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Model of Independence of Mothers with Diabetes Mellitus in Exclusive Breastfeeding with an Experiental Learning Care-Based Approach Theory of Goal Attainment in Pekanbaru

Emi Yulita[1], Chrismis Novalinda Ginting[2], Linda Chiuman[2*], Erika[3]

[1]Doctoral Program in Medical Sciences, Faculty of Medicine, Dentistry, and Health Sciences, University Prima Indonesia, Medan, Indonesia

[2]Center of Excellence for Phytodegenerative and Lifestyle Medicine, Faculty of Medicine, Dentistry and Health Science, University Prima Indonesia, Medan, Indonesia

[3]Faculty of Nursing, University of Riau, Indonesia

***Corresponding Author:**

Linda Chiuman

Center of Excellence for Phytodegenerative and Lifestyle Medicine, Faculty of Medicine, Dentistry and Health Science, University Prima Indonesia, Medan, Indonesia

Email ID: lindachiuman@unprimdn.ac.id

ABSTRACT

Introduction: Breastfeeding behavior and maternal independence are often only associated with child health outcomes. However, based on the Life Journey Theory, maternal behavior also influences the broader family context. This study aimed to develop and test a model to increase independence in exclusive breastfeeding among mothers with diabetes mellitus (DM) through an Experiential Learning Care (ELC) approach integrated with the Theory of Goal Attainment.

Methods: This research was conducted in two phases. Phase I applied a non-experimental, explanatory quantitative design with 189 respondents from 21 health centers in Pekanbaru. Data were analyzed using Structural Equation Modeling-Partial Least Squares (SEM-PLS). Phase II used a quasi-experimental design with non-equivalent control and intervention groups (20 participants each), analyzed using independent sample t-tests.

Results: In Phase I, exclusive breastfeeding knowledge had a significant relationship with ELC (Path Coefficient = 0.6874; t = 19.4052), decision-making (0.6173; t = 12.4414), and action (0.2806; t = 3.9609). The ELC construct showed an R^2 value of 0.408. In Phase II, pre-test results showed no significant difference in knowledge between groups (p = 0.468), while post-test results indicated a significant improvement in the intervention group (p = 0.000), confirming the model's effectiveness.

Conclusion: The integration of ELC with the Theory of Goal Attainment significantly improves knowledge and independence in exclusive breastfeeding among DM mothers. The introduction of a structured Exclusive Breastfeeding Diary further enhances maternal self-awareness and problem-solving skills.

Keywords: *Exclusive breastfeeding, Diabetes mellitus, Experiential learning, Goal attainment theory, Maternal independence*

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1. INTRODUCTION

Breast milk (breast milk) is a fat emulsion secreted by the mother's breast glands and is very useful as the baby's main food, which contains a solution consisting of protein, lactose, and inorganic salts given to babies under six months only eating breast milk and not drinking anything other than breast milk. During the exclusive breastfeeding stage, water is not even given. Babies get breast milk because of its many benefits. One of them is that breast milk protects babies from germs such as clostridium tetani, diphtheria, pneumonia, E. Coli, salmonella, sigela, influenza, streptococci,

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staphylococci, polio virus,

rotavirus, and vibrio cholera. It can also increase children's IQ and EQ. Chlorostrum is highly recommended in the early stages of breastfeeding because it offers health benefits for both mother and baby.[1] The direct benefits of breastfeeding are the survival of the baby and his immunity, stopping hypothermia, reflection from the baby's sucking can help and the release of the hormone oxytocin will increase milk production. World Health Organization explains that breast milk is the main ingredient in acceptable food for babies, reported to be 2/3 of infant deaths and mostly related to poor feeding practices. It has been widely recognized that the role of breastfeeding could soon reduce 22% of all neonatal deaths, making breastfeeding a top priority for babies.[2]

