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Relation between Social Determinants of Maternal Health and Child Development: A Path Analysis

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Abstract

Background: Since several factors, rather than a single cause, contribute to developmental delay in children, identification of the condition's risk factors and their pathway of effects are critical to the design and implementation of appropriate intervention. This study aimed to determine the relation between social determinants of maternal health and child development in Iranian mothers and their children.

Materials and Methods: In this analytical cross-sectional study, the subjects were recruited from mother-child health clinics located at general hospitals affiliated to Shahid Beheshti University of Medical Sciences (Tehran, Iran). A total of 950 mothers and their children were selected using cluster sampling. Based on the WHO conceptual framework of Social determinants of health (SDH) and review of literature, this model was proposed. The questionnaires used for data gathering were: Beck's Depression Inventory II (BDI-II), Spiel Berger's State-Trait Anxiety Inventory (STAI), the 12-item MSPSS questionnaire for social support, Cohen's measure of perceived stress, the Ages and Stages Questionnaires (ASQ) of infant developmental status, and socio-economic status questionnaire. The data and theoretical Path Model were analyzed using SPSS software version 19.0 and Lizrel 8.8 software.

Results: The mean of Mother's age was 28.05±4.22 years old. The percentage of children with suspected delay was 12.2%. The final path model fitted well (RMSEA=0.049 GFI=1). Maternal Socioeconomic status had the greatest direct, indirect, and total effects on child development (βTotal=0.35377), and maternal depression had the second most significant direct effects on child development (β= -0.17).

Conclusion: The proposed path model regarding the effects of maternal socioeconomic status, perceived social support, perceived stress, anxiety and depression, on the developmental status of 6 to 18 month-old children, fitted well.

Key Words: Child development, Health, Mothers, Social determinants of health, Social Support.

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1- INTRODUCTION

Today, human resources are considered an essential part of the development of societies and attention to children as the future generation, especially at early ages, is an important strategy for this purpose (1, 2). The first few years of life, when most developmental progress in all domains occurs, are of critical importance (3). Developmental delay is one of the most common chief complaints that causes parents go to pediatric clinics (4), and as a major challenge even in advanced societies, it incurs high costs of diagnosis, care and treatment on families and policy makers of the healthcare and education sectors. These children usually need special education and highly specialized health care (5). A number of studies have indicated the effect of developmental delay in early childhood on psychology, behavior and health later in their life (6).

At least 200 million children worldwide do not reach their potential growth and development (7). About 39% of children under the age of five in low-income countries suffer from developmental disorders (8). The prevalence of developmental delay ranges from 11.8% to 30% and even more in different cities of Iran. The rather high figures in the country require that further and serious attention be paid to prevention and control strategies. For this purpose, affecting factors need to be identified in detail and in depth (5, 9-12). Development of the central nervous system in the child is affected by many factors such as biological, nutritional, pregnancy, environmental and social factors. Since only one factor cannot lead to developmental delay, identification of risk factors is vital and highly important (13, 14). While child development has long been known to be affected by biological and nutritional factors, recent research has highlighted its relationships with other factors, mainly psychological in origin, including maternal stress and depression (5, 15). The very high rates of developmental delay in poorer societies show that causes should be sought in psycho-social, as well as biological factors (16). Numerous as they are, studies conducted to explore factors affecting the incidence of developmental delays and disorders in children universally focus on one or a few number of factors, most usually of biologic origin, without considering the complex, multi-factorial and inter-related nature of the bio-psycho-social network of factors and chain of events leading to a child's delayed developmental status. The authors believe that this is an over-simplification of the reality and a major gap in our present body of knowledge regarding the issue. Today, we need a deeper and more comprehensive picture of the complex process ending with the unfortunate outcome of developmental delay in over 200 million children worldwide (7), in order to prevent and control it effectively and efficiently.

Fortunately, "path analysis" a well-suited statistical method for child development or other longitudinal studies where phenomena do not have single causes, but are the product of chains of predisposing influences(17), that involve many complex interactions and where the causal direction between variables is ambiguous allows us to try to unveil this ambiguity and complexity to a certain degree (18). However, considering that if the primary path analysis diagram is proposed simply on the basis of the researcher's own conception of the causal relationships, misleading path diagrams may be produced. In the present study and in order to avoid this unwanted disadvantage, the authors adopted the WHO's Conceptual framework of social determinants of health (SDH) as the theoretical basis for their proposed path model and then tried to back up and enrich the model with a bulk of literature existing on factors related to or affecting child development. The reason

for this choice of conceptual basis was that in fact, according to WHO report, early childhood development actually comprises one of the main themes of the SDH. Given WHO conceptual framework, structural factors including socioeconomic position, affect psychosocial, behavioral, and biological factors, which consequently influence quality of health status, and determine inequalities in health (19). Obviously, these factors interact with one another. Many of them have accumulative and overlapping influence in the life of people.

