



Predictive Power Evaluation of the Theory of Planned Behavior on Pregnant Women's Intention to Neonatal Care

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Abstract

Background: Considering the fact that neonatal are the most susceptible group against different kinds of disease, the present study aimed to evaluate the predictive power of the theory of planned behavior on the intention of pregnant women to neonatal care.

Methods: In this cross-sectional study, 100 pregnant women were selected in their trimester of pregnancy via random sampling in health centers of Arak in 2019. Data was collected using a questionnaire and interviews with pregnant women. The questionnaire included demographic characteristics of the mothers and the theory of planned behavior construct. The data were analyzed via Pearson correlation and linear regression.

Results: The average age was 26.12 ± 4.9 years and their marriage age were 3.9 ± 2.7 years. There was a close correlation between perceived behavioral control and behavioral intention ($r=0.40$; $P<0.001$). Over 40% of the pregnant women were found not to have enough overall neonatal care-associated knowledge. The mothers who were better prepared for parenting tended to have a higher level of schooling, perceived control behavior, and knowledge. Regression analysis revealed that the constructs of the theory of planned behavior predicted variance of 32% in intention. Perceived behavioral control and knowledge were the most significant predictors of the intention to neonatal care ($P<0.001$).

Conclusions: This study supports the predictive ability of the theory of planned behavior for neonatal care; therefore, the design of educational intervention should be based on intention and knowledge as the most important predictors of maternal behavior.

Keywords: Health, Intention, Child, Infant welfare

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Introduction

The United Nations' Sustainable Development Goals (SDGs) include reducing the global maternal mortality rate to less than 70 per 100,000 live births and ending preventable deaths of newborns and children under five years of age in every country by 2030. Neonatal death audit and review are widely recommended as an intervention to reduce neonatal morbidity and mortality and to improve the quality of care. This could also be the key to attaining the SDGs. For pregnant mothers, having a child requires the incorporation of new knowledge and performance to develop proficiency in neonatal and child-care (1).

In fact, to save the life of neonates, newborn care are crucial interventions; mainly the care for the low-birth-weight newborn (2). Based on UNICEF, an average rate of 18 deaths per 1000 live births in 2017 has been reported, the majority of which occurred during the first

week (3). Meanwhile, infant mortality rate in Iran has been reported to be 13 deaths per 1000 live births (4, 5).

Given the fact that in human life cycle, early childhood phase or neonatal period, is the most important phase for every human being (6, 7), the well-being of children and neonates depends on the ability of families, mothers in particular, to function effectively. It is of great importance that the capacity of mothers be strengthened for giving their children the best possible start in life (8). To improve children care quality, it is necessary to identify obstacle in accessing maternal health services and enhance protection for mothers before and after birth for child health (9). Deficiency of women awareness, attitude, and performance may influence mothers regarding their child's needs (for example, lack of information about the side effects of self-medication in newborn and children) (10).

In a study in Mongolia, it was revealed that parents

gave medications to their children without prescription for different reasons (11). Moreover, the result of another paper showed that some parents give drugs to their children to treat an inflammatory bowel disease without consulting a doctor (12). In other countries, for example, Kenya, Ethiopia, and Himalayas, only 28%, 18.2%, and 52% of women had adequate knowledge about neonatal care, respectively (13-15).

In this study, the theory of planned behavior (TPB) was utilized. This theory has been used in many studies on health behaviors (16-19), such as urinary tract infection in children (16) and during pregnancy (17). TPB is applied to determine the effect of environmental and individual factors on a behavior (10).

The level of pregnant women's knowledge, attitude, TPB construct, and performance towards their neonatal care have not been investigated and also the applied TPB have not been reported in the previous studies in Iran. Therefore, the present study was conducted to determine the relationship between TPB construct and the pregnant women intention about neonatal care.