Exclusive breastfeeding is intended to reduce infant mortality and neonatal mortality. In addition, the Government of Indonesia launched the policy of Government Regulation Number 33 of 2012 concerning exclusive breastfeeding where it is mandatory for the first six months of their lives to be given exclusive breastfeeding, this is done because the success of exclusive breastfeeding in Indonesia is still considered low. Exclusive Breast Milk is one of the nutritional needs of babies up to six months of age.[3] According to the WHO, exclusive breast milk is breast milk naturally prepared for babies six months early in life without getting any other foods other than medicines, vitamins and minerals, which are allowed for medical reasons Research produced Research studies show that the mother's living environment including husbands, families, and health workers, should provide support in addition to finding that the environment in which the mother lives, including husbands, families, and health workers, is the primary source of support for mothers during breastfeeding their babies. In their study, they said that a mother's behavior in the fulfillment of exclusive breastfeeding was influenced by family support. Her research shows that family assistance is the key to the success of mothers who breastfeed Exclusively.[4] Support that involves family has a good impact on mothers acting well as well. Family support will affect the mental health of the mother, so the mother as well as includes motivation to apply the right breastfeeding method for six months. According to additional research, breastfeeding requires family support.[5]

WHO stated that only 44 percent of babies worldwide aged between six months were breastfed. Exclusive. This is less than the WHO target for 2025 which is at least 50%. In Indonesia, babies who received exclusive breastfeeding were 66.1%, this figure has passed the achievement of the 2021 strategic plan of 40% but has decreased which was 67.74%. The government has made efforts to achieve the sustainable development goals (SDGs), one of which is in the exclusive breastfeeding program where Indonesia is reported to have 80% of people given exclusive breastfeeding. This is because exclusive breast milk prevents attacks by germs such as Clostridium tetani, Diphtheria, pneumonia, E. Coli, Salmonella, Sigela, Flu, Streptococci, Staphylococcus, Polio, Rotavirus, and Vibrio colera.[6] These benefits can also improve children's EQ and IQ. Very few people get breast milk exclusively. In the world, 40% of babies under the age of six months get exclusive milk. The achievement of the success of exclusive breastfeeding in Indonesia is still considered far from the target, which is around 29.5% of the 80% national target.[7]

Babies should get breast milk exclusively for optimal intellectual and physical growth. Babies are given exclusive breastfeeding during the age of under six months, without being given food or other drinks and continued with breastfeeding Until the age of two, breast milk is still given. However, the achievement of exclusive breastfeeding in Riau Province in 2020 was 43.5% it was 39.4%. The data on exclusive breastfeeding coverage in the city of Pekanbaru is 45.1%. Average Achievement in each Regencies/Cities in exclusive breastfeeding of 45%. This means that it is very important for mothers and families to better understand the importance of providing exclusive breastfeeding to their babies during their growing period. Mothers and babies get many benefits from exclusive breastfeeding.[8] Breast milk can help babies become healthier and help their physical and mental development. Breast milk can also help mothers reduce trauma and reduce the risk of breast cancer. There are several reasons why some mothers give formula milk as a substitute for breast milk and do not get breast milk exclusively. Firstly, the promotion of various dairy manufacturers is intensively promoted as a food substitute for breast milk is widespread, secondly, not many mothers know about how to feed their children. Third, health experts do not try to encourage mothers to breastfeed their children. Fourth, some government agencies in developing countries do not run targeted social welfare programs. As a result, mothers must know how to improve health and milk production so that exclusive breastfeeding is successful.[9]

