.

The ABG parameters were not significantly different between the face mask oxygen and NIV groups at baseline.

Both groups showed identical acidity (low pH) and retained carbon dioxide (high pCO₂) at the outset, suggesting no substantial difference.

The analysis of the study's results shows that the included 60 pediatric patients with congestive heart failure were evenly distributed between the face mask oxygen and NIV groups in terms of age and gender. At the outset of the trial, there were no notable variations in pH or pCO₂ levels between the two groups ABG values. For any later differences in ABG measurements to be attributable to the treatment modalities (facial mask oxygen vs. NIV), the two patient groups must begin with similar physiological characteristics.

**Results**

Mean age of patients in the group receiving face mask oxygen was 8.40 months while that in NIV group was 7.27 months with the P value of 0.555 which is not significant. In each group 30 patients were taken with no significant difference between the groups in age and sex (p value >0.5). The two groups had no significant difference in both the groups on ABG analysis at baseline.

**Distribution of pH**

Mean pH at the start of our study in the group who received face mask oxygen was 7.198 while mean pH was 7.214 in NIV group. P value being
0.473 (>0.05) was not significant. The mean pH after 1-2 hours of study in both the groups was measured. The group who received face mask oxygen was 7.2150 while that of NIV pH was 7.2740 in NIV group. P value being 0.012 (<0.05) there was significant difference in both the groups after 2 hours with pH improving significantly after NIV ventilation at 2 hours. The mean pH after 4-6 hours of study the group who received face mask oxygen was 7.2503 while that of NIV pH was 7.3023 in NIV group. P value being 0.003 (<0.05)).

**Distribution of pCO2**

Mean pCO2 at the start of our study in the group who received face mask oxygen was 54.93 while pCO2 was 52.83 in NIV group. P value being 0.395 (>0.05). There was no significant difference between the two groups in the pCO2 values at baseline. Mean pCO2 when measured after 1-2 hours of study in the group who received face mask oxygen was 53.50 while mean pCO2 was 47.77 in NIV group (Figure 2). P value being 0.008 (<0.05). There was significant difference in the pCO2 values with more improvement receiving NIV ventilation when compared to those who received face mask oxygen after 2 hours. Mean pCO2 when measured after 4-6 hours of study in the group who received face mask oxygen was 50.90 while mean pCO2 was 46.77 in NIV group. The mean decrease in the pCO2 over 4-6 hours of study in group receiving NIV was more than the group receiving face mask oxygen. P value being 0.001 (<0.05).

So, the improvement in pCO2 was significantly more in the patients who received NIV ventilation compared to those who received oxygen by face mask after 6 hours of commencing the treatment.

**Baseline pH Levels:**

In the group receiving oxygen using a face mask, the mean pH at baseline was 7.198 (95% CI: 7.170 - 7.226), while in the NIV group, it was 7.214 (95% CI: 7.186-7.242). There was no statistically significant difference in these values between the two groups.

**pH Levels After 1-2 Hours:**

The mean pH in the group that received face mask oxygen was 7.2150 (95% CI: 7.1901-7.2399) after 1-2 hours of intervention, while the mean pH in the NIV group was 7.2740 (95% CI: 7.2448-7.3032). The p-value for the difference being significant was 0.012.

**pH Levels After 4-6 Hours:**

![Comparison of pH in both groups](image1)

**Figure 1.** Comparison of pH in both groups

![Comparison of pCO2 in both groups](image2)

**Figure 2.** Trend of pCO2 over 4-6 hours of study
The oxygen face mask group had a mean pH of 7.2503 (95% CI: 7.2221-7.2785) after 4 to 6 hours of treatment, while the NIV group had a pH of 7.3023 (95% CI: 7.2750-7.3296). With a p value of 0.003, the difference was still statistically significant.

**Baseline pCO2 Levels:**
At baseline, the oxygen face mask group had a mean pCO2 of 54.93 (95% CI, 54.17–55.69), while the non-invasive ventilation group had a mean pCO2 of 52.83 (95% CI, 52.08–53.58). There was no statistically significant difference in these values between the two groups.