2- MATERIALS AND METHODS

Based on the WHO conceptual framework of SDH (19), and review of literature, this model was proposed (**Figure.1**):

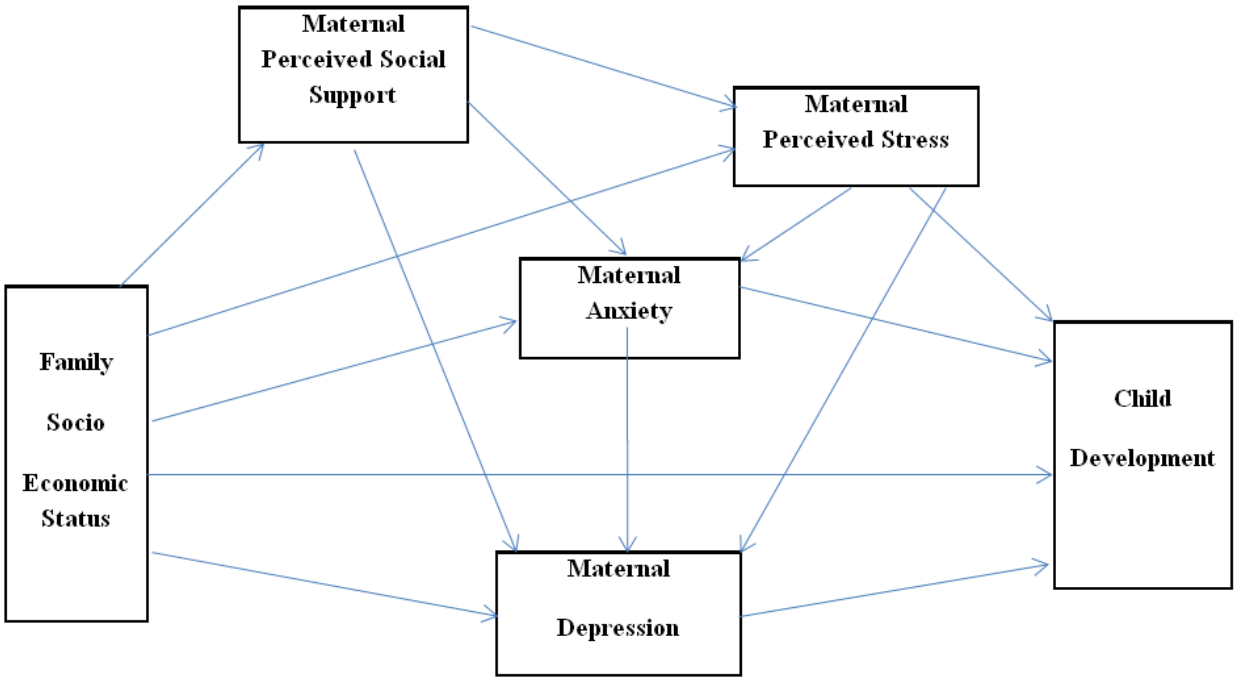


Fig.1: Theoretical Path Model for Effects of Social Determinants of Maternal Health on Child Development (19).

2-1. Method

The present cross-sectional study recruited 950 Iranian mothers and their 6 to18-month-old infants by a cluster sampling method. After registering in the Ethical Committee (Code USWR.REC.1393.152) of Social Welfare and Rehabilitation University, the subjects were selected randomly from mother-child health care clinics located at general hospitals affiliated to Shahid Beheshti University of Medical Sciences in Tehran city (Iran). The mothers attended these clinics for routine well-baby care and vaccination of their children. The hospitals were located at different areas of the city. The number of participants selected from each clinic was proportionate to the population of its attendants. Since the frequency of childhood developmental disorders in the Iranian population has been estimated around 20% in different studies (5, 9, 11, 20) a minimum sample size of 700

participants was considered. Due to the possibility of sample loss, the number of subjects was increased to 900 individuals and 980 participants were finally included. The questionnaires used for data gathering were: Beck's Depression Inventory II (BDI-II), Spiel Berger's State-Trait Anxiety Inventory (STAI), the 12-item MSPSS questionnaire for social support, Cohen's measure of perceived stress, the Ages and Stages Questionnaires (ASQ) of infant developmental status, and socio-economic status questionnaire. Women were included if they aged 18-35 years old, had a child of 6-18 months age, had a history of no more than four pregnancies, and experienced no medical conditions during their last pregnancy or in the course of the present study. Mothers of children with congenital malformations or with any gross developmental disorders, women with a history of preeclampsia, placental abruption, polyhydramnios, stillbirth, the use of forceps or vacuum, and experiencing complications such as bleeding and dystocia during their recent childbirth were not recruited.