Self-reliance is a part of the components of human personality that cannot be separated from the individual himself. Independence means daring to do something and not depending on others. Independence is a trait that allows a person to act freely, confidently, and do things without the help of others.[10] It also allows a person to overcome problems, control his actions, influence his environment, believe in their abilities, appreciate their own circumstances, and derive satisfaction from their own efforts. Theory of goal attainment (Goal Achievement) is a functional requirement that arises as a result of actions taken to achieve the main goal.[11] The interpersonal system, which does not know each other according to its duties and responsibilities, helps and supports the state of health. This is a key element of goal achievement theory.[12] According to King, the intensity of interpersonal systems is essential for setting and achieving goals. In this interaction, key concepts are interconnected in every situation, such as the interpersonal system of a DM mother giving exclusive breastfeeding in maintaining status to achieve success in breastfeeding. Pekanbaru is a city in Riau Province that has 21 Puskesmas based on data on the coverage of Exclusive breastfeeding based on Agency data of 19.2%, in 2022 it is 20.3% it is 40.5%. Among the data are breastfeeding mothers with Diabetes Mellitus. Diabetes Mellitus data in 2021 is 30.3%, it is 30% there is a number of DM Investigators of 40%. Based on a survey at the health

center, there are breastfeeding mothers with DM as many as 8 to 9 people in each health center, in detail, this data is not reported in the Health Report data.[13]

2. METHODS

This research was carried out in 2 stages to determine the model and test the model. Phase I research using quantitative methods non experiment. The type of approach used is a type of descriptive analysis approach with research Explanatory Research and using the Survey method. Research Explanatoty Research is a study that explains the relationship between variables X and Y. Survey method is a method that takes from the data of 1 population and uses a coefficient as data collection.

Phase II research uses a quasi-experimental research method with a nonequivalent control group design pattern (pretest-postest that is not equivalent). The experiment itself is an observation under artificial conditions where the conditions are created and regulated by the researcher. Meanwhile, experimental research is research that is carried out by manipulating the research object and the existence of control

The reason why researchers choose experimental research is because an experiment is intended to assess the influence of an action on behavior or test whether or not there is an effect of that action. The action in the experiment is called treatment which means the provision of conditions that will be assessed for its effect

In the implementation of experimental research, the experimental group and the control group should be intensively regulated so that the two variables have the same or close to the same characteristics. What distinguishes the two groups is that the experimental group was given a specific treatment, while the control group was not given a treatment or walked as usual. Considering the difficulty of controlling all variables that affect the variables being studied, the researcher chose a quasi-experiment. Another basis for researchers to use quasi-experimental design is because this research includes social research. This research will be carried out by 21 Puskesmas in the city of Pekanbaru, Phase I from July to November 2024, while Phase II will be carried out from November 2024 to March 2025. The population in this study is all DM mothers who have provided exclusive breastfeeding in 21 Pekanbaru City Health Centers. The number of DM mothers who provide exclusive breastfeeding in each of the 21 Pekanbaru City Health Centers with an average of 9 people, so that the total population is 189 respondents. The sample size in this study is DM mothers who have given exclusive breastfeeding in the city of Pekanbaru. The number of samples in this Phase I study was determined based on sampling selected by the consecutive sampling method, while the sample size of the Phase II research was 60 samples taken Part of the number of DM mothers who breastfed in each of the 21 Puskesmas in Pekanbaru was 30 people each for the Control and intervention group

3. RESULT

The research has been carried out with the approval of the Research Ethics Commission in the Health Sector of Universitas Prima Indonesia Medan with the title Model of Independence of Mother with Diabetes Mellitus in Exclusive Breastfeeding with an Experiental Learning Care Approach Based on the Theory of Goal Attainment The data collection of Phase I Research was carried out for 6 months, namely from June to November 2024, 189 respondents spread across 21 Pekanbaru City Health Centers with subjects according to inclusion criteria.

Table 1. it shows that most of the respondents are 145 people (76.7%) with an age between 25-30 years, Furthermore, most of the respondents are 123 people (65.1%) while the level of education is mostly high school education as many as 113 people (59.8%) while the respondents' jobs are mostly self-employed, namely 99 people (69, 992%). Only a small part are >30 years old, namely 44 people (23.3%), elementary education as many as 2 people (4.8%) and 13 people working as civil servants (6.9%).