Methods

Study Design

This is a cross-sectional and analytical study on 100 pregnant women referred to health centers in Arak, Iran, in 2019. According to study by Ghasemi and colleagues (18) and estimating the provincially representative proportions, the sample size calculated with α (error)=0.05, $1-\beta$ (power)=0.90. The mean (SD) score of performance of the mothers to take care of premature infants in each group were 31.3 ± 16.14 and 30.6 ± 16.20 , respectively, based on the study by Ghasemi and colleagues (18).

$$n = \frac{(S_1^2 + S_2^2) \left(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta} \right)^2}{(\bar{X}_1 - \bar{X}_2)^2}$$

The samples were estimated 100 pregnant women. They were selected via convenience sampling from pregnant mothers who had been referred to four health centers in Arak. A total of 100 pregnant women were selected using convenience sampling based on the following inclusion criteria: (1) being a mother - pregnant in the trimester of pregnancy, (2) nulliparous women, and (3) willing to participate in the study. The exclusion criterion was lack of desire to participate in the study. In this study, the dependent variables were

intentional behavior and demographic variables and other constructs of TPB were independent variables. The pregnant women were initially approached by health worker in the health centers and invited to participate in the study. All those who were approached agreed to participate. The study objectives and procedures were explained, emphasizing the voluntary nature of participation and the participants' right to withdraw from the study at any time.

Measures

Instruments for gathering the data were designed based on the theory of planned behavioral constructs and assessing performance of the mothers based on the questionnaire. Before starting the study, the questionnaire was developed by a researcher and its validity and reliability were measured and confirmed. The questionnaire comprised six parts as follows:

1- Socio-economic variables, such as mother's age, marriage age, parents' level of education and job.

2- General knowledge about neonatal care, consisting of eight items based on three- or four-choice questions; for instance, "what time the first baby visit by physician after birth?". In the awareness questions section, for each correct answer, a score of 1 and for each false answer, a score of 0 was considered; the scores ranged from zero to one.

3- Attitude of pregnant women toward neonatal care, in which four items were scored according to five-score Likert's scale: from completely disagree (score 1) to completely agree (score 5); the range of scores was between 1 and 5.

4- Subjective norm of pregnant women about neonatal care was assessed using six items with 5-point Likert scale, where the scores ranged from 1 to 5; for example, "health worker or husband encourages me to improve my awareness about neonatal care for my child."

5- Perceived behavioral control in neonatal care, including six items; the range of scores was between 1 and 5.

6- Behavioral intention in neonatal care was assessed using three items; the range of scores was between 1 and 5.

All the items were scored on a 5-point Likert scale

ranging from 1=totally disagree to 5=totally agree.

To make the results comparable with other scales, in the construct of TPB, we transformed scores from 1 to 5. In our study, the minimum possible score for each question in the construct of TPB was one and the scores ranged from 1 to 5. The total scores for each subscale were calculated by averaging the scores of all the questions on that scale, ranging from 1 to 5. To obtain the score of each dimension, the mean scores of all the items in that dimension was obtained. One of the potential sources of bias in this study was neonatal care, which was self-reported. Based on valid resources (16, 19), the researcher can use self-reporting method when encountering problems in obtaining data by direct observation.

In this study, the questionnaire validity was measured using content validity method, including content validity ratio (CVR) and content validity index (CVI), and were 0.62 and 0.79, respectively. Moreover, in the qualitative face validity, the participants expressed no problems with reading and understanding the items. Reliability was calculated with internal consistency method based on Chronbach's alpha. In this study, Cronbach's alpha in knowledge=0.8, attitude=0.75, perceived behavior control=0.7, intention behavior=0.7 and subjective norm=0.7 in the subscale questionnaire.

Statistical Methods

The data were analyzed by descriptive statistics (Mean, Standard deviation, and Percentage) and analytical statistics (Pearson correlation, linear regression) in SPSS version 20. The data had a normal distribution (correction of the Kolmogorov-Smirnov test by Lilliefors).

Ethical Considerations

All the procedures were performed in the study involving the participation of the individuals in accordance with ethical standards. The present study was approved by the Ethics Committee of the Research

Council of Arak University of Medical Sciences with the code of IR.ARAKMU.REC. 1397. 169 (Grant Number: 2957). Written informed consent was obtained from the participants.

Results

A total of 100 pregnant women participated in the study. Their average age was 26.12 ± 4.9 years. The participants responded to the interviewer-administered questionnaire; 40% were between the age of 24 and 28 years; 35% had completed higher education and 44% had completed secondary education. The average duration of marriage age or years of living together was 3.9 ± 2.7 years.

Table 1 and 2 present the characteristics (qualitative and quantitative variables) of pregnant women interviewed in the survey.

The highest score belonged to the construct of intention behavior, which was 4.40, while the lowest scores were obtained for the attitude, which was 3.48. Table 3 demonstrates the knowledge, construct of TPB, and intention behavior of pregnant women regarding neonatal care.

A study on pregnant women's inclination toward neonatal care indicated women's positive attitudes towards breastfeeding, appropriate temperature of baby's room, and bathing him/her. This study implied the importance of assessing women's intentions in order to choose strategic approaches to increasing intention in neonatal care.

There was a close correlation between perceived behavioral control and behavioral intention ($r=0.40$; $P<0.001$). Table 4 depicts the correlation between pregnant mothers' intention behavior and neonatal care based on TPB.

Regression analysis revealed that the constructs of theory of planned behavior predicted 32% of the variance in intention. Perceived behavioral control and

Table 1: Demographic quantitative characteristics of pregnant mothers (n=100)

Variables	Mean±Std. Deviation	Minimum	Maximum
Age (years)	26.12±4.9	16	39
Height (Cm)	163.64±6.02	150	176
Weight (Kg)	70.50±11.9	45	99
BMI (weight (Kg)/Height (m ²)	26.29±4.08	17.15	37.26
Delivery	5.58±0.997	4	9
Marriage age	3.97±2.74	1	15

Table 2: Demographic qualitative characteristics of pregnant mothers (n=100)

Variables		Frequency
Age groups (years)	<=23	32
	24-28	40
	>=29	28
Mother's level of education	Primary school	3
	Secondary school	18
	High school	44
	Academic education	35
Husband's level of education	Primary school	2
	Secondary school	24
	High school	45
	Academic education	29
Mother's job	Housewife	88
	Employee	12
Husband's job	Employee	22
	Unemployed	78

Tables 3: The mean score of the constructs of theory of planned behavior regarding neonatal care in pregnant women

Variables	Mean±Std. Deviation	Minimum	Maximum
Knowledge	0.5825±0.23	0.001	1.00
Attitude	3.48±0.367	2.80	4.00
Subjective norm	3.47±0.49	2.50	5.00
Perceived behavior control	3.67±0.44	2.83	4.67
Intention behavior	4.40±0.44	3.67	5.00

Table 4: Correlation between the pregnant mothers' intention behavior and neonatal care based on theory of planned behavior

Variables		age	Marriage age	Knowledge	Attitude	Subjective norm	Perceived behavior control	Intention behavior
Age	Pearson Correlation	1						
	P value							
Marriage age	Pearson Correlation	0.381**	1					
	P value	<0.001						
Knowledge	Pearson Correlation	0.060	0.052	1				
	P value	0.554	0.608					
Attitude	Pearson Correlation	0.061	0.068	0.493**	1			
	P value	0.547	0.498	<0.001				
Subjective norm	Pearson Correlation	0.046	0.054	0.131	-0.003	1		
	P value	0.653	0.591	0.192	0.975			
Perceived behavior control	Pearson Correlation	-0.017	-0.073	0.011	0.117	0.058	1	
	P value	0.870	0.467	0.914	0.246	0.567		
Intention behavior	Pearson Correlation	0.039	-0.117	0.089	0.012	0.075	0.409**	1
	P value	0.699	0.245	0.381	0.908	0.457	<0.001	