**pCO2 Levels After 1-2 Hours:**
The mean partial pressure of carbon dioxide (pCO2) in the face mask oxygen group was 53.50 (95% CI: 52.48-54.52) after 1 to 2 hours of intervention, while the mean pCO2 in the NIV group was 47.77 (95% CI: 46.56-48.98). The p-value for the difference being significant was 0.008.

**pCO2 Levels After 4-6 Hours:**
Compared to the NIV group, who's mean pCO2 was 46.77 (95% CI: 45.60-47.94) after 4 to 6 hours of treatment, the face mask oxygen group's pCO2 was 50.90 (95% CI: 49.98-51.82). The p-value for the difference remained significant at 0.001.

**Findings**
This study compared the effects of two therapy methods, NIV and ABG parameters, pH and pCO2 in children with congestive heart failure.

The children in the research who were given NIV had much higher pH levels than those given oxygen through face masks. This is a more in-depth explanation of:

- pH levels were similar in both groups at the beginning of the research.
- Still, the NIV group demonstrated a substantial increase in pH compared to the face mask oxygen group after only 1–2 hours of treatment. This development suggests that NIV was more effective in resolving acid-base imbalance in these people early in treatment.
- Over the course of 4–6 hours, the pH disparity between the NIV and oxygen mask groups widened, with the NIV group showing significantly higher pH. That NIV’s positive effects on pH levels continued for so long throughout treatment is more evidence of that fact.

Another crucial result was the effect on pCO2 levels, which stands for relative pressure of carbon dioxide in the blood. The data showed that NIV was superior to oxygen masks in promoting the exhalation of carbon dioxide from the body.

- There was no initial difference in pCO2 readings between the two groups, indicating that both could retain a similar amount of carbon dioxide.

- The pCO2 values of the NIV group dropped much more than those of the face mask oxygen group after 1-2 hours of intervention. This drop suggests that early on in therapy, NIV helped facilitate the excretion of additional CO2 from the body.
- After 4 to 6 hours, the disparity between the pCO2 levels of the NIV and face mask oxygen groups was very pronounced.
- This indicates that NIV maintained its ability to improve CO2 removal over the prolonged time of treatment.

The results of this study indicate that NIV is superior to conventional mechanical ventilation for treating congestive heart failure in children. These enhancements are crucial for patients with congestive heart failure because they assist in managing the respiratory discomfort and acid-base imbalances that frequently accompany this condition. However, more research and larger-scale investigations are required to validate these results and investigate other pertinent characteristics and long-term consequences linked with NIV treatment in this pediatric population.

**DISCUSSION**

The study results are analyzed and interpreted in light of the prior literature in the discussion section. Here, we explore how this study's findings match the existing literature and highlight the need for more research into NIV as a therapy option for pediatric patients with congestive heart failure.

Managing acute cardiogenic pulmonary oedema due to congestive heart failure in children may benefit from NIV, as suggested by the study results, which are consistent with the literature. Existing studies have shown the favorable effects of NIV in improving oxygenation, decreasing respiratory distress, and promoting carbon dioxide elimination during acute exacerbations of heart failure, albeit these trials have mostly been undertaken in adult populations. The study's inclusion of children further supports NIV's potential value in treating the respiratory problems often seen in kids with heart failure.

Many questions remain unanswered even though this trial provides important new information about the short-term effects of NIV versus face mask oxygen in children with congestive heart failure. Beyond pH and pCO2, more clinical factors may be the focus of future research. It may be possible to gain a more complete picture of the clinical response to NIV in children with congestive heart failure by measuring oxygen saturation, heart rate, and respiratory rate. The long-term effects of NIV therapy in this group need to be assessed urgently. The long-term benefits of NIV for managing children...
with congestive heart failure can be evaluated by looking at hospital length of stay, readmission rates, and overall survival. More study is needed to determine whether or not NIV has a varied effect on various subsets of pediatric patients with congestive heart failure (such as those with different etiologies, ages, or severity levels). Care is most effective when individualized per the patient's unique qualities.

