

# Antecedent factors of maternal identity among primiparous Thai teenage mothers

Suphawadee Panthumas, Wirin Kittipichai,  
Kanittha Chamroonsawasdi and Pimsurang Taechaboonsersak  
*Faculty of Public Health, Mahidol University, Bangkok, Thailand*

## Abstract

**Purpose** – Maternal identity (MI) is the attainment of maternal role adaptation. Though the role of the motherhood is expected to be achieved, teenagers, who are still developing their personal identity, do not always clearly identify or align with their role of motherhood. The purpose of this paper is to determine the structural relationship among a set of variables, infant temperament (IT), strain (ST), social support (SS), self-esteem (SE) and balanced family functioning (BF) influencing MI and to test the model using the empirical data.

**Design/methodology/approach** – A cross-sectional survey was conducted among 353 primiparous Thai teenagers of infants aged 4–12 months. A self-administered questionnaire comprised six scales with Cronbach's  $\alpha$  coefficients ranging from 0.81 to 0.93. The structural equation modeling method was employed to test the validity of the model undertaken using Mplus Software.

**Findings** – The model fit the empirical data well ( $\chi^2/df = 2.17$ , CFI = 0.92, TLI = 0.91, RMSEA = 0.06, SRMR = 0.05). The MI could explain 62 percent of the variance through its set of variables. Three antecedents, i.e. IT, ST and SS, had a direct effect while SE and BF had an indirect effect on MI. The IT had the highest total effect on the MI, while ST was a mediator among other study antecedences concerning the MI.

**Originality/value** – The model adequately fit the data among teenage mothers one-year postpartum. Promoting MI should strongly diminish strain and encourage positively perceived infant temperament, self-esteem, social support and balanced family functioning.

**Keywords** Maternal identity, Primiparous, Teenage mother, Structural equation model

**Paper type** Research paper

## Introduction

Maternal and child health problems have long been a crucial health topic, particularly regarding primiparous teenage mothers. Developing maternal skills for the first time is a complex process that relies on physical, emotional and cognitive maturity in order to better develop the abilities of a competent mother. Mothers who are more emotionally developed are more likely to take better care of their babies whereas primiparous teenage mothers who do not clearly identify with their role of motherhood do not enjoy such positive results [1–4].

The Becoming a Mother theory of Mercer is a well-known nursing theory regarding attaining the maternal role during the first year after birth. Interaction on three levels can affect the mother's and infant's development, i.e. family and friends, comprising the mother, infant, and father providing supportive guidelines to facilitate maternal and infant care; the community, as health care and support groups, offering resources for new parents; and society at large that promotes culture and law in the support of families. A woman's

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acceptance of her motherhood and maternal identity (MI) develops in four stages: first, making the commitment and attachment to the unborn baby during pregnancy; second, the acquaintance and physical restoration stage to learn how to care for her infant occurs during the first two weeks after delivery; third, the links to reinforce their capabilities and transform themselves into their unique mothering role during the first two weeks to four months; and, finally, the stage of achieving MI or motherhood (around four months) by integrating the maternal role into the self-system and viewing herself as a mother comprising attachment to the infant, role competence and expressing gratification in the role[4–6].

Though the role of MI is expected to occur naturally, the majority of teenagers are not ready to be mothers and are unprepared physically and emotionally to take up the maternal role. They perceive themselves as lacking in maternal experience or competence and consequently exhibit a negative impression of their infants. They represent a risk group that fails in or delays developing MI, as they take longer to attain MI (six to ten months) than adult mothers (three to ten months), with a recorded one-fifth not completing MI adaptation during the one-year postpartum period[7]. First-time adolescent mothers often delay MI development due to immaturity, low self-esteem, low health care knowledge, low self-care behavior and reduced knowledge and skills regarding infant care[3, 7–9]. The WHO has developed a home-based maternal and child health campaign to address MI development in primiparous teenage mothers between 4 and 12 months following birth at home. In the cases who did not achieve MI, several impacts were presented, e.g. poor parenting quality, high stress and role conflict, reduced ability to perform balanced family functioning, continued difficulty in adapting to motherhood, high risk of abusing or neglecting their children, high risk of illness and poor quality of life, welfare dependency, high risk of the child's delayed development, and high risk of their daughters becoming teenage mothers and continuing the cycle[7, 9–13].