Table 1. Characteristics of Respondents by Age, Number of Children, Education, and Occupation

General Data	Frequency	
	∑	%
Age		
25-30 Years	145	76.7
>30 Years	44	23.3
Child to		
Child 1	66	34.9

Child 2	123	65.1
Education		
SD	9	4.8
JUNIOR	54	28.6
SMA	113	59.8
PT	13	6.9
Work		
Not Working	18	9.5
Wiraswsata	99	52.4
Private	59	31.2
PNS	13	6.9

Table 2. it shows that most of the respondents, namely 90 people (49.3%) with less knowledge, Furthermore, most of the respondents have inappropriate decisions in exclusive breastfeeding as many as 104 people (55.0%) while actions are mostly negative (not doing) as many as 155 people (82.0%) while Exclusive Breastfeeding Interactions are mostly <3 months, which is as many as 111 people (58.7%). Only a small percentage of the decisions were made for exclusive breastfeeding, namely 85 people (45.0%), 34 people (82.0%) positive actions and 78 people (41.3%) for exclusive breastfeeding interactions for 3-6 months.

Tabel 2. Variable Decryption: Knowledge, Decisions, Exclusive Breastfeeding Actions and Exclusive Breastfeeding Interactions

Variables and Parameters	**Frequency**	
	∑	%
Knowledge		
Good	60	31.7
Enough	36	19.0
Less	90	49.3
Decision		
Good	85	45.0
Less	104	55.0
Action		
Negative	155	82.0
Positive	34	18.0
Exclusive Breastfeeding Interactions		
< 3 Months	111	58.7
3– 6 Months	78	41.3

Table 3. it shows that the Independence of Exclusive Breastfeeding is mostly Based on Theory of Goal as many as 123 people (65.1%) Only a small part based on Experiential Learning Care, which is as many as 66 people (34.9%).

Table 3. Variable Decryption: Exclusive Breastfeeding based on (Experiential Learning Care) and (Experiential Learning Of Care based on Theory Of Goal)

Variables and Parameters	Frequency	
	∑	%
Exclusive Breastfeeding Independence		
Based on Theory of Goal	123	65.1
Experiential Learning Care	66	34.9

Table 4 and Figure 1. The validity indicator is seen from the outer loading value. If the outer loading of an indicator is >0.7, then the indicator is considered valid. On the other hand, if the indicator's outer loading value is <0.7, then the indicator is said to be invalid and must be removed from the model design. The following is an external evaluation of the Exclusive Breastfeeding Knowledge model, Exclusive Breastfeeding Action, Exclusive Breastfeeding Decision and Exclusive Breastfeeding Interaction processed using PLS 4.0 smart software.

Table 4. Outer *Loading* Value of Model Testing

Yes	Leave variable	Indicators		*Outer loading*	Ket.
1	Exclusive Breastfeeding Knowledge	P1	The Importance of Breast Milk	0,707	Valid
		P2	Breast milk content	0,720	Valid
		P3	Breast Milk Immunity	0,800	
		P4	When to give breast milk	0,773	Valid
		P5	The Difference Between Breast Milk and Formula Milk	0,778	Valid
		P6	Possible Diseases from Breastfeeding	0,762	Valid
		P7	Benefits of Breast Milk	0,726	Valid
		P8	Breastfeeding Techniques	0,748	Valid
2	Exclusive Breastfeeding Actions	T1	What to do once a baby is born	0,719	Valid
		T2	Colostrum	0,767	Valid
		T3	Breastfeeding time	0,715	Valid
		Q4	Breastfeeding with formula	0,731	Valid
		Q5	Foods other than breast milk	0,705	Valid
3	Exclusive Breastfeeding	I1	Giving Exclusive Breastfeeding to	0,705	Valid