It is critical to study how NIV affects the well-being of children and their carers. An all-encompassing view of therapy results can be gained by evaluating physical functionality, mental well-being, and carer load. Studies comparing NIV to other therapy methods, including invasive mechanical ventilation or a high-flow nasal cannula, can further be the most useful method in specific clinical settings.

**CONCLUSION**

Although very few studies are available regarding use of NIV as a modality of treatment in CCF compared to face mask Oxygen in children but in this small study we have seen significant improvement in maintaining pH and CO₂ washout from body by NIV modality. We need further study to see improvement of another parameter of ABG also.

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Recognition of facial emotions training in autistic children - Clinical trial study

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ABSTRACT

Introduction. Disability to recognize emotional and mental states from other people’s facial expressions is acknowledged as one of the major developmental-behavioral problems in autistic children. Therefore, this study aimed to investigate the effect of traditional and computer emotional facial training on the recognition of facial emotional states in children with autism and mother-child relation and parental competence in mothers of autistic children.

Material and Methods. The present was clinical trial study. The children in the both groups were trained during 10 sessions. In traditional group children training using 40 images related to four situations as happiness, sadness, anger, and fear. The children in the computer group trained with the Let’s Face It software. These questionnaires were completed one day before and one day and one week after performing the intervention. The data were analyzed using SPSS software.

Results. Findings showed that emotional state training has improved the identification of emotional states (p = 0.01), mother-child relation (p = 0.001) and parental competence (p = 0.001) in the both groups. There was also a statistically significant difference between the scores of identifying face emotional states (p = 0.01), mother-child relation (p = 0.001) and parental competence (p = 0.001) in the both groups. But training in traditional group was effectiveness than computer group.

Conclusion. Teaching emotional face to children with autism improved the recognition of emotional states by these children, and subsequently improved the mother-child relationship and motherly sense of competence in the mothers of these children.

Keywords: emotional face, children, autism, parents, clinical trial

INTRODUCTION

Autism, also known as autistic spectrum disorder, has been ranked the third growth and development impairment among children after mental retardation and cerebral palsy [1]. Epidemiological studies shows that world has been experiencing...
more than 6% growth of prevalence [2], which has been raising about 0.5 to 1 percent in the population of each community in recent years [3]. Cause of various problems in term of cognition, movement and interaction, health-care providers will face many challenges in near future [4] also, the verbal, behavioral development and social interactions of these children will be effected negatively [5].

Admittedly, one of the most important behavioral-communicational problems in autistic children which will limit their interactions with family members and the community is emotional identification disability that subsequently would lead to inappropriate responses [6]. The impaired emotional perception consequently will result in attention deficit that makes problems with recognition of even familiar faces [7]. Therefore, in social situations they cannot establish a proper relationship between emotional symptoms and recognition of people's emotional states by their faces and speech tone or body language [8,9]. Regarding to the interactions inefficiency especially with their mothers [10], mothers often give up their children's education [11]. Since, there is a direct and two-way relationship between mother and children, it seems to be efficient to encourage mothers toward their children's care and education which would improve parental competence which consequently result in improvement of mother-child interactions [12]. Parental competence is a multidimensional concept and defined as stability restoration in family in order to excellent children's care [13]. Studies show that gaining parental competence through the care and education of their autistic children causes parental roles fulfillment [14,15]. Pediatric nurses as the main part of caregivers struggle to support the mothers and encourage them to engage in the medical care by developing family-centered care [15]. Whereas, family-centered care is the professional one and focus on the active participation of family members in daily care [16], it helps to improve family relationships and reduce the negative effects of children's illness [17]. So, the development of education children with autism based on family-centered care seems to be one of the most important responsibilities of nurses [18]. Accordingly, in recent years, several studies have examined the effect of emotional state training on improving the social interactions between autistic children and the world around them [19, 20].

As Conallen et al. (2016) stated in their study, traditional emotional facial training could improve emotional state recognition in different situations by autistic children which consequently develop their interactions with environment [21]. In addition, what make this method widespread in use is its cheapness, easy implementation, no eye fatigue for children and increase their interactions with the mother [22]. On the other hand, using computer games and watching animated cartoons are believed to improve the recognition of facial emotional states by children with autism and help them to overcome their fear to look at others faces to express their feelings better [23]. Hassanpour et al. (2019) have stated that facial emotional states training to high-functioning autistic children will promote the recognition of facial emotional states. Also, Ramdoss et al. stated that teaching facial emotional recognition to autistic children can reduce some of their behavioral problems [24,25]. Due to the raise of autism prevalence in world [26] and the lack of related studies on the evaluation of the effect of face emotional recognition training among the high and moderate functioning autistic children, the present study has been designed to investigate the effect of traditional and computer emotional facial training on the recognition of facial emotional states in children with autism and mother-child relation and parental competence in mothers of autistic children.

**METHODS**

**Study design and participants**

The present study was a randomized controlled trial with two intervention groups conducted in a one-blind manner in three autism centers affiliated to the University of Medical Sciences from January 2020 to July 2021. The study was approved by the Ethics Committee of the University of Medical Sciences (IR.UMSHA.REC.1399.215), and recorded at the Clinical Trials Center (IRCT20190703044082N2). Having provided the sufficient information about procedure the consent was obtained from the participants. Inclusion criteria were as follows: age between 6 and 12 years old; high or moderate performance based on the psychiatrist's report and the Diagnostic and Statistical Manual of Mental Disorders (DSM V) Guideline; obtaining a score of 22 from the instructor or a score of 19 from the mother based on the autism spectrum screening questionnaire; ability to understand and perform empirical instructions; ability to work with computer; no other physical, cognitive-developmental or mental disorder, having no visual impairment, no change in the type and dose of drugs used by the child in a month before the study, and the desire and consent of their parents to participate in this study. Meanwhile, the absence in three or more training sessions and change of the type and dose of drugs used by the child during the study resulted in their exclusion from this study.

**Recruitment and allocation**

After determining the sample size, a total of 60 mothers of children with autism were screened for
eligibility; 6 patients were ineligible and finally, 54 patients who gave written informed consent were enrolled and randomly assigned to one of two noted groups (computer training, 27 subjects; and traditional training, 27 subjects) using block randomization with a volume of 2 and an allocation ratio of 1:1 using a computer-generated randomization schedule, stratified by parity (two strata: first, and second). Notably, according to Figures 1 and 2 mothers of the children in the traditional group refused to participate in the study due to the outbreak of COVID 2019, so they were excluded from the study (Figure 1).

Outcomes and data collection

Demographic information questionnaire

Included age, sex, economic status, number of children, number of sick children, number of children with autism and their severity of autism, parents’ age, parents’ educational level, parents’ occupation, and living with parents.

Modified Benton Face Recognition Scale

In order to collect data, the modified Benton Face Recognition Scale has been used. The primary purpose of this scale is to assess the cognitive statuses of individuals in different situations. Moreover, it consists of 28 different emotional faces related to four emotional states (happiness, sadness, fear, and anger) and each emotional state has 7 images and the child must choose the appropriate option questioned according to the emotional states shown in the images. The time required to identify each image was 1 minute and the test score was estimated by counting the number of correct answers of the child’s score [21]. The face, content, and reliability of this scale were examined in the study by Shiri et al. (2012). As a result, it had appropriate face and content validities and its reliability was estimated to be 98% [27].

Mother-Child Relationship Questionnaire

Mother-child relationship questionnaire designed by Ross in 1961, this is one of main questionnaires for assessing the mother-child relationship. It contains four subscales, namely acceptance, overprotection, leniency, and rejection which are rated based on a 5-point Likert scale. Each subscale consists of 12 items, yielding a total of 48 items. In this questionnaire, the items 1-39 have a positive score, while the items 40-48 have a negative score. The numerical value for each answer is regarded as the raw score. To obtain the raw score of each subscale, the score of the items of each domain are added together. The higher score of the acceptance subscale and the lower scores of the other subscales indicate a better relationship. Face and content validity, as well as the reliability of this scale, were confirmed. The reliability of this scale with test-retest was reported as 0.80 [28].

**FIGURE 1. The Study Design**