The absence of known developmental disorders in the relatives of the participants was another inclusion criterion. These women had to have physically healthy 6-, 8-, 12-, and 18-month-old singleton infants with a birth weight of equal or more than 2,500 gr, a gestational age of 37-42 weeks, an Apgar score over seven, and no fetal growth restriction, history of hospitalization, or growth delay, in order to be included in the study. The mothers of infants who had not received iron supplements were not recruited. The mothers were first informed about the study objectives and requested to provide consent. They were then handed with a questionnaire containing demographic and personal characteristics of the mother and child. The content validity as well as the reliability (test-retest correlation coefficient = 0.94 to 0.97) of these questionnaires were confirmed.

2-2. Measuring tools

A questionnaire designed by Garmaroodi and Moradi, in Tehran (Iran) was used to assess the subjects' socioeconomic- status (21). This socioeconomic status questionnaire contains items on mother's education, father's education, living place floor area (in square meters) per person, price per square meter of the house, ownership of certain facilities (e.g. automobile, computer, etc.), family income per month, which together produce a compound variable. The correlation of these factors with the total score of the questionnaire was calculated to be 0.87 and a cut-off point of 16 was determined by the author to create a binary variable which classifies households into two groups (with poor or desirable economic status).

The BDI-II (Beck depression inventory-II) is a 21-item scale commonly administered to determine levels of depression. Its scores, ranging between 0 and 63, are interpreted as normal conditions, mild, moderate, severe, and extremely severe depression (scores equal to 0-9, 10-18, 19-30, 31-40, and 41-63, respectively). Previous studies have confirmed the reliability of the BDI-II. The internal consistency (Cronbach's alpha) and test-retest (22, 23), correlation coefficient of the scale for the Iranian population has been calculated as 0.87 and 0.74, respectively (24).

The Perceived Stress Questionnaire developed by Cohen in 1983 was used to measure the participants' perceived stress during the past month (25). This 14-item questionnaire has been widely used in different countries and has been translated into many languages. Each item was scored on a five-point Likert scale from zero (never) to four (most of the time). The total scores of the questionnaire ranged

between zero and 56. Higher scores indicated greater perceived stress. Previous studies have reported the Cronbach's alpha for the questionnaire to be 0.84-0.86 (25). The State-Trait Anxiety Inventory (STAI), developed by Spielberger, was used to measure anxiety in this study (26-28). A total of 20 items are devoted to trait anxiety and measure the severity of anxiety symptoms on a scale of one to four. The lowest and highest scores of these items are 20 and 80, respectively. The STAI is a valid and reliable tool for measuring anxiety various studies have assessed the validity and reliability of this scale in different countries (26-28).

In Iran, the reliability of the Persian version of this scale has been assessed and reported as 0.91 and 0.95 in two different studies, respectively (29, 30). The 12-item Multidimensional Scale of Perceived Social Support (MSPSS) questionnaire was applied to assess social support (31). The total scores of the questionnaire ranged between 12 and 84. The questionnaire has been used in different studies and an Iranian study reported its reliability as 0.89 (31).

In the present study we used the Persian version of the Ages and Stages Questionnaire (ASQ), a valid and reliable parent-report tool (32), to determine the developmental status of the infants. The questionnaire includes five developmental domains including communication, gross-motor, fine-motor, problem-solving, and personal-social skills. The tool provides age and domain-specific cut-off points. The cut-off points for Iranian Infants were previously determined by Vameghi et al. (32), and later accepted and used by the Iranian Ministry of Health and Medical Education at a national level. The lowest and highest achievable scores in each domain are 0 and 60.

2-3. Ethics

For ethical purposes, in case of identification of mothers and infants who had problems, they were introduced to and followed by a specialist. Data were analyzed in LISREL and SPSS software version 19.0 using the Mann-Whitney test, the Chi-square and the independent t-test at a significance level of 0.05.

2-4. Data Analysis

Path analysis shows which path of the proposed model is more important or significant; in this method, the overall effect of a variable on another variable is calculated by adding its "direct effect" and "total indirect effects". The RMSEA, Goodness of Fit Index (GFI), Normed Fit Index (NFI) and Comparative Fit Index (CFI) are used in the present study to determine the fit of the model.

3- RESULTS

This study aimed to determine the relationship of some social determinants of maternal health with each other and ultimately with the developmental status of 6-18-month-old children. As can be seen in **Table.1** the two groups of children identified in this study, that is those with normal and delayed developmental status, were not significantly different in terms of gender as well as in terms of family demographic characteristics, except for the number of years of mother's education and monthly family income ($P<0.001$). As is demonstrated in **Table.2** developmental delay was 12.2 % overall, in all domains and in all age groups. The highest and lowest rates of developmental delays were detected in problem solving (6.2%) and personal-social domains (4.2%), respectively (**Table.3**).