	Interactions		Children		
		I2	Non-breastfeeding	0,732	Valid
		I3	Feeding other foods such as fruits other than breast milk	0,773	Valid
		I4	Other Foods such as porridge other than breast milk	0,790	Valid
		I5	Benefits of Breast Milk	0,720	Valid
4	Exclusive Breastfeeding Results	K1	The Importance of Breast Milk	0,785	Valid
		K2	Breast milk for intelligence	0,726	Valid
		K3	Breast milk disease	0,740	Valid
		K4	Breastfeeding age	0,720	Valid
		K5	The Difference Between Breast Milk and Formula Milk	0,753	Valid
		K6	Benefits of Breast Milk	0,725	Valid
		K7	Benefits of Breast Milk	0,783	Valid
		K8	Breastfeeding Techniques	0,730	Valid
		K9	How to breastfeed correctly	0,765	Valid
		K10	Breastfeeding schedule	0,714	Valid

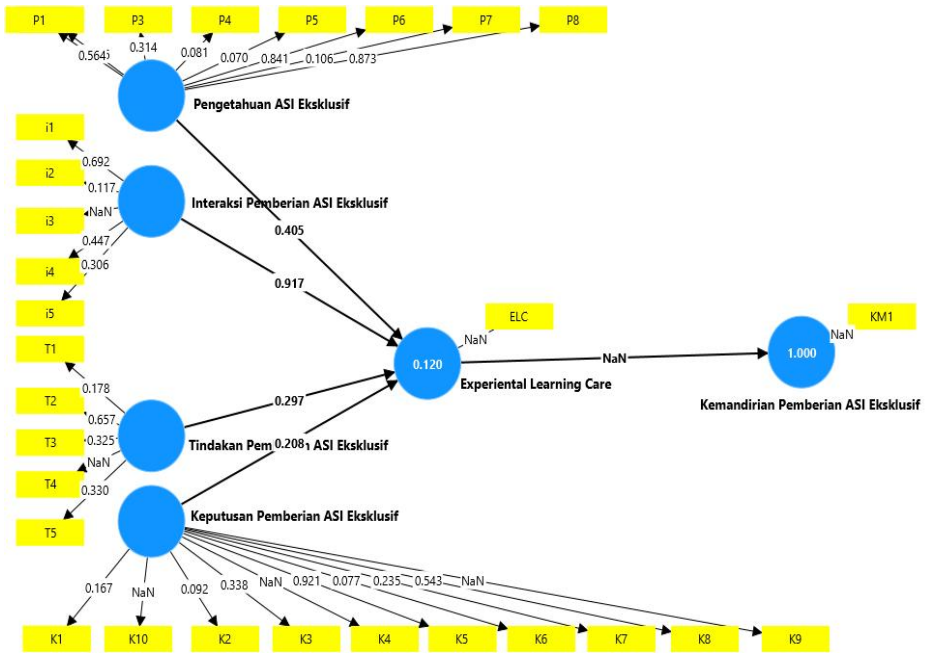

Figure 1. ***Outer Model*** **of Knowledge, Actions, Decisions and Interactions of Exclusive Breastfeeding Based on Experiential Learning Care on Independence**

Table 5. The composite reliability value of each research variable showed a value of >0.7 and a value of Cronbach's Alpha >0.6, so it can be said that all variables are reliable. Furthermore, the AVE value on all variables with a value of <0.5. So that the AVE value describes the magnitude of the variance or diversity of construct variables contained by latent variables. So it can be concluded that all construct variables in variables can represent latent variables.

Table 4. Outer *Loading* Value of Model Testing

Yes	Leave variable	Indicators		*Outer loading*	Ket.
1	Exclusive Breastfeeding Knowledge	P1	The Importance of Breast Milk	0,707	Valid
		P2	Breast milk content	0,720	Valid
		P3	Breast Milk Immunity	0,800	
		P4	When to give breast milk	0,773	Valid
		P5	The Difference Between Breast Milk and Formula Milk	0,778	Valid
		P6	Possible Diseases from Breastfeeding	0,762	Valid
		P7	Benefits of Breast Milk	0,726	Valid
		P8	Breastfeeding Techniques	0,748	Valid
2	Exclusive Breastfeeding Actions	T1	What to do once a baby is born	0,719	Valid
		T2	Colostrum	0,767	Valid