**Correlation is significant at the P<0.001; *Correlation is significant at the P<0.05

Table 5: Regression analysis of predictive construct of theory of planned behavior for the intention behavior of the pregnant mothers in neonatal care

Model	Model Summary			Coefficients				
	R	R Square	Adjusted R Square	Unstandardized Coefficients		Standardized Coefficients	t	P
				B	Std. Error	Beta		
Perceived behavior control and knowledge	0.584 ^b	0.341	0.327	0.460	0.072	0.532	6.424	0.001

Dependent Variable: Intention behavior of pregnant mother in neonatal care; a. Predictors: (Constant), Knowledge; b. Predictors: (Constant), perceived behavior control and knowledge

Table 6: The frequency of knowledge scores for each item about neonatal care in the pregnant women

Variables	Know	Don't Know
The first baby visit after birth	41	59
Temperature of Baby's room	27	73
Baby cord care	53	47
Bathing the baby	40	60
Breastfeeding (colostrum)	74	26
Knowing the benefits of breastfeeding	86	14
Recognizing risky signs in neonates	78	22
Neonatal jaundice	67	33

knowledge were the most significant predictors of the intention to neonatal care ($P < 0.001$) (Table 5).

The results showed deficient knowledge of mothers about the majority of dimensions. Over 40% of the pregnant women were shown to have lack of knowledge about the neonatal care; 59% did not know the appropriate time for the babies to be visited in the first days after birth for identification of any hereditary abnormalities, 22% did not know the first time for the baby's breastfeeding should be, 73% did not know the appropriate baby's room temperature, and 47% were unaware of how to take care of the baby's cord. Moreover, 60% of the mothers did not have sufficient knowledge about how to bath a baby, and 33% of the mothers had lack of knowledge about physiological jaundice infants. Slightly over 26% of the mothers had deficient knowledge about the advantage of the colostrum or the first milk the baby gets. Table 6 represents the knowledge scores for each assessment item.

To identify the mothers who are prepared more for parenting, we analyzed the associations among the level of knowledge, attitude, intention behavior, and the attribute variables, such as parents' higher level of education, living with baby's father, intention to breastfeeding, and getting help from a health worker or midwife as an information source.

Discussion

The obtained findings revealed the predictability

of the theory of planned behavior in neonatal care. In this study, the proportion of pregnant women who were sufficiently informed about neonatal care showed the lack of knowledge concerning certain items. In a research in Nepal, participants had a moderate level of knowledge on newborn care (56%) and the most serious lack of knowledge was observed in breastfeeding (44%) and adequate knowledge (78%) of immunization. Maternal education and socioeconomic status had a significant positive association with newborn-care knowledge (20). In other studies in Kenya, Ethiopia, and Himalayas, 28%, 18.2%, and 52% of women had adequate knowledge about neonatal care (13-15). The results of these studies are consistent with our findings.

Hence, assistance of health educators and midwives in health centers could be conducive to improving women's knowledge and motivation regarding neonatal care.

A systematic review of 30 studies by Schaaf and colleagues indicated that low socioeconomic status has a significant influence on neonatal care and increased the risk of preterm birth (21). Some causative factors on neonatal care include lack of knowledge, poverty, adverse environmental conditions, access to quality health care, maternal stress, and maternal health behaviors, such as smoking or illicit drug use (22).