In Thailand, teenage mothers are perceived as a national problem and are in the fifth health region where a high prevalence of teenage birth rates are reported[14]. In this context, most teenage mothers were residing together with their infants and their own family, one-fifth were unemployed and seven-tenths relied on their own mothers for infant care support. Moreover, maternal role problems showed that four-fifths of teenage mothers did not intend to have the baby when they experienced their first childbirth, two-fifths had low birth weight infants, seven-tenths were inexperienced in child-rearing, a half of them exclusively breastfed for less than six months and about four-fifths had infant care support provided by their own mothers, and most of them had experience of stress or trauma. Furthermore, three-fifths of postpartum teenage mothers had a poor level of health-related quality of life[15–18]. About 12 percent of infants were suspected of delayed development at nine months, while Thai infants as a whole present this trait at only 7 percent[19].

Regarding Mercer's study and other related studies, self-esteem, infant temperament, strain, social support and balanced family functioning were key factors which may affect MI among teenage mothers during 4–12 months following the birth of the first child [7, 16, 20–26]. However, there are few related studies concerning the relationship between a set of variables on MI. Therefore, this study aimed to determine the structural relationship of a set of variables and to test the model using the empirical data. Using the maternal outcome study based on Mercer's theoretical framework, the factors were grouped in four categories comprising environmental variables: balanced family functioning (BF) and social support (SS); maternal variables: self-esteem (SE) and strain (ST); infant variable: perceived infant temperament (IT); and outcome variable: MI. Therefore, for the structural equation modeling (SEM) with the full model, latent factors comprised: two exogenous factors, i.e. BF and SS; three endogenous factors, i.e. SE, IT and ST; and one outcome factor, i.e. MI. The hypothesized causal model of MI theorized that ST has a negative direct effect (DE) on MI; IT has a negative DE on ST and a positive DE on MI; SE has a positive DE on IT and MI and

a negative DE on ST; SS has a positive DE on SE, IT and MI, and a negative DE on ST; and BF has a negative DE on SE and IT and a positive DE on ST. The 13 hypotheses were defined to test that the model fits the empirical data (Figure 1).

## Methods

### *Study design and participants*

A cross-sectional survey was conducted among primiparous Thai adolescent mothers who were pregnant under 20 years of age, residing with their infants aged between 4 and 12 months under the fifth Health Region Catchment Area located in the central and western regions of Thailand. Multivariate sample size calculated for the study was based on the rule of thumb, i.e. the  $N:q$  rule, where  $q$  is the number of observed factors in the model[27]. This study defined the ratio as 20:1, and  $q$  was 17 observed factors. The estimated sample size totaled 340 subjects, to which a 15 percent increase was added to ensure completeness of the data. Therefore, the total number of subjects for data collection were 400 subjects. Thai healthy adolescent mothers, who had babies with a normal diagnosis at birth, were included. A community-based, cluster random sampling method was used to obtain the sample. First, the provinces were stratified in three sizes (large, medium and small) by the number of teenage mothers, selecting one province for each size. Second, cluster random sampling was performed in three provinces using the proportion 3:2:1 (160:140:100 teenage mothers), in each province, a municipal district was selected with the districts out of a municipal area selected based on the top three highest numbers of teenage mothers. The lottery method was applied for sampling at the individual level during the day when the home health care staff visited.