Table-1: The comparison of some family demographic characteristics between children with normal and delayed development

Demographic Characteristics		Normal development n=834	Delayed development n=116	P-value
Mother's age (mean ± SD)		28.01±4.25	28.36±4.07	NS
Father's age(mean ± SD)		33.39±5.61	33.59±5.60	NS
Years of mother's education (mean ± SD)		11.86±3.84	10.30±4.21	<0.001
Family income in Iranian Rials per month×1000 (mean ± SD)		10615.107±3469.200	8844.827±2667.366	<0.001
Mother's Employment (frequency/percent)	Unemployed (Housewife)	783(88)	107(12)	NS
	Employed	51(85)	9(15)	
Type of Delivery (frequency/percent)Frequency (percent)	Vaginal	233(90.7)	24(9.3)	NS
	Cesarean Section	601(86.7)	92(13.3)	
Gender Frequency (percent)	Boy (494)	431(87.2)	63(12.8)	
	Girl (456)	403(88.4)	53(11.6)	

SD: Standard Division; NS: Not Significant.

Table-2: Developmental Status of 6-18-month-old children

Child's Age (months)	Normal development Number (%)	Delayed development Number (%)
6 (n=257)	225(87.5)	32(12.5)
8 (n=210)	174(82.9)	36(17.1)
12 (n=271)	234(86.3)	37(13.7)
18 (n=212)	201(94.8)	11(5.2)
Total	834(87.8)	116(12.2)

Table-3. Developmental Status in 5 domains of 6-18-month-old children

Domains of development	Normal Development (frequency/percent)	Delayed Development (frequency/percent)
Communication	931(98)	19(2)
Gross motor	928(97.7)	22(2.3)
Fine motor	917(96.5)	33(3.5)
Problem-solving	891(93.8)	59(6.2)
Personal-social	910(95.8)	40(4.2)

Moderate to extremely severe depression was present in 20.9% of the studied women. About 16.7% of women received low, 42.4% moderate and 40.8% high degrees of social support. Moreover, 63.3% of women enjoyed a favorable economic status. The mean, minimum and maximum scores of child development, as well as of different determinants of maternal health are demonstrated in **Table.4**. The correlation between different social determinants of maternal health and child development are shown in **Table.5**.

Table-4: Mean scores of some determinants of maternal health and child development scores

Variables	Mean (SD)	Minimum value	Maximum value
Infant total ASQ Score	265.52 (30.60)	115	300
Maternal Socio-economic status	19.97 (7.20)	6	46
Maternal Perceived Social support	62.48 (15.17)	12	84
Maternal Perceived stress	23.75 (8.60)	0	42
Maternal Anxiety	44.62 (5.79)	31	70
Maternal Depression	11.28 (6.69)	0	57

SD: Standard deviation; ASQ: Ages and Stages Questionnaire.

Table-5: Correlation between different social determinants of maternal health and child development

Variables	Child ASQ Score	Maternal Socio-economic Status	Maternal Social Support	Maternal Perceived Stress	Maternal Anxiety	Maternal Depression
Child ASQ Score	1	.229**	.088**	.078**	.018	-.208**
Maternal Socio-economic Status		1	.197**	-.010	-.160**	-.233**
Maternal Social Support			1	-.070*	-.108**	-.327**
Maternal Perceived Stress				1	-.006	.012
Maternal Anxiety					1	.157**
Maternal Depression						1

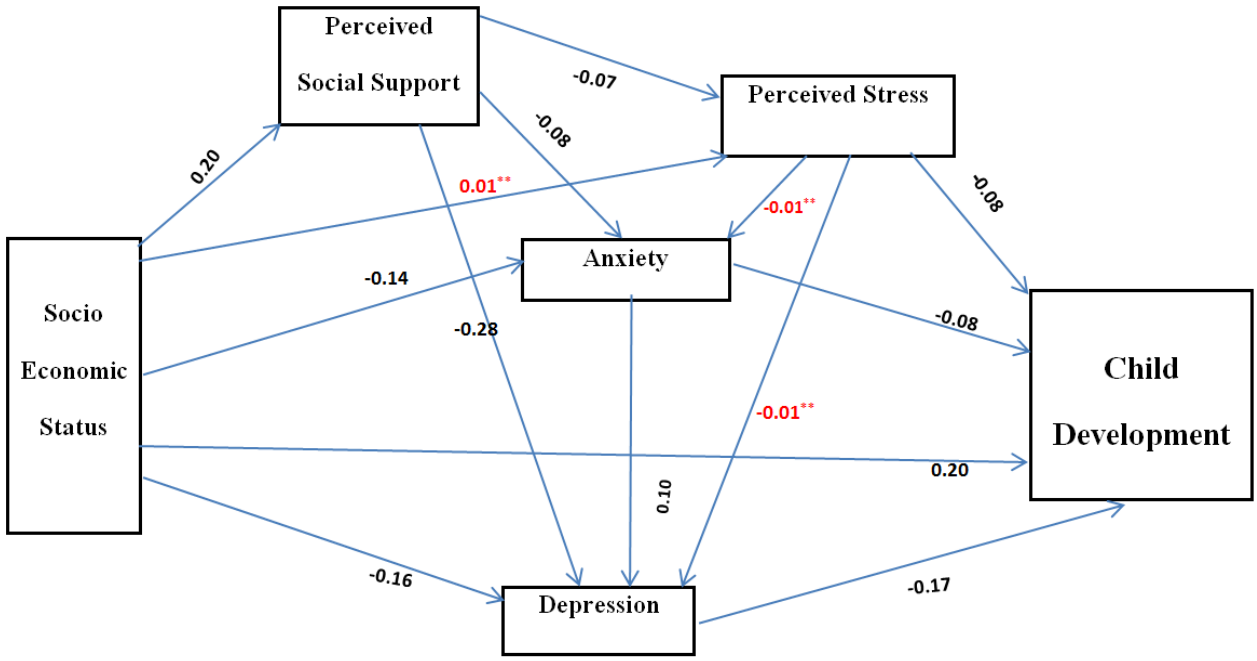
*. Correlation is significant at 0.05 levels (2-tailed); **. Correlation is significant at 0.01 levels (2-tailed).

According to the path analysis of the developed model and as can be seen in **Table.6**, socioeconomic status had the greatest direct, indirect, and total effects on child development. The second most significant direct effects on child development were exerted by maternal depression. Social support caused the second most indirect effects on child development (β standardized showed in **Table.6**)

Table-6: Path Coefficients for social determinants of maternal health and child development.

Predictor Variables	Effect (standardized β)			T-value
	Direct	Indirect	Total	
Socioeconomic status	0.20	0.15377	0.35377	6.28
Perceived Social support	-	0.06096	0.06096	-
Perceived Stress	-0.08	-	-0.08	2.66
Anxiety	-0.08	-0.017	-0.097	2.47
Depression	-0.17	-	-0.17	5.42

The final path model fitted well. The effects of social determinants of maternal health on each other as well as on child development determined by pathway analysis are shown in **Figure**.**2**.



**Not significant. Numbers signify standardized β.

Fig.2: Full empirical path model for the effects of Social Determinants of Maternal Health on Child Development (β standardized was showed in model).

The GFI, CFI, NFI and RMSEA indices were used to investigate the model fitness, and showed that the well-fitted model had no significant differences with the conceptual model (**Table.7**).

Table-7: Goodness of Fit Indices for the model for Effects of Social Determinants of Maternal Health on Child Development

	$\chi 2$	df	P-value	NFI	CFI	GFI	*RMSEA
Model index	0.038	1	0.85	1	1	1	0.000

NFI: Normed Fit Index; CFI: Comparative Fit Index; GFI: Goodness of Fit Index; RMSEA: Root Mean Square Error of Approximation; X2: Chi-square test. *90% percent CI (confidence interval) for RMSEA (0.00-0.049).

4- DISCUSSION

We aimed to determine the relation between social determinants of maternal health and child development in Iranian mothers and their children. The percentage of children with suspected delay was 12.2%. The fitting of the model based on the selected indexes revealed its high goodness-of-fit. In the proposed well-fitting model, socio-economic status affected child development both directly and indirectly through its effects on social support, stress, depression, and anxiety. Economic status is an important indicator of health and disease outcomes (33). In terms of the direct effect, our finding corresponds to that of many other studies (34). Low economic status is linked with physical, psychological, and cognitive health during both childhood and adulthood (35). Due to its relationship with childhood experiences, economic status can affect children's cognitive abilities,

performance, and development (36), Martin et al. found a relationship between economic status and behavioral problems in male children (37). Simon et al. showed that developmental delay in children aging 18 months to five years old was associated with environmental factors, especially poverty and parents' education level (38). The relationship between economic status and development in motor and cognitive domains was also confirmed by Servili et al.'s study (39). In terms of our finding regarding the indirect effect of socioeconomic status on child development through its effect on maternal psychological status (defined as maternal perceived stress, anxiety and depression in the present study), some studies have reported the former and others the latter relationship. According to Baum et al. economic status was related with chronic stress and could result in psychological distress, mental health problems, and harmful health behaviors (33).

Moreover, a strong relationship was observed between parents' mental state and family's economic status (40). Our study confirmed a direct relationship between maternal anxiety as well as maternal depression and child development. In fact, maternal depression was the second most significant directly acting determinant of child development, after maternal socio-economic status. The presence of mental health problems in parents is a strong predictor of mental disorders in children. Studies have identified stress, anxiety and depression as risk factors for maternal and child health (41, 42). Children of mothers with anxiety disorders scored lower than other children in cognitive, personal, social, emotional, and behavioral development (43). Koutra et al., found high levels of maternal anxiety were related with psychosocial development in 18-month-old infants (44). Strong evidence supports the relationship between maternal depression and mental health problems in children. Ali et al. found a relationship between maternal depression and cognitive development in 6-12-month-old children. They also found a relationship between maternal depression and delayed fine motor development at 12 months (40). Inadequate stimulation from depressed mothers adversely affects mental development in children. Maternal depression can affect the quality of mother-child relationships. Depressed mothers have limited social interactions and are less interested in playing with their children (45). In our model, depression also acted as a mediator for the indirect effects of maternal perceived social support, perceived stress, and anxiety on child development. The correlation between depression with each of these factors, as well as its mediating role regarding the effect of some of these factors on child development have been previously shown in some studies.

Huang et al., confirmed the mediating role of maternal depression in the effects of parental stress and social support on child development after a one-year follow-up period (46). Maternal depression was directly related with maternal anxiety as well as behavioral disorders in children (47). Evidence suggests that a relationship exists between social support and maternal and child health (48). It has also been shown that social support is related to depression (49). Some authors have concluded that mothers with higher levels of social support enjoy better mental health and perform their maternal roles better. They tend to improve their skills in dealing with stress and communicating with their children (50, 51). Social support seems to lower the stress levels in mothers (46). The findings of the present study confirmed the previous findings. In fact we showed that maternal perceived social support had an indirect effect on child development through maternal perceived stress, anxiety and depression.

5- CONCLUSION

The proposed path model regarding the effects of maternal socioeconomic status, perceived social support, perceived stress, anxiety and depression, on the developmental status of 6 to 18 month-old children, fitted well. Maternal economic status had the greatest direct, indirect, and total effects on child development. Maternal depression had the second most significant direct effect and social support showed the second most indirect effect on child development, respectively. Evidently, the model proposed and tested in the present study sheds light only on part of the whole picture and more similar studies are needed in order to access a sufficiently wide-angle view of this complex and multi-factorial phenomenon.

6- CONFLICT OF INTEREST: None.

7- ACKNOWLEDGMENTS

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8- REFERENCES

1. Lin JD, Yen CF, W, JL, Kang, SW. The administrative population report on children with developmental delays in Taiwan, 2003 through 2007. Research in Developmental Disabilities. 2009; 30: 353-8.

2. Ahmadi J, Ahmadi Doulabi M, Sajedi F, Nasiri M. The Effect of Care Package on Motor Development among 12-Month-Old Infants in Saqqez-Iran: A Randomized Clinical Trial Study. International Journal of Pediatrics, 2017; 5(8): 5571-5582.

3. Flamant C, Branger B, Nguyen The Tich S, de la Rochebrochard E, Savagner C, Berlie I, et al. Parent-completed developmental screening in premature children: a valid tool for follow-up programs. PloS One. 2011; 6: e20004.

4. Mulcahy H, Savage E. Uncertainty: A little bit not sure. Parental concern about child growth or development. J Child Health Care. 2015; 23: doi: 10.1177/1367493515587059

5. Vamegh R, Amir Ali Akbari S, Sajjadi H, Sajedi F, Alavimajd H. Correlation Between Mothers' Depression and Developmental Delay in Infants Aged 6-18 Months. Glob J Health Sci. 2015; 23; 8(5): 50060.

6. Brown MA, McIntyre LL, Cmic KA, Baker BL, Blacher J. Preschool Children with and without Developmental Delay: Risk, Parenting, and Child Demandingess. J Ment Health Res Intellect Disabil. 2011; 4: 206–26.

7. de Moura DR, Costa JC, Santos IS, Barros AJ, Matijasevich A, Halpern R, Dumith S, Karam S, Barros FC. Risk factors for suspected developmental delay at age 2 years in a Brazilian birth cohort. Pediatrics and Perinatal Epidemiology. 2010;24: 211–21.

8. Singla DR, Kumbakumba E, Aboud FE. Effects of a parenting intervention to address both maternal psychological wellbeing and child development and growth in rural Uganda: a community-based, cluster randomized trial. Lancet Glob Health. 2015; 3: e458-69.

9. Shahshahani S, Vameghi R, Azari N, Sajedi F, Kazemnejad A. Validity and Reliability Determination of Denver Developmental Screening Test-II in 0-6 Year-Olds in Tehran. Iran J Pediatr. 2010; 20: 313-322. PMID: 23056723

10. Shahshahani S, Vameghi R, Azari N, Sajedi F, Kazemnejad A. Comparing the Results of developmental Screening of 4-60 Months Old Children in Tehran Using ASQ and PDQ. Iranian Rehabilitation Journal. 2011; 9: 3-7.

11. Shahshahani S, Sajedi F, Azari N, Vameghi R, Kazemnejad A, Tonekaboni, SH. Evaluating the Validity and Reliability of PDQ-II and comparison with DDST-II for two step developmental screening. Iranian Journal of Pediatrics. 2011; 21: 343-349.

12. Vameghi R, Hatamizadeh N, Sajedi F, Shahshahanipoor S, Kazemnejad A. Production of a native developmental screening test: the Iranian Experience. Child: Care, Health and Development; 2010; 36: 340-345. 13. Persha A, Saroj Arya S, Nagar R, K.Verma P, Behera R, Kishore MT. Biological and Psychosocial Predictors of Developmental Delay in persons with Intellectual Disability:

Retrospective Case-File study. Asia Pacific Disability Rehabilitation Journal. 2007; 18, 93-100.

14. Soleymani F, Shahnazi H, Hassanzadeh A. Effects of Educating Mothers about the National Child Development Screening Plan on Detecting Abnormal Child Development. International Journal of Pediatrics, 2017; 5(9): 5631-5641.

15. Petterson SM, Albers A. Effects of Poverty and Maternal Depression on Early Child Development. Child Development. 2001; 72: 1794-1813. PMID: 11768146.

16. Conger RD, Conger KJ, Martin MJ. Socioeconomic Status, Family Processes, and Individual Development. Journal of Marriage and Family. 2010; 72: 685–704.

17. Gochman DS, Health Behavior: Emerging Research Perspectives, 1998, New York, Springer Science+Business Media, p.88.

18. Olobatuyi ME. A user's guide to path analysis. 2006; Maryland, University Press of America. p. 60

19. Irwin LG, Siddiqi A, Hertzman C. Early Child Development: A Powerful Equalizer. Final Report for the World Health Organization's Commission on the social determinants of health. Available at: http://apps.who.int/iris/bitstream/10665/69729/1/a91213.pdf. Accessed: April 9, 2016.

20. Torabi F, Akbari SA, Amiri S, Soleimani F, Alavi Majd H. Correlation between high-risk pregnancy and developmental delay in children aged 4-60 months. Libyan J Med. 2012; 7:18811. doi: 10.3402/ljm.v7i0.18811

21. Garmaroudi GH.R, Moradi A. Instrument designed to measure socioeconomic status in Tehran. Payesh. 2010; 2, 137-44. (In Persian)

22. Jakšić N, Ivezić E, Jokić-Begić N, Surányi Z, Stojanović-Špehar S. Factorial and diagnostic validity of the Beck Depression Inventory-II (BDI-II) in Croatian primary health care. J Clin Psychol Med Settings. 2013; 20: 311-322.

23. Hall BJ, Hood MM, Nackers LM, Azarbad L, Ivan I, Corsica J. Confirmatory factor analysis of the Beck Depression Inventory-II inbariatric surgery candidates. Psychol Assess. 2013; 25: 294-299.

24. Ghassemzadeh H, Mojtabai R, Karamghadiri N, Ebrahimkhani N. Psychometric properties of a Persian-language version of the BeckDepression Inventory--Second edition: BDI-II-PERSIAN.DepressAnxiety. 2005; 21:185-192.

25. Leung DY, Lam TH, Chan SS. Three versions of Perceived Stress Scale: validation in a sample of Chinese cardiac patients who smoke. BMC public health. 2010; 10:513.

26. Fountoulakis KN, Papadopoulou M, Kleanthous S, Papadopoulou A, Bizeli V, Nimatoudis I, Iacovides A, Kaprinis GS. Reliability and psychometric properties of the Greek translation of the State-Trait Anxiety Inventory form Y: preliminary data. Ann Gen Psychiatry.2006; 5:2. doi: 10.1186/1744-859X-5-2.

27. Donzuso G, Cerasa A, Gioia MC, Caracciolo M, Quattrone A. The neuroanatomical correlates of anxiety in a healthy population: differences between the State-Trait Anxiety Inventory and the Hamilton Anxiety Rating Scale. Brain and Behavior. 2014; 4: 504-54.

28. Perpiñá-Galvañ J, Richart-Martínez M, Cabañero-Martínez MJ, Martínez-Durá I. Content validity of the short version of the subscale of the State-Trait Anxiety Inventory (STAI). Rev Lat Am Enfermagem. 2011; 19: 882-887.

29. Kaviany H, Ahmady Abhary A. Prevalance of anxiety disorder in Tehran city. Thinking and Behavior Journal. 2002; 8: 4-11. (In Persian)

30. Masoomi R, Lamiyan M, Ghaedi S. Role of oxytocin in anxiety in the normal Parturition. Journal of Zahedan university of Medcial sciences. 2008; 10: 53-58. (In Persian)

31. Mirabzadeh A, Dolatian M, Forouzan AS, Sajjadi H, Majd HA, Mahmoodi Z. Path Analysis Associations Between Perceived Social Support, Stressful Life Events and Other Psychosocial Risk Factors During Pregnancy and Preterm Delivery.Iranian Red Crescent Medical Journal. 2013; 15: 507- 514.

32. Vameghi R, Sajedi F, Kraskian Mojembari A, Habiollahi A, Lornezhad HR, Delavar B. Cross-Cultural Adaptation, Validation and

Standardization of Ages and Stages Questionnaire (ASQ) in Iranian Children. Iranian J Pub Health. 2013; 42: 522-528.

33. Baum A, Garofalo JP, Yali AM. Socioeconomic status and chronic stress. Does stress account for SES effects on health? Ann N Y Acad Sci. 1999; 896:131-44.

34. Pan BA, Rowe ML, Singer JD, Snow CE. Maternal correlates of growth in toddler vocabulary production in low-income families. Child Development. 2005; 76: 763–782.

35. Bradley RH, Corwyn RF. Socioeconomic status and child development. Annual Review of Psychology. 2002; 53:371–399.

36. Noble KG, Norman MF, Farah MJ. Neurocognitive correlates of socioeconomic status in kindergarten children. Dev Sci. 2005; 8: 74-87.

37. Martin MJ, Conger RD, Schofield TJ, Dogan SJ, Widaman KF, Donnellan MB, Neppl TK. Evaluation of the interactionist model of socioeconomic status and problem behavior: a developmental cascade across generations. Dev Psychopathol. 2010; 22: 695-713. doi: 10.1017/S0954579410000374.

38. Simon A, Pastor P, Avila R, Blumberg SJ. Socioeconomic disadvantage and developmental delay among US children aged 18 months to 5 years. J Epidemiology Community Health.2013; 67: 689-95.

39. Servili C, Medhin G, Hanlon C, Tomlinson M, Worku B, Baheretibeb Y, Dewey M, Alem A, Prince M. Maternal common mental disorders and infant development in Ethiopia: the P-MaMiE Birth Cohort. BMC Public Health. 2010; 12: 10:693.

40. Ali NS, Mahmud S, Khan A, Ali BS. Impact of postpartum anxiety and depression on child's mental development from two peri-urban communities of Karachi, Pakistan: a quasi-experimental study .BMC Psychiatry. 2013; 13:274.

41. Wachs TD, Black MM, Engle PL. Maternal Depression: A Global Threat to Children's Health, Development, and Behavior and to Human Rights. Child Development Perspectives. 2009; 3: 51–59.

42. Dunkel Schetter C, Tanner L. Anxiety, depression and stress in pregnancy: implications for mothers, children, research, and practice. Curr Opin Psychiatry. 2012; 25: 141-148.

43. McLearn KT, Minkovitz CS, Strobino DM, Marks E, Hou W. The timing of maternal depressive symptoms and mothers' parenting practices with young children: implications for pediatric practice. Pediatrics. 2006; 118:e174-e182. doi: 10.1542/peds.2005-1551

44. Koutra K, Chatzi L, Bagkeris M, Vassilaki M, Bitsios P, Kogevinas, M. Antenatal and postnatal maternal mental health as determinants of infant neurodevelopment at 18 months of age in a mother–child cohort (RheaStudy) in Crete, Greece. Soc Psychiatry Psychiatr Epidemiol. 2013; 48: 1335–1345.

45. Cunningham F, Leveno K, Bloom S, Hauth J, Rouse D, Spong C. Williams Obstetric. Philadelphia: McGraw-Hill Companie. 2005.

46. Huang CY, Costeines J, Ayala C, Kaufman JS. Parenting Stress, Social Support, and Depression for Ethnic Minority Adolescent Mothers: Impact on Child Development J Child Fam Stud. 2014; 23: 255–262.

47. Boyd RC, Tervo-Clemmens B. Exploring Maternal and Child Effects of Comorbid Anxiety Disorders among African American Mothers with Depression. J Depress Anxiety. 2013; 2(129): 1000129.

48. Logsdon CM, Birkimer JC, Ratterman A, Cahill K, Cahill N. Social support in pregnant and parenting adolescents: Research, critique, and recommendations. Journal of Child and Adolescent Psychiatric Nursing 2002; 15:75-83.

49. Miech RL, Shanahan MJ. Socio-economic status and depression over the life course. Journal of health and social behavior. 2000; 41: 162-76.

50. Bunting L, McAuley C. Research review: Teenage pregnancy and parenthood: The role of fathers. Child & Family Social Work.2004; 9: 295–303.

51. Letourneau NL, Stewart MJ, Barnfather AK. Adolescent mothers: Support needs, resources, and support-education interventions.Journal of Adolescent Health.2004; 35:509–25.