This study shed light on the correlation between mothers' knowledge, intention behavior, age, and

level of education. Herein, the mothers with higher education were more knowledgeable about neonatal care. Similarly, in the study by Memon and co-workers on knowledge, attitude, and practice among mothers about newborn care in Sindh and Pakistan, it was indicated that among the study samples, more than half of the newborns were bathed within six hours of delivery. Around 50% started breastfeeding after 1h of birth. A substantial proportion (45%) of mothers gave pre-lacteal feeding and 44.8% of them did not feed colostrum to their newborns. Mothers with no education had less significant knowledge, attitude and practice score about newborn care as compared to those who had higher education (23). According to this study, health workers and midwives in health centers and spouses were the most subjective norm that influences the knowledge and attitude of mothers about neonatal care. This finding is consistent with the results of other studies; for example, in Vietnam, it has been shown that fathers' support can influence mothers' breastfeeding decisions and behavior (24).

Therefore, health workers and midwives need to gain the knowledge, attitudes, and adequate skills to deliver culturally competent care, including tools on how to effectively communicate with pregnant mothers or families from diverse cultural and socioeconomic status and level of education. Application of culturally appropriate communication is believed to be crucial. This will in turn help elicit helpful dialogue with pregnant women and families, which will encourage them to ask questions in health centers and communicate their concerns more clearly to ensure the best delivery of the highest quality of neonatal care for every pregnant woman. In addition, delivery health information through mass-media, such as televisions, radio, and booklets about neonatal care would change women's misconception and contributes to improving their service utilization.

This study also revealed positive attitude towards neonatal care. The respondents who had a positive attitude towards neonatal care were more likely to have this intention compared to those who had a negative attitude. A similar result was reported that women's attitude towards breast feeding is the most significant factor that affects on neonatal care (25).

More than half of the mothers interviewed in the present research lacked the necessary knowledge about the time of baby visit by physician after birth, bathing the baby, and the appropriate temperature for the infants. Another study in China observed that 48.2% of the

participants reported practicing neonatal care, in which the range of score for each scale was as follows: knowledge was from 0 to 16 ($M=9.62$), perceptions were from 28 to 103 ($M=79.99$), barriers were from 17 to 85 ($M=65.40$), and practice was from 11 to 55 ($M=34.44$) (26).

In this study, the mothers were found to have inadequate knowledge about neonatal jaundice (33%). Meanwhile, in the study by Amegan and colleagues, which was about awareness, perception, and preventive practices about neonatal jaundice in mothers in Accra, 92.6% did not know the causes of jaundice or had the wrong information; there were no significant associations between these factors and their level of education (27). Goodman and colleagues in Nigeria showed that 68.9% of the mothers had a poor level of knowledge about neonatal jaundice. In this study, age and educational qualification did not show any statistically significant relationships with knowledge about neonatal jaundice (28).

Considering neonatal jaundice as a preventable cause of neonatal morbidity and mortality, increased pregnant mothers' knowledge will help early recognition of neonatal jaundice, prompt, and appropriate intervention.

According to this study, a considerable number of mothers lacked knowledge (73%) about the proper temperature for the baby's room. The reported percentage is considered low when compared to a study conducted in North Ethiopia, where 99.3% of the participants had enough knowledge about temperature of the baby's room (29). This difference could be related to the difference in study participants in the two countries.

Herein, we also reported the proportion of mothers with adequate knowledge about benefits of breastfeeding (86%) and colostrum's (74%), which is almost similar to that in a study in Jimma (66.4%) (30). On the other hand, knowledge of the study participants in this study was slightly higher compared with that reported in a study in Uganda (47%) (31). This might be due to a slight variation in the used tools and socio-economic variable.

In study by Chhetri and co-workers on newborn care practices at home, initiation of breastfeeding was practiced by only 40% of the mothers. Among neonates, 65% were given colostrums and hand washing was practiced by 62.5 % before touching the baby. For thermal care, burning charcoal (75%) was mostly used.

The study revealed the association between newborn care and mother education and per capita income of family (32).

According to this study, 40% of the pregnant women had enough knowledge about bathing the baby. In a study in Pakistan and Southern Tanzania, 32% and 60% of the respondents respectively stated that they bathed their newborns within six hours after birth (33, 34).

The results also showed that over 47% of the mothers did not have any knowledge about how to take care of the baby's umbilical cord and 60% did not know how to bath the baby.

That is on the contrary to a study in Jordan (35) and one in Arab society (36), which showed that mothers mostly lacked information about neonatal care.

The mothers also showed a lack of knowledge about visit of baby by a physician on the days after birth (59%). Based on this study, health workers at health centers must have enough knowledge so that they could advise pregnant women about visiting the neonates after birth.

In the current paper, intention behavior for neonatal care was 4.4 score. Similarly, in the study by Andre and colleagues, which is about the influential factors on influenza vaccination during pregnancy, 76% of pregnant women had received the influenza vaccination. Intention of women for vaccination was the desire for neonatal protection. The common reasons for not being vaccinated were lack of information on vaccination and safety concerns (37).

22% of our participants did not know how to recognize a risky sign in infants. Welay and co-workers indicated that the knowledge score of neonatal risky signs was 32.9%. The mothers with the education of secondary level and those whose husband had college or above education were 4.9 times more likely to know about neonatal risky signs (8).

The present work examined the applicability of knowledge and perceived behavior control ($R^2 = 32\%$) in the prediction of neonatal care intentions. In fact, the findings of this study showed partial support for the predictive ability of the theory of planned behavior in pregnant women for neonatal care.

Wang and colleagues predicted women's intentions to screen for breast cancer ($R^2 = 8.3\%$) (38). Moreover, Sun and co-workers investigated the prediction of iron

consumption intention in women and showed that the model explained 35% to 55% of the variance of behavioral intention (39).

TPB assumes that attitude, subjective norms, and perceived behavioral control contribute to the development of a behavioral intention and the behavioral intention is accordingly the immediate antecedent of behavior (40).

The obtained findings reflected that perceived behavior control could be considered as a significant construct of TPB for intention behavior in neonatal care among mothers. The present study had certain limitations. The research is a cross-sectional study and all the independent and dependent variables were measured in a single point of time. All the variables were self-reported, which may lead to misclassification due to recall and reporting bias. This limitation was resolved by allocating sufficient time and explicit expression of the objectives of the study and gathering information along with interviewing. Further research with larger and more diverse samples could be suggested.

Regardless of these limitations, this study has some strengths. One of the strengths of the present study is the design of the protocol based on theory base (TPB) for assessment of neonatal care. Cognition is a critical process to practice good health behavior. Theory-based research could be conducive to understanding the cognition elements better. The TPB constructs of perceived control behavior and attitude explain significant to increase intention behavior among pregnant women about neonatal care. Finally, this study showed support for the predictive ability of the TPB for neonatal care; thus, the design of educational interventions should be based on intention and knowledge as the most important predictors of maternal behavior

Conclusions

Neonatal care is known as an important fact worldwide. Neonatal care must be taken into consideration since newborns are the most vulnerable population. Our study provided evidence of potential factors for strengthening intention behavior improving mothers' knowledge, perceived behavior control, for neonatal care. Thus, efforts should be made to improve the attitude of women involving influential people for a physician and midwife, which could improve women's intention for neonatal care performance.

According to the results of the study, health workers and midwives play a critically important role in the development of knowledge and attitude of mothers about neonatal care. By identifying the lack of knowledge of mothers, the findings of this study could inform and suggest the design of educational program for pregnant women by focusing on the constructs of perceived control behavior for health promotion of neonatal care. Finally, the theory of planned behavior constructs are useful for prediction of neonatal care in pregnant women, which may be helpful in the future for designing interventions for educational mothers during the pregnancy.

Ethical Approval

All the procedures performed in the study involving the participation of the individuals were in accordance with the ethical standards. The present study was approved by the Ethics Committee of the Research Council of Arak University of Medical Sciences with the code of IR.ARAKMU.REC. 1397. 169 (Grant Number: 2957). Written informed consent was obtained from the participants.

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