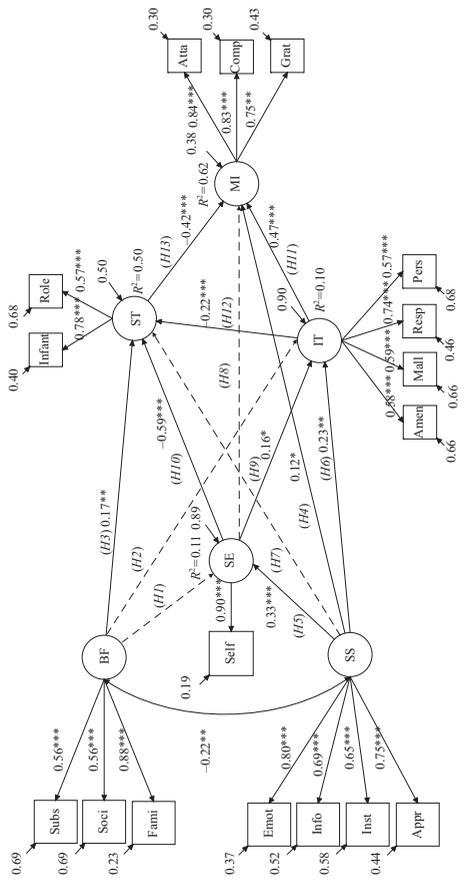
### *Ethical considerations*

Ethics clearance was granted by the Ethics Review Committee for research involving human research of the Faculty of Public Health, Mahidol University (MUPH-IRB), approval no. COA. No. MUPH2017-194. For those subjects who were less than 18 years old, consent was obtained from a legally authorized guardian such as a parent or husband and included a signed informed consent form. Each questionnaire was coded by number to conceal the names of participants.

### *Instrument*

The research instrument was a self-administered questionnaire comprising six scales, which were modified with permission. All contents were approved for validity by three experts in three areas: strategy management and policy makers among teenage mothers; nursing science; and public health science. Moreover, the confirmatory factor analysis (CFA) was used for construct validity. The corrected item-total correlation (CITC) was used as an item discrimination power, and the Cronbach's  $\alpha$  coefficient was shown as reliability. The six scales are described as follows:

- (1) Balanced family functioning was measured by adapting the Feetham's Family Functioning Survey from 1982[28]. The 21-item covered three subscales: relationship with broader social units, six items; relationship with relatives, five items; and relationship with individual family, ten items. A seven-point scale rated from 1 (strongly disagree) to 7 (strongly agree). Two sub-questions in each question item served as the perceived actual family function rating (A) and the expected rating (B). The  $D$  score was a discrepant score;  $D = |A - B|$ . Lower  $D$  scores indicated a higher level of balanced family functioning. The result of CFA showed item loadings ranged 0.33–0.66, composite reliability (CR) ranged 0.55–0.75 and  $R^2$  ranged 0.11–0.43. CITCs ranged 0.30–0.62, and Cronbach's  $\alpha$  coefficient was 0.83.



**Notes:** BF, balancing family functioning; Subs, relationship with relatives; Soci, relationship with society; Fami, relationship with individual; SS, social support; Emot, emotional support; Info, informational support; Inst, instrumental support; Appr, appraisal support; SE, self-esteem; Self, self-esteem; ST, strain; Infant, strain to the infant; Role, strain in the role; IT, infant temperament; Amen, amenability; Mall, malleability; Resp, responsiveness; Pers, persistence; MI, maternal identity; Alta, attachment to the infant; Comp, role competence; Grat, gratification in the role.  $\chi^2/df=2.17$ , CFI=0.92; TLI=0.91; RMSEA=0.06; SRMR=0.05; AIC=28,164.86; BIC=28,392.98. *H1-H13* play a role in the hypothesized model, and 4 path hypotheses, shown by dashed lines, i.e. *H1*, *H2*, *H7* and *H8*, were not statistically significant. The coefficients presented in the figure are standardized from parsimonious model. \* $p<0.05$ ; \*\* $p<0.01$ ; \*\*\* $p<0.001$

**Figure 1.** The causal model of the maternal identity among primiparous Thai teenage mothers

- (2) Social support was evaluated by developing the social support scale based on House's four types of support in 1981[29]. The ten-item, five-point rating scale, covered four subscales: emotional support, three items; informational support, two items; instrument support, three items; and appraisal support, two items. A five-point rating scale rated from 1 (strongly disagree) to 5 (strongly agree). The higher score referred to respondents who received higher levels of help. Item loadings ranged from 0.43 to 0.92, CR ranged 0.77–0.89,  $R^2$  ranged 0.19–0.84. CITCs ranged 0.42–0.74 and Cronbach's  $\alpha$  coefficient was 0.89.
- (3) Self-esteem was measured by applying the Thai version of the Rosenberg's Self-Esteem Scale of Wongpakaran and Wongpakaran in 2011[30]. The seven-item, five-point Likert scale determined that a higher score referred to a higher perception of her self-esteem. Item loadings ranged from 0.31 to 0.82, CR was 0.81 and  $R^2$  ranged from 0.09 to 0.67. CITCs ranged 0.32–0.69, and Cronbach's  $\alpha$  coefficient was 0.81.
- (4) Infant temperament was measured by adapting the Thai version of the "What My Baby Is Like" of Phumonsakul in 2000[21]. A 15-item, five-point rating scale, covered four subscales: amenability, four items; malleability, two items; responsivity, six items; and persistence, four items. A higher score indicated that the respondent perceived a higher level of infant adaptability or easy temperament. Item loadings ranged from 0.37 to 0.88, CR ranged 0.40–0.88,  $R^2$  ranged 0.14–0.77, CITCs ranged 0.40–0.67 and Cronbach's  $\alpha$  coefficient was 0.86.
- (5) Strain was assessed by adapting the Parental Stress Scale of Berry and Jones in 1995[31]. The 13-item, five-point rating scale, covered two subscales: strain to the infant, five items; and strain in the role, eight items. Higher scores indicated higher levels of strain. Item loadings ranged from 0.37 to 0.75, CR ranged from 0.58 to 0.83,  $R^2$  ranged from 0.14 to 0.56. CITCs ranged from 0.42 to 0.74 and Cronbach's  $\alpha$  coefficient was 0.84.
- (6) MI was measured using the Maternal Identity Scale modified from the Maternal Role Attainment Scale-Form B of Phumonsakul in 2004[32]. The 24-item, five-point rating scale covered three components: attachment to the infant, six items; competence in the role, eight items; and gratification in the role, ten items. A higher score indicated the respondent perceived a higher level of MI adaptation. Item loadings ranged from 0.52 to 0.79, CR ranged 0.80–0.90,  $R^2$  ranged 0.27–0.63. CITCs ranged 0.49–0.66 and Cronbach's  $\alpha$  coefficient was 0.93.

#### *Data collection*

All data were collected by the researcher and individually trained home health care staff. The subjects who met the study criteria provided volunteer cooperation without any condition related to health care services and agreed to sign the informed consent form. The self-administered questionnaire took about 45 min to complete. The data were collected at the participant's house after the home health care services were completed or depending on the day that participants were available between November 2017 and February 2018. A total of 353 of 400 participants returned the questionnaire and completed data analysis. About 12 percent were excluded because they were missing 10 percent or more of the necessary data.

#### *Data analysis*

Data exhibited normal distribution when skewness and kurtosis ranged from  $-1$  to  $+1$ , and the Shapiro–Wilk test was non-significant ( $p > 0.05$ )[33]. Mplus Software, license no. STBML80006817 was used for SEM to test the model. Three overall fit indices criteria were: the absolute fit index, i.e. the normed  $\chi^2$ ; root mean square error of approximation,

standardized root mean square residual; incremental fit index, i.e. comparative fit index, Tucker–Lewis Index[33]; and the model comparison index, i.e. Akaike’s information criteria and Bayesian information criteria[34]. Additionally, factor loadings within the measurement model were accepted  $\geq 0.50$ [27].

## Results

A total of 353 participants between 14 and 20 years of age participated in this study. Approximately 70 percent of subjects were late adolescents, had attained secondary school, were homemakers, had spouses and were living together or with their own family. Almost 80 percent reported having an unplanned pregnancy. About 70 percent were the infant’s caretakers, and more than one half relied on their own mothers to shape their maternal role (Table I).

The results revealed that data of observed variables did not have perfect normality distributions. Data analysis with non-normality was performed for SEM analysis using the maximum likelihood parameter estimates with standard error and the  $\chi^2$  test statistics (MLR) method as the estimator. Considering the inter-correlations matrix, coefficients ranged from  $-0.011$  to  $0.64$ . All variables did not correlate greater than  $0.80$ , indicating the present study was without multicollinearity. Observed factors among four latent factors, i.e. MI, IT, SE and SS showed high mean scores, while the ST presented moderate mean scores and observed factors in the BF exhibited low mean scores (Table II).

