Original Research

The effect of regular home visits on the development indices of low birth weight infants

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ABSTRACT

The main purpose of the present study was to determine the effect of regular home visits on the developmental indices of low birth weight infants. The present study was an on-site clinical investigation. 90 infants ranging between 1500 to 2500g born in Razi Hospital of Marand town having the entrance criteria to the present study were taken into consideration through the available sampling method and then they were divided into two intervention and control groups. The intervention group has received the whole routine cares since the first to fourth week and then they were visited at home for 45 minutes a week. The control group received the routine cares. The evolutionary indices of both groups were also completed monthly for three months by referring homes. The related data gathering tool was also subjected to the demographic information through registration list and the Persian version of the Low Weight Infant Inventory (LWII) (2 months) that have been completed by the researcher on the birthday, first, second and third months of the birth through the interview. SPSS-15 software and the application of the inferential and descriptive statistical tests (K2 and T-tests) were also applied in order to analyze the related data in this study. The significance level was considered as p<0.05.

More than half of these related research units of both groups had experience (61.5%) and control (55.8%) regarding all women in this study; the mean score of the low weight infants on the first month had not shown any statistical significant difference; but on the second months (p=0.04) and the third months (p=0.001), they had shown statistical significant difference progressively. The healthcare based on home-visit had influence on the recovery indices of the low weight infants. Hence, nurses and other health monitors of the infants should apply for the healthcare programs based on home-visit particularly in caring infants.

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INTRODUCTION

According to the definition of the World Health Organization, the Low Birth Weight infant (LBW) is new born infants with weights ranging from 1500-2499 g (Islami *et al.,* 2012). The most important part of these infants' life are subjected to the health of the uterine. The birth weight is the only parameter that directly influencing and relating to the health and nutrition of mother; on the other hand, another important determinant factor related to the cognitive performance of the childhood and adulthood. Many of these low birth weight infants have been exposed to the interruption or delay of the uterine growth (Gardner *et al.,* 2003). In these infants, learning problems, deficiency at speech, neurological and behavioural problems could be seen potentially (Wyk *et al*., 2012). Also, these infants showed the worst consequences in long-term. The low cognitive evolution could cause to the reduction of the Intelligence Quotient and weak neurological and mental -motor consequences among these birth-retarded infants. The evolution or completion of the big motor action is very low among these infants. The sensual, behavioural and the deficiency of attention and hyper-activity can also seen among these infants that these will efficiently influence on the future of these children at school ages (Kynø *et al*., 2012). According to studies, about 16% of these children have evolutionary retard requiring to be specified and determined for making the intervention approaches over them (Newacheck *et al.,* 1998) and about 30-35% children being specified for having this retard at first three months of life should be referred to the intervention approaches and only 13% of these children receive healthcare services at the first year of the life. For the reason, the American academy of pediatrics suggested an evolution issue for all health problems in children (McCrae *et al.,* 2012). The growth of a child is a dynamic process including gross motor, fine motor, relationship, language, cognitive and behavioural issues. Based on the health organization's

estimation, the degree of the low birth infants were reached to 17% (6% in developed countries and 21% in developing countries) in all over the world. In Iran, this degree is estimated about 10% (Karimi *et al.,* 2011).

The occurrence of the low birth weight in Eastern Azerbaijan province was taken place since 1993 to 2001 ranging from 2.3% to 3.34% that it is a very discussable case for its increase in this regard. In Marand town, the occurrence of the low weight birth is going up according to the same town medical statistic center and this degree has reached to about 5.29%. In their analysis they have determined and specified various factors regarding to the children evolutionary retard. For example, the marriage within the close relatives in a family, mother age, twin delivery and the existence of some diseases like diabetics, hypertension, pregnancy infection, taking drugs and toxins during pregnancy (Dorre *et al.,* 2011) and more important is the low birth. The neuro development is potentially seen among these infants (Balakrishnan *et al.,* 2011). Today by the progression of the technology, the rate of the mortality and morbidity of these children is considerably reduced and these infants took for short time in bed. The birth of a low weight infant not only influences on the infant's health but also it impacts the family members' spiritual issues terribly so that the parents of these infants are very worried and concerned all about the future of their infants for they are retarded in this case. Fortunately, due to the priority of the health services and therapeutical approaches, this process has been paid attention for many years by all the related officials (Davis *et al.,* 2003). One of the most important approaches regarding the children health issues was subjected to follow-up of children and by using the best health measurement tool in this regard. Home visits are a pre-determined program in order to investigate the mother and infant health case for increasing the ability of taking cares of the child and maternal issues (Peighambardoost *et al.,* 2015).

Many health cares can be started before the delivery to the end of the delivery process for all mothers. The home-visit was considered as the most essential strategy for the postpartum services in order to evaluate the relationships between mother and infant (Shaw *et al.,* 2006). During the first weeks of the life, the contact of the healthcare service should be carried out in order to specify the relationships between mother and infant and this should be also continued until the end of the lactation time successfully. In these programs, the home-visit is considered as the most advanced course for all developed countries; these programs can reduce the degree of mortality and morbidity of all infants recovering the interaction between the mother and infant in this regard. The studies carried out on the world regarding the healthcare approaches are very little unfortunately. Some of these interventions are started after releasing from the hospital and other cases can be also taken place during transformation into the hospital and the next ones are related to the end of the delivery process. For example, the infant behavioural evaluation could be considered as one of those interventions that can be directly influenced on the infant stimulation for a long time positively. Also, this could led to recover the behaviour and recognition of infants in six months (Tofail *et al.,* 2012; Robson, 1997). In the study done by Orton *et al.* (2009) the healthcare programs after release are allocated to low birth infants, mother-child interactions, the motor-cognitive evolution and social-mental skills (Shulman, 2016). The other healthcare programs include seven educational sessions for these mothers before releasing of the hospital along with four home-visit programs because of having the highest potential influence on the mother-child interactions and the low birth infants' evolution in this regard (Wang *et al.,* 2014). However there are also other studies regarding the influence of the intervention programs including the big motor actions, cognitive, behavioural and social

evolution among these low birth infants (Gaiva *et al.,* 2014). Since the home-visit program is scarcely carried out in Iran, the mortality and morbidity of these low birth infants have been strongly emphasized in this regard (Saad and Fraser, 2010); for the reason, the main purpose of the present study is to determine the influence of the home-visit on the low birth infant indices.

MATERIALS AND METHODS

The present study is a clinical re-testing type. The ethical clearance certificate of the study is 1391-5-4 -4217; obtained from the Tabriz Medical Sciences University. The related population of the low birth infants are subjected are confined to the Marand Town and its sub urban areas being born in Razi Hospital of Marand Town having 1500-2500 g weight. After the permission of the mothers, people tending to participate voluntarily in this test have been taken up the samples for this study. According to an accidental process, 45 infants have been established in the test group (home-visit) and 45 other infants were established in the observation group (receiving after-postpartum health cares from the medical centers). The number of samples are established based on the preliminary study conducted ($\beta=0.8$ and $\alpha=0.95$) that the total number has reached to 90 samples in this study. In order to determine the first one of the test or observation group, two different cases are taken up with different colours. A mother taking up a colour is established in test group and the next mother is established in another group being different with another colour. Then, the related samples are established among the groups. All mothers are given the related explanations before sampling that they will receive the necessary home-visit when they establish in one of these related groups. The intervention includes the given health cares after postpartum that it is established based on the healthcare lines during 3-5, 14-15, 21-28 and 30-40 days. Then, the

researcher of the test group carried out the prepared educational program over these low birth infants at home as the main intervention program. All these health cares are registered in the related lists. Before referring to homes, mothers are called being aