



UTILIZATION OF MEDICINAL PLANTS AS GALACTAGOGUES TO INCREASE BREAST MILK PRODUCTION AS AN EFFORT TO ACHIEVE EXCLUSIVE BREAST MILK IN REALIZING THE GOLDEN GENERATION OF 2045

Niki Astria¹, Dwi Rahmawati¹, Liani Setyarsih³

¹Bachelor of Midwifery Study Program, Universitas Adiwangsa Jambi, Jl. Sersan Muslim No.RT 24, The Hok, Jambi Selatan, Jambi 36138, Indonesia

²Bachelor of Nutrition Study Program, Universitas Adiwangsa Jambi, Jl. Sersan Muslim No.RT 24, The Hok, Jambi Selatan, Jambi 36138, Indonesia

*nikiastria29@gmail.com

ABSTRACT

Providing breast milk to babies has a direct impact on the nutritional status and health of children. The various benefits provided by breastfeeding for mothers and children affect the child's immunity, nutrition, body and psychological status. Breastfeeding mothers must pay attention to several things to improve the quality and quantity of their breast milk, one of which is by consuming vegetables as galactagogues which are relatively safe to use. Synthetic galactagogue drugs are known to have side effects if consumed long term. The aim of this research is to determine the benefits of medicinal plants as galactagogues to increase breast milk production as an effort to achieve exclusive breast milk in realizing the Golden Generation 2045. The research method was carried out experimentally using medicinal plants, namely *Moringa oleifera* leaves, *Musa paradisiaca*, and *Sauropus androgynous* L. consisting of 3 groups that were given treatment, while the control group was not given treatment. Data was taken using direct measurements of the amount of breast milk production of respondents in both groups receiving intervention I (*Moringa* Leaves), Intervention II (*Banana* Heart), Intervention III (*Katuk* Leaves) and in the Control group. Then the results The research was analyzed using the Kruskal-Wallis statistical test. The results of the study show that there is a difference in breast milk production in the intervention group and the control group with a p-value of 0.046 (<0.05). Thus, in the future, this research will be able to contribute to optimizing breast milk production as a first step in preventing various health problems, especially stunting and wasting, so that a golden generation can be realized.

Keywords: breast milk production; galactagogue; moringa leaves; musa paradisiaca ; sauropus androgynous l

How to cite (in APA style)

Astria, N., Rahmawati, D., & Setyarsih, L. (2024). Utilization of Medicinal Plants as Galactagogues to Increase Breast Milk Production as An Effort to Achieve Exclusive Breast Milk in Realizing the Golden Generation of 2045. *Indonesian Journal of Global Health Research*, 6(S6), 815-824. <https://doi.org/10.37287/ijghr.v6iS6.5171>.

INTRODUCTION

The World Health Organization (WHO) recommends exclusive breastfeeding up to six months of age followed by the introduction of safe and age-appropriate foods, maintaining breastfeeding for two years or more. The World Health Organization (WHO) recommends exclusive breastfeeding for the first six months of life, after which appropriate and safe complementary foods should be introduced for ages $>$ months. Breastfeeding should be continued for at least two years (WHO, 2024). In Mexico, according to the 2012 National Health and Nutrition Survey, the percentage of exclusive breastfeeding in children under six months of age has decreased to 14.4% compared to 22.3% reported in 2006 (Campos et al., 2020). As has been reported, the lack of exclusive breastfeeding in the first month of life increases the likelihood of premature introduction of foods, thereby increasing the risk of allergies and infectious diseases (Ortiz-Prado et al., 2016). It has also been associated with chronic diseases such as diabetes, cardiovascular disease, and childhood obesity (Petek & Varda, 2024). In addition, the failure to implement exclusive breastfeeding, especially in low-income families, has an impact on the family economy because of the need to buy breast milk substitutes (Hadi et al., 2021).

Exclusive breastfeeding is essential for the survival and well-being of children. For infants, breast milk is a natural, safe, nutritious and sustainable source of food. Antibodies found in breast milk help prevent many common childhood illnesses, including respiratory diseases and diarrhoea. Inadequate breastfeeding is estimated to cause 16% of infant deaths each year. Breastfed children score higher on IQ tests (Domenici & Vierucci, 2022). Worldwide, 48% of infants under six months of age are exclusively breastfed, nearly reaching the World Health Assembly target of 50% by 2025. Significant progress is possible and has been made in all regions and countries, as seen by the ten percent increase in exclusive breastfeeding compared to 10 years ago. The Global Breastfeeding Collective has set a target of reaching 70% by 2030 (Global Breastfeeding Scorecard et al., 2023). Only 67.96% of Indonesia's population exclusively breastfed in 2022, compared to 69.7% in 2021. This indicates that more intensive support is needed to increase coverage (WHO, 2023). In Jambi province, it can be seen in Figure 3. That in 2022, exclusive breastfeeding coverage is still very low at only 27.14%, still very far from the target of 50% (Dinas Kesehatan Provinsi Jambi, 2023).

Insufficient breast milk production is one of the causes of failure in providing exclusive breastfeeding. Galactogogues include foods, plants, and synthetic drugs that can increase breast milk production. Long-term use of synthetic galactagogue drugs is known to cause adverse consequences. The use of medicinal plants containing galactogogues to overcome insufficient breast milk production is relatively safe (Foong et al., 2020). There are many plants in Indonesia that are thought to be able to increase breast milk production. Among the local plants known as Galactogogues are katuk leaves (Monika, 2020), banana hearts (Buntuchai et al., 2017), and moringa leaves (Handayani et al., 2021). The aim of this research is to determine the benefits of medicinal plants as galactagogues to increase breast milk production as an effort to achieve exclusive breast milk in realizing the Golden Generation 2045.

METHOD

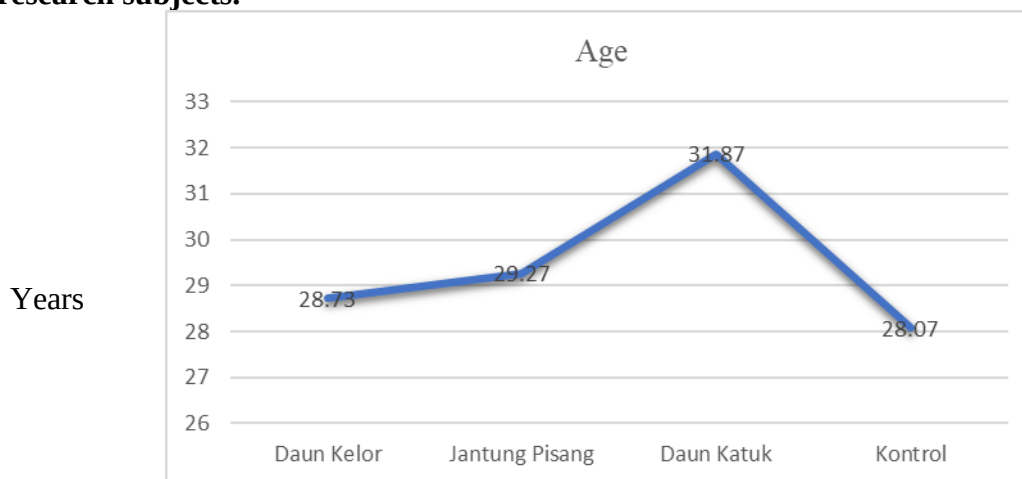
This study used a quasi-experimental approach using the Pretest Posttest with the Control Group research design. In this design, participants in the experimental and control groups were not selected randomly. This design allows for comparisons between the experimental and control groups. The sample of this study was normal postpartum mothers on the third day in Jambi. The field of midwifery expertise responsible for the research topic of breast milk production and exclusive breastfeeding coverage and coordinating and responsible for the topic of the use of medicinal plants is a research team from the field of nutrition. The location of the study was in the Working Area of Kebun Handil Health Center and Kebun Kopi Health Center and Paal V Health Center in Jambi City and the time of data collection was carried out in September - October 2024.

The population and sample of the study focused on mothers after three days of giving birth. The research sample consisted of 60 participants divided into four groups consisting of Intervention Group I (Moringa leaves), Intervention II (Banana heart), Intervention III (Katuk leaves) and the control group, each group consisting of 15 postpartum mothers. Sampling using Purposive sampling as a sample selection method, which involves selecting samples based on criteria; in particular, every patient encountered by the researcher can be included as a sample, as long as the patient is a data source that meets the criteria. Data was taken using direct measurements of the amount of breast milk production of respondents in both groups receiving intervention I (Moringa Leaves), Intervention II (Banana Heart), Intervention III (Katuk Leaves) and in the Control group. The research was analyzed using the Kruskal-Wallis statistical test.

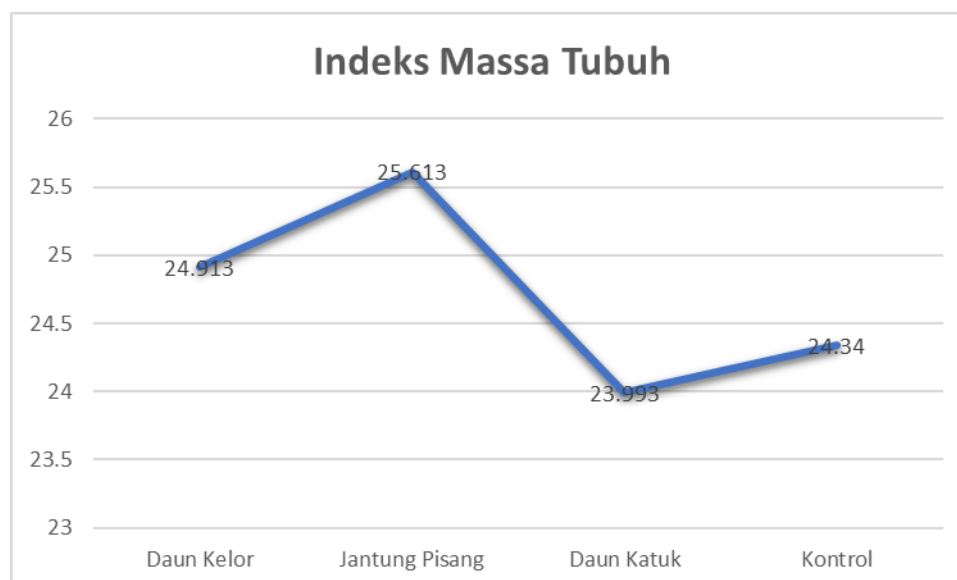
RESULT

Characteristics of Postpartum Mother Respondents in the Working Area of the Coffee Plantation Health Center, Handil Garden and Paal V of Jambi City in 2024.

The data obtained will be presented descriptively according to the characteristics of the research subjects.



Graph 1. Distribution of Age Characteristics of Postpartum Mother Respondents in the Working Area of the Coffee Plantation Health Center, Handil Garden and Paal V of Jambi City in 2024



Graph 2. Distribution of Body Mass Index (BMI) Characteristics of Postpartum Mother Respondents in the Work Area of the Coffee Plantation Health Center, Handil Plantation and Paal V, Jambi City in 2024

Based on Table 1. Shows that the average age of intervention group I who consumed moringa leaves was 28.7 years, intervention group II who consumed banana heart was 29.2 years old, intervention group III who consumed katuk leaves was 31.8 years old and the control group was 28.1 years old. The average BMI of intervention group I who consumed moringa leaves was 24.9, intervention group II who consumed banana heart was 25.6, intervention group III who consumed katuk leaves was 23.9 and the control group was 24.3.

Effect of giving Medicinal Plants as Galactagogues to Increase Breast Milk Production in Postpartum Mothers in the Working Area of the Coffee Garden, Handil Garden and Paal V Health Centers of Jambi City in 2024

Table 1.

Effect of giving Medicinal Plants as Galactagogues to Increase Breast Milk Production in Postpartum Mothers in the Working Area of the Coffee Garden, Handil Garden and Paal V Health Centers of Jambi City in 2024

Group	n	Breast milk production (cc)		P-value
		Pretest	Posttest	
		Mean $\pm$ SD	Mean $\pm$ SD	
Intervention I (Moringa Leaves)	15	24.3 $\pm$ 20.1	81.6 $\pm$ 8.4	0,046
Intervention II (Banana Heart)	15	24.3 $\pm$ 13.2	82.0 $\pm$ 28.2	
Intervention III (Katuk Leaves)	15	19.0 $\pm$ 10.7	69.6 $\pm$ 15.1	
Control	15	20.8 $\pm$ 9.7	63.4 $\pm$ 9.0	

Based on the table above, Production before intervention in the control group with an average breast milk production of (20.87), in experimental group 1 with an average breast milk production of (24.33), in experimental group II with an average breast milk production of (24.33) and in experimental group III with an average breast milk production of (19.00). While after intervention in the control group with an average breast milk production of (63.40), in experimental group I with an average breast milk production of (81.67), in experimental group II with an average breast milk production of (82.00) and in experimental group III with an average breast milk production of (69.67). Based on the Kruskal-Wallis statistical test. H there is a difference in breast milk production after being given treatment between experimental group I, experiment II and experiment III with the control group with a p value of 0.046 (<0.05).

DISCUSSION

Characteristics of Postpartum Mother Respondents

This study was conducted on breastfeeding mothers on the 3rd day - 9th day in the work area of Kebun Kopi Health Center, Kebun Handil Health Center and also Paal V Health Center in Jambi City, in addition, the research team also went directly to the Independent Midwife Practice Place (TPMB) in the work area of the Health Center where the research took place. The research sample consisted of 60 mothers who were divided into 3 groups that were given treatment (consumption of Moringa leaves, katuk leaves and banana flowers) and 1 control group with each group containing 15 mothers. Meanwhile, the sampling technique used Purposive sampling where researchers determined samples based on predetermined criteria. The importance of giving breast milk to babies in reducing various health problems in babies and children because the antibodies contained in breast milk can provide protection to babies so that they are protected from various diseases including deadly diseases (Hadi et al., 2021).

In addition, future health problems of children, namely growth disorders or stunting, can be prevented by giving breast milk to babies. Breast milk is the best and ideal food and contains a source of micro and macro nutrients that are very necessary for the development and growth of children. Breast milk will increase its benefits if babies are only given breast milk for 6 months and given with complementary foods after 6 months to 2 years or more (Peraturan Presiden (Perpres) Nomor 72 Tahun 2021 Tentang Percepatan Penurunan Stunting, 2021). Breast milk has the potential to reduce the risk of stunting in children because it contains micro and macro nutrients so that mothers are advised to continue to provide breast milk exclusively for 6 months (Astuti et al., 2024). Breast milk production needs to be considered in supporting the success of breast milk in children. Consuming vegetables and fruits that can increase the volume of breast milk is one solution that can be done so that mothers are successful in producing breast milk. In accordance with research on the consumption of herbs

that can increase the production of breast milk needed by mothers for breast milk production (Zakaria et al., 2016). One way that can be done to increase breast milk production is to increase the production of the hormone prolactin using galactogogue (Ningrum et al., 2021).

Vegetables are natural galactogogues that are easily obtained and used to increase breast milk production. The low amount of breast milk can be overcome by mothers by consuming beans, moringa leaves, turmeric, katuk leaves, banana heart, papaya fruit, and tamarind (Wilda & Sarlis, 2021). The first data acquisition was conducted by conducting interviews regarding the menstrual cycle, rest patterns and daily activities, then conducting direct observation and anthropometric measurements (height and weight) carried out according to World Health Organization (WHO) standards. Height was measured using a stadiometer. Weight was measured using a digital weighing scale and recorded to the nearest 0.1 kg. Determination of breast milk production by pumping breast milk using a Portable Electric Breast Pump with the following provisions: Pump the breasts according to the baby's drinking hours if you are far from him, to increase the amount of breast milk expressed, compress the breasts with warm water and massage gently before expressing (Maula & Widyawati, 2017). Determination of breast milk production was carried out before and after treatment in both the control and experimental groups. The determination of the first breast milk production was carried out after data on eating habits, rest patterns and daily activities of breastfeeding mothers were collected, then categorized as pre-test data. Next, the experimental group (I) was given Moringa Leaf tea with a dose of 1 tea bag once a day for 7 days. The experimental group (II) was given Banana Flower for 7 days with a frequency of 2 times a day as much as 200 gr. The experimental group (III) was given boiled Katuk Leaves for 7 days with a frequency of 3 times a day as much as 150 cc. Furthermore, after the experimental group had finished being given treatment, the second breast milk production measurement was carried out and entered as post-test data. The age range of 20-35 years is adulthood where at this age mothers can solve problems well, one of which is to seek accurate information related to providing Exclusive Breast Milk. Mothers aged <20 years are considered immature both spiritually and physically so that mothers will rely on others in providing Exclusive Breast Milk. Mothers aged >35 years begin to experience changes in their hormonal system so that the production of breast milk produced decreases and will be an obstacle for mothers in providing exclusive breastfeeding (Afriyani et al., 2018). Based on (the table above) most are of reproductive age, however this is a warning and alertness for mothers that increasing age will potentially decrease breast milk production.

Nutritional status at delivery is related to nutritional status at the time of conception, also based on social and economic conditions during pregnancy, work, nutritional intake, and infectious diseases that have been suffered. The nutritional status of the mother will affect the nutritional status of the fetus in the womb and affect the estimated birth weight. Postpartum mothers often encounter obstacles in not producing enough breast milk, because the mother is not confident that her breast milk is enough for her baby, resulting in a lack of breastfeeding frequency. Breastfeeding mothers are a group that is included in the nutritionally vulnerable group. Breast milk (ASI) is the main food for babies obtained from the mother. The nutritional status of breastfeeding mothers can be measured through anthropometric measurements consisting of measuring body weight, height, upper arm circumference and body mass index (BMI) (Arviyanti et al., 2024). According to P2TM, Ministry of Health of the Republic of Indonesia (2020), it states that the normal BMI category is at 18.5-22.9 kg/m², while underweight <18.5 and overweight 23-24.9 kg/m². Based on the classification of the Indonesian Ministry of Health (2020), (table 1.), it is shown that most of the research subjects have normal BMI results and only a small number are underweight or overweight. Although most subjects have normal BMI, it is very possible for BMI to increase with age.

This is something that must be considered, considering that many women experience weight gain after giving birth, especially mothers who use hormonal contraception.

The Effect of Giving Medicinal Plants as Galactagogues to Increase Breast Milk Production in Postpartum Mothers

The breastfeeding period is a critical period in which physiological and psychological changes occur and is the beginning of the breastfeeding process which is the key to the Sustainable Development strategy. However, the perception of insufficient breast milk (ASI) can cause mothers to stop breastfeeding. Natural galactagogues are substances that can increase breast milk production, generally sourced from herbal preparations (plants) or food. The purpose of this study was to determine the use of natural galactagogues in increasing breast milk production in postpartum mothers (Arviyanti et al., 2024). Based on the table above, Production before intervention in the control group with an average breast milk production of (20.87), in experimental group 1 with an average breast milk production of (24.33), in experimental group II with an average breast milk production of (24.33) and in experimental group III with an average breast milk production of (19.00). While after intervention in the control group with an average breast milk production of (63.40), in experimental group I with an average breast milk production of (81.67), in experimental group II with an average breast milk production of (82.00) and in experimental group III with an average breast milk production of (69.67). Based on the Kruskal-Wallis statistical test. H there is a difference in breast milk production after being given treatment between experimental group I, experimental group II and experimental group III with a control group with a p value of 0.046 (<0.05). This is certainly the use of plants as natural galactagogues to increase breast milk production is successful and beneficial for breastfeeding mothers so that there will be an increase in the success of exclusive breastfeeding and even up to 2 children aged 2 years.

Breast milk is the best food for babies. Breast milk is safe and clean, and contains antibodies that protect babies from various diseases. Breast milk also contains nutrients and energy that are beneficial for babies, especially in the first month of life. Breastfeeding provides physiological and health benefits for both mother and baby. The World Health Organization (WHO) and the United Nations Children's Emergency Fund (UNICEF) recommend that babies be breastfed within the first hour and exclusively for the first 6 months of life. WHO actively promotes breastfeeding as the best source of nutrition for infants and young children, and has set a target of exclusive breastfeeding for the first 6 months of life of at least 50% by 2025 (Mulatu et al., 2021). The benefits of moringa leaves are effective in overcoming various problems caused by vitamin and mineral deficiencies, including vitamin A deficiency (which can cause visual impairment), choline deficiency (which causes fat accumulation in the liver), vitamin B1 deficiency (which causes beriberi), vitamin B2 deficiency (causes dry and cracked skin), vitamin B3 deficiency (causes dermatitis), vitamin C deficiency (which can cause bleeding gums), calcium deficiency (causes osteoporosis), iron deficiency (causes anemia), and protein deficiency (causes split ends and growth problems in children). The phytosterol compounds found in moringa leaves have a lactagogue effect, including the presence of sterols. Lactagogue can help stimulate the hormones oxytocin and prolactin which are useful for increasing breast milk production (Foong et al., 2020).

Adequate breast milk volume is a key factor in the success of exclusive breastfeeding. Various methods have been used to increase breast milk volume. Galactagogue herbs, one of which is *Moringa oleifera*, have been used by nursing mothers who have breast milk problems to increase breast milk volume (Prayekti, 2021). *Moringa oleifera* is widely used in traditional medicine. And its leaves along with immature seed pods are used as food products (Syamra, Arleni Indrawati, Andi Warsyidah, 2018). *Moringa oleifera* leaves increase breast milk

volume by increasing prolactin and providing essential nutrients. It takes about 24 hours after consumption for *Moringa oleifera* to work. Various safety studies have been conducted on animals using water leaf extracts and the results show that there is a high level of safety. No side effects have been reported in human studies (Foong et al., 2020).

Based on the researcher's hypothesis, *Moringa* leaves are rich in phytosterol compounds that have lactagogic effects, including sterols. Lactagogic properties have the potential to increase the hormones oxytocin and prolactin, helping to increase and facilitate breast milk production. Two key hormones involved in breast milk production are oxytocin and prolactin. The hormone oxytocin is triggered by the baby's sucking during breastfeeding, which sends signals to the hypothalamus, causing smooth muscle contractions around the alveoli and the release of milk. When the baby suckles, the hormone prolactin plays an important role because sensory signals from the nipple are transmitted to the brain. This hormone then flows through the bloodstream to the breasts, stimulating additional cells to produce milk (Hakim, 2015).

Many cultures believe that eating certain foods makes people produce more milk. Depending on local cultural beliefs, they vary from place to place. In tropical and subtropical regions of the world, bananas are a popular and affordable plant. Banana flowers are one of the most widely used and practical galactagogue plants in Asian cultures (Foong et al., 2020). A number of galactagogue plant species have been reported to have estrogenic qualities that can promote the growth of breast alveoli, increase serum prolactin and cortisol levels, and total protein and glycogen levels (Buntuchai et al., 2017). In addition, these products can increase blood flow to the mammary glands, which will increase milk flow. Due to its chemical structure similar to endogenous estrogen and its ability to bind to estrogen receptors, the hormone-like action of steroid saponins has been associated with lactogenic effects (Harsono, 2020).

The tropical shrub *Sauropus androgynus* (SA), also known as star gooseberry, belongs to the Euphorbiaceae family. SA is known as Chhkrmani in Hindi, Katuk in Indonesian, and Phak Wan Ban in Thai. Katuk leaves are rich in antioxidants and phenolic compounds. Carotenoids, flavonoids, and other phytochemicals are abundant in it (Katuk, 2017). Papaverine, an alkaloid found in katuk leaves, is responsible for the increase in gene expression. Papaverine dilates blood vessels and smooth muscles, which increases the amount of oxygen in the mammary cells and the levels of prolactin and oxytocin hormones in the blood. Because it is a sterol chemical, the phytosterol in katuk leaves has a hormonal effect that triggers the expression of prolactin hormone receptors (Ningrum et al., 2021). Although many factors are associated with breastfeeding challenges in mothers of infants including premature infants, the establishment of breast milk production in the first week postpartum plays a major role and determines the success of breastfeeding. A volume of <1700 mL/week, or an average of 250 mL/day, has been mentioned as the limit of the mother's opportunity to achieve sufficient breast milk production in the 6th week postpartum and beyond. This could be a response to various interventions, including galactagogue treatment (Syachriyani et al., 2023). The estrogenic qualities of many species of galactagogue plants have been shown to increase serum prolactin, cortisol, total protein, and glycogen content, stimulate the growth of mammary alveoli, and increase blood flow to the mammary glands, which enriches milk flow (Handayani et al., 2021).

CONCLUSION

Based on the results of the research that has been done, it is concluded that there is an effect of giving medicinal plants as natural galactagogues to increase breast milk production in

breastfeeding mothers with a p value of 0.046 (<0.05). The results of this study are expected to be a new experience and knowledge for breastfeeding mothers and prospective mothers to prepare for breastfeeding and a solution for mothers in dealing with insufficient breast milk through the use of medicinal plants that are safe for consumption. In addition, for further researchers, the researcher hopes to be able to expand this study by using different techniques so that the treatment offered is more successful.

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