The hypothesized model revealed overall models fitted the empirical data. However, when examining individual paths, four hypotheses (i.e. *H1*, *H2*, *H7* and *H8*) were not statistically significant ( $p > 0.05$ ). Therefore, the hypothesized model was modified. The parsimonious model provided a good fit to the empirical data, namely, it constituted parsimony and the best model (Figure 1 and Table III). Factor loadings of all observed variables were acceptable (loadings  $0.56$ – $0.90$ ). The five antecedent factors on MI showed the IT had the highest direct and total effects on MI, followed by ST, SS, SE and BF, in a ranked order. Mediating factors of the study showed indirect effects of the BF, SS, SE and IT on MI were mediated by ST. In addition, the MI was affected by its set of variables accounting for 62 percent of the variance (Figure 1 and Table IV).

## Discussion

Five antecedent factors within three categories affected MI: environment, i.e. BF and SS; mother, i.e. SE and ST; and infant, i.e. IT. The hypothesized model fitted the empirical data. However, regarding the model parsimony, four hypotheses were deleted due to being non-statistically significant. The relationship among the set of factors in the model are discussed as follows.

First, balanced family functioning necessitates a balanced relationship between a mother and her environment both within and external to the family. Most teenage mothers reported reduced ability to balance family relationships[4, 13]. In this study, most mothers were residing with their extended family who supported them. This resulted in reduced strain and improved MI as BF had an indirect effect on MI through ST supported by previous studies [7, 25].

Second, participants who experienced higher levels of social support reported a higher mean score. Typically, teenage mothers received higher social support than adult mothers because they were so young and were an inexperienced mother[7]. The study found 97 percent had infant care support, 66 percent resided with their family or spouse’s family (27 percent) and 70 percent lived with their spouse. The physical support received resulted in positive perceptions of their infant’s temperament which in turn decreased strain. Therefore, it is possible that the study found SS had a positive DE on SE, IT and MI as previously reported in other studies.

Third, participants reported a high mean score of SE, indicating that they had higher confidence levels and acceptance of themselves; contrarily, previous findings found adolescent mothers had a lower self-esteem score than adult mothers[7, 9, 23]. Adolescent mother with

Teenage mother's information	Frequency	%
<i>Mother's age (years)</i>		
Middle adolescence (14–17)	123	34.80
Late adolescence (18–20)	230	65.20
Range = 14–20, Mean ± SD = 17.99 ± 1.39		
<i>Infant's age (months)</i>		
4–6	140	39.70
7–9	105	29.70
10–12	108	30.60
Range = 4–12, Mean ± SD = 7.63 ± 2.80		
<i>Educational attainment</i>		
Primary school (Grade 1–6)	54	15.30
Secondary school (Grade 7–9)	240	68.00
High school (Grade 10–12)	59	16.70
<i>Employment status</i>		
Homemaker	261	74.00
Student	22	6.20
Employed	70	19.80
<i>Marital status</i>		
Married and living together	244	69.10
Married but not living together	71	20.10
Single	38	10.80
<i>Living arrangement</i>		
Living with own family	232	65.70
Living with spouse's family	95	26.90
Living with only her spouse	26	7.40
<i>Intention of having an infant</i>		
No	279	79.00
Yes	74	21.00
<i>Infant care experience</i>		
No	207	58.60
Yes	146	41.40
<i>Parenting role training</i>		
No	85	24.10
Yes	268	75.90
<i>Having an infant care supporter</i>		
No	9	2.50
Yes	344	97.50
Mother	203	57.50
Spouse	86	24.40
Spouse's mother	24	6.80
Relatives	23	6.50
Health staff	8	2.30
<i>Infant's caretaker</i>		
Self	253	71.70
Own parent/spouse's parent	100	28.30