		T3	Breastfeeding time	0,715	Valid
		Q4	Breastfeeding with formula	0,731	Valid
		Q5	Foods other than breast milk	0,705	Valid
3	Exclusive Breastfeeding Interactions	I1	Giving Exclusive Breastfeeding to Children	0,705	Valid
		I2	Non-breastfeeding	0,732	Valid
		I3	Feeding other foods such as fruits other than breast milk	0,773	Valid
		I4	Other Foods such as porridge other than breast milk	0,790	Valid
		I5	Benefits of Breast Milk	0,720	Valid
4	Exclusive Breastfeeding Results	K1	The Importance of Breast Milk	0,785	Valid
		K2	Breast milk for intelligence	0,726	Valid
		K3	Breast milk disease	0,740	Valid
		K4	Breastfeeding age	0,720	Valid
		K5	The Difference Between Breast Milk and Formula Milk	0,753	Valid
		K6	Benefits of Breast Milk	0,725	Valid
		K7	Benefits of Breast Milk	0,783	Valid
		K8	Breastfeeding Techniques	0,730	Valid
		K9	How to breastfeed correctly	0,765	Valid
		K10	Breastfeeding schedule	0,714	Valid

Table 5. Results of Composite *Reliability* of Knowledge, Decision Actions and Interactions of Exclusive Breastfeeding

Yes	Varibel	Composite *reliability*	*Average variance extracted* (AVE)	Cronbach alpha	Ket.
1	Knowledge	0,749	0,254	0,734	Reliable

2	Action	0,700	0,217	0,700	Reliable
3	Decision	0,717	0,106	0,701	Reliable
4	Interaction	0,722	0,195	0,783	Reliable

Table 6, it can be seen that the maximum age of the intervention group respondents was between 25-30 years old with a total of 8 people (57.1%) out of 14 respondents. As for the control respondents, the largest age group was between 25 – 30 years old with a total of 14 respondents (70.0%) out of 20 respondents. Next is the education of the respondents, the majority of whom are high school education in the intervention group as many as 6 people (42.9%) and the control group as many as 12 (60.0%) people. Finally, the majority of respondents worked in the intervention group as many as 11 people (78.6%) and in the control group did not work as many as 11 people (45.0%)

Table 6. Variable Characteristics of Intervention and Control Phase II Research

Respondent Characteristics	N (%)			
	Intervention		Control	
	N	%	N	%
Age				
<25 th	0	0.0	0	0.0
25-30 th	8	57.1	14	70.0
>30 th	6	42.9	6	30.0
Total	14	100	20	100
Education				
JUNIOR	6	42.9	7	35.0
SMA	6	42.9	12	60.0
PT	2	14,3	1	5.0
Total	14	100	20	100
Work				
Work	11	78.6	9	55.0
Not Working	3	21.4	11	45.0
Total	14	100	20	100

Table 7, it can be seen that the most respondents' knowledge before treatment in the intervention group was knowledge of 5 people (28.6%) and after intervention increased by 8 people (57.1%). Meanwhile, in the control group before the Good knowledge treatment, 9 people (30.0%) and after the intervention increased by 8 people (40.0%).

Table 7. Frequency Distribution of Intervention and Control Phase II Research

Variable	N (%)			
	Intervention		Control	
	N	%	N	%
Knowledge Before Action				

Good	5	28.6	9	30.0
Enough	5	35.7	5	25.0
Less	4	35.7	6	45.0
Total	14	100	20	100
Knowledge After Action				
Good	8	57.1	8	40.0
Enough	3	21.4	7	35.0
Less	3	21.4	5	25.0
Total	14	100	20	100

Table 8, the Intervention Group has a total of 14 respondents, while the Control group is 20 Respondents. Thus, descriptively, statistics can be concluded that there is a difference in the average knowledge about exclusive breastfeeding or the mean for the Intervention group is 69.88 while for the Control group is 65.25. thus, descriptively statistically it can be concluded that there is a difference in the average knowledge of exclusive breastfeeding between the intervention group and the control group. So that to declare the result significant, a comparison is made between the value of t calculated and the significance t table or Sig. if the value is <0.05.

Table 8. Independent *sample t-test* Phase II research before being carried out was given Exclusive Breastfeeding Theory in the Intervention Group and Control Group

	Before Being Given Theory	aN	Mean	Std. Deviation	Std. Error Mean
Knowledge	Intervention Groups	14	69.86	16.580	0,000
	Control Group	20	65.25	18.934	

DISCUSSION

This study showed that most mothers with diabetes mellitus were within the productive age group (25–30 years), with secondary education (high school), and the majority were self-employed. These findings are consistent with data from GLOBOCAN 2022, which identified women of reproductive age as the most affected demographic by health challenges, including cancer and metabolic complications such as diabetes mellitus.[14] Most respondents demonstrated low knowledge of exclusive breastfeeding (49.3%), made inappropriate decisions regarding breastfeeding (55.0%), and engaged in negative actions (82.0%), with breastfeeding interaction generally limited to less than 3 months (58.7%).[15] This indicates a significant gap in awareness and practice related to exclusive breastfeeding, which may be associated with the lack of targeted educational interventions for mothers with chronic illnesses such as diabetes.[16]

When comparing the Experiential Learning Care (ELC) approach with the Goal Attainment Theory (GAT) model, the majority of mothers exhibited independence based on GAT (65.1%). This suggests that clear, collaborative goals between mothers and healthcare providers as emphasized in King's theory have a strong influence on breastfeeding decision-making.[17] While the experiential learning approach was utilized, it was not the predominant method for guiding mothers' decisions.[18]

From a validity and reliability standpoint, outer loading values >0.7 and composite reliability values >0.7 indicate that the indicators used in this model were both valid and reliable.[19] However, the AVE values for all variables were <0.5, suggesting that the constructs did not fully capture the variance of the latent variables, and future studies may consider expanding the measurement dimensions to improve model quality.[20] Comparative analysis between the intervention and control groups demonstrated a significant increase in mothers' knowledge following the implementation of the ELC-based intervention. The mean knowledge score rose to 69.88 in the intervention group compared to 65.25 in the control

group. Based on the t-test results, this difference was statistically significant ($p<0.05$), indicating that the ELC approach effectively enhanced mothers' knowledge about exclusive breastfeeding. These findings align with previous research by Meedya et al., which reported that experiential learning effectively improves breastfeeding abilities, particularly among mothers with medical complications.[21] These results underscore the importance of structured educational interventions, especially for high-risk groups such as mothers with diabetes mellitus, to foster consistent and independent breastfeeding behavior. Integrating Experiential Learning Care with the Goal Attainment Theory is recommended as a sustainable educational strategy within primary health services.[22]

4. CONCLUSION

This study concludes that the level of independence among mothers with diabetes mellitus in exclusive breastfeeding remains low, primarily due to limited knowledge, inappropriate decision-making, and negative breastfeeding behaviors. The application of the Experiential Learning Care (ELC) approach significantly improved mothers' knowledge and supported more positive breastfeeding practices. However, the Goal Attainment Theory (GAT) model was more commonly associated with achieving breastfeeding independence, suggesting the importance of goal-oriented collaboration between healthcare providers and mothers. Statistical analysis confirmed that the ELC approach had a significant effect on increasing mothers' understanding of exclusive breastfeeding. Therefore, integrating both experiential learning and goal-setting strategies is recommended to strengthen maternal self-efficacy in breastfeeding, particularly among high-risk groups such as those with chronic conditions like diabetes mellitus. These findings highlight the need for continuous, structured educational interventions within primary healthcare services to ensure that all mothers regardless of health status can make informed, independent decisions regarding exclusive breastfeeding.

5. CONFLICT OF INTEREST

The authors declare no conflict of interest related to this study. The research was conducted independently without any financial or personal relationships that could influence the findings and interpretations of the results**.**

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