**Table I.**  
Teenage  
mother's information

**Note:** n = 353

Observed factors	Subs	Soci	Fami	Emot	Info	Inst	Appr	Self	Amen
Soci	0.33**								
Fami	0.49**	0.49**							
Emot	0.13*	0.05	-0.14**						
Info	-0.14**	-0.08	-0.24**	0.62**					
Inst	-0.11*	-0.03	-0.11*	0.47**	0.42**				
Appr	-0.17**	-0.05	-0.12*	0.57**	0.45**	0.58**			
Self	-0.04	-0.05	0.01	0.23**	0.13*	0.15**	0.31**		
Amen	0.05	-0.01	-0.06	0.24**	0.14**	0.04	0.19**	0.23**	
Mall	-0.02	0.04	-0.01	0.11*	0.06	0.11*	0.13*	0.13*	0.38**
Resp	-0.01	0.06	0.08	0.13*	0.07	0.18**	0.21**	0.11*	0.40**
Pers	0.04	0.04	0.04	0.11*	0.04	0.13*	0.12*	0.11*	0.30**
Infant	0.09	0.07	0.10	-0.25**	-0.17**	-0.16**	-0.28**	-0.46**	-0.18**
Role	0.01	0.05	0.14**	-0.06	-0.06	0.02	-0.12*	-0.35**	-0.18**
Atta	-0.07	-0.03	-0.08	0.31**	0.31**	0.23**	0.17**	0.32**	0.29**
Comp	-0.08	-0.11*	-0.09	0.25**	0.20**	0.15**	0.29**	0.27**	0.37**
Grat	-0.01	-0.03	-0.01	0.17**	0.17**	0.10	0.22**	0.32**	0.30**
Range	0-12	0-13	0-24	3-15	2-10	3-15	2-10	15-35	5-20
Mean	2.80	2.68	5.59	11.22	7.14	10.89	7.37	28.97	15.87
SD	2.75	2.60	5.11	2.58	1.83	2.48	1.65	4.26	2.58
Skewness	0.95	0.94	0.99	-0.49	-0.53	-0.44	-0.58	-0.64	-0.68
Kurtosis	0.32	0.61	0.69	0.01	0.32	0.08	0.64	-0.14	1.43
$p^{***}$	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Observed factors	Mall	Resp	Pers	Infant	Role	Atta	Comp	Grat	
Soci									
Fami									
Emot									
Info									
Inst									
Appr									
Self									
Amen									
Mall	0.47**								
Resp									

(continued)

Antecedent factors of MI

**Table II.** Intercorrelation matrix and descriptive statistics of each observed variable



Fit indices	Criteria	Hypothesized model	Consideration	Parsimonious model	Consideration
$\chi^2/df$	$\leq 3$	2.21	Accepted	2.17	Accepted
CFI	$> 0.90$	0.92	Accepted	0.92	Accepted
TLI	$> 0.90$	0.90	Accepted	0.91	Accepted
RMSEA	$< 0.07$	0.06	Accepted	0.06	Accepted
SRMR	$< 0.05$	0.05	Accepted	0.05	Accepted
<i>Model comparison indices</i>					
AIC	Smaller value is a better	28,168.22	–	28,164.86	Better than the hypothesized model
BIC		28,411.80	–	28,392.98	

**Notes:** Hair criteria[24];  $\chi^2/df$ , the normed  $\chi^2$ ; CFI, comparative fit index; TLI, Tucker–Lewis Index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual; AIC = Akaike's information criterion[26]; BIC, Bayesian information criterion[26]

**Table III.**  
Statistical overall fitted indices

low self-esteem reported difficulty with identifying as a mother and interacting with their infant[23]. Because mothers an average of 7.63 months (SD = 2.80) into delivery and about 70 percent were older adolescents. This may explain why they expressed confidence and acceptance of their roles in the early postpartum period, further improved by the support they received that influenced their self-esteem. Moreover, confident mothers who accepted their role were more likely to rate their infants as having an easy temperament and rated themselves as a good caretaker[4, 7]. It is possible that this study found SE had a DE on ST and IT compared to previous studies[7, 9, 21]. However, SE had an indirect effect on MI through ST and IT. This contrasted with studies of Thai adult mothers whose self-esteem had a DE on maternal role attainment[21].

Fourth, regarding infant temperament, participants rated a high mean score of IT, indicating increased levels of adaptability toward their infant's needs, possibly due to higher levels of support from others. In a similar study, Korean adult mothers reported that their baby's positive temperament directly decreased role strain, but had no statistically significant effect on maternal role attainment[20].

Finally, with regard to strain, participants reported a moderate mean score of ST, indicating moderate feelings of strain about their role and toward their infant. Mothers who reported lower strain levels experienced higher levels of MI adaptation[7]. In this study, the majority of participants were late adolescents, living with their spouse and had additional infant care support which significantly reduces strain. Therefore, this is possible that ST had a negative DE on MI, supported by Mercer's study[7].

In addition, the model could explain 62 percent of the variance in the MI, which indicated five antecedent factors could adequately serve as a majority predictor of MI regarding the criteria of  $R^2 > 0.50$ [27]. Comparing related studies based on Mercer's theory, e.g. the model study among Korean mothers comprising social support, change in daily life, baby's temperament and role strain ( $R^2 = 0.60$ )[20], the model study among Thai working mothers comprised working condition, marital relationship, social support, infant characteristics and self-esteem ( $R^2 = 0.58$ )[21], and the model study among Thai HIV-seropositive mothers comprised maternal health, infant health, stigma, social support, self-esteem and depression ( $R^2 = 0.17$ )[22]. Three different factors in this study, i.e. balanced family functioning, infant temperament, and strain, could contribute to the model exhibiting a greater  $R^2$  than previous studies.

### Conclusion and recommendation

The result of this study indicated that the study model could be considered to promote MI among primiparous teenage mothers 4–12 months after delivery. This study offers policy makers who are involved in maternal and child health the research findings to support the

**Table IV.**  
Effects and  
mediating factors

Structural paths	Hypothesized model				Parsimonious model			
	DE	IE (mediating factors)	TE	R <sup>2</sup>	DE	IE (mediating factors)	TE	R <sup>2</sup>
SE ←BF (H1)	0.07		0.07	0.11				0.11
←SS (H2)	0.34***		0.34***		0.33***		0.33***	
IT ←BF (H3)	0.10		0.10	0.11				0.10
←SS (H4)	0.25***	0.05* [SE]	0.31***		0.23**	0.05* [SE]	0.28***	
←SE (H5)	0.16*		0.16*		0.16*		0.16*	
ST ←BF (H6)	0.17**	-0.06 [SE (-0.04); IT (-0.02)]	0.11	0.51	0.17**		0.17**	0.50
←SS (H7)	-0.04	-0.26*** [SE (-0.20***); IT (-0.05*); SE and IT (-0.01)]	-0.31***			-0.25*** [SE (-0.19***); IT (-0.05*); SE and IT (-0.01)]	-0.25***	
←SE (H8)	-0.59***	-0.03 [IT]	-0.62***		-0.59***		-0.62***	
←IT (H9)	-0.20**		-0.20**		-0.22***		-0.22***	
MI ←BF		-0.01 [ST]	-0.01	0.64		-0.07** [ST]	-0.07**	0.62
←SS (H10)	0.12*	0.27*** [IT (0.12**); ST (0.02); IT and ST (0.03); SE and ST (0.10**)]	0.39***		0.12*	0.24*** [SE and ST (0.08***); SE and IT (0.02); IT (0.11**); IT and ST (0.02*); SE, IT and ST, 0.01]	0.36***	
←SE (H11)	-0.08	0.38*** [IT (0.07*); ST (0.30***); IT and ST (0.01)]	0.30***			0.34*** [IT (0.07*); ST (0.25***); IT and ST (0.02)]	0.34***	
←IT (H12)	0.47***	0.10* [ST]	0.57***		0.47***	0.09** [ST]	0.57***	
←ST (H13)	-0.49***		-0.49***		-0.42***		-0.42***	

**Notes:** BF, balancing family functioning; SS, social support; SE, self-esteem; ST, strain; IT, infant temperament; MI, maternal identity; DE, direct effect; IE, indirect effect; TE, total effect. \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

establishment of a policy to promote MI and reduce strain amongst primiparous teenage mothers in the first year after delivery. Additionally, a program of activities could be introduced within communities to increase the self-esteem of teenage mothers. Furthermore, balanced family functioning should not be overlooked and a father's responsibility must also be given due attention as a means of offering emotional support and taking a share in child-rearing responsibilities.

Experienced nurses should provide parenting class training in the hospital but also in easy-to-access venues within the community. Recommendations for future study include researching into other factors that affect MI, an extended study of the outcomes of the MI, i.e. infant growth and development through a longitudinal study, and, finally, a study of multi-group models, e.g. comparing primiparous teenage mothers who had the support of a spouse with those who did not.

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**Corresponding author**

Wirin Kittipichai can be contacted at: [wirin.kit@mahidol.ac.th](mailto:wirin.kit@mahidol.ac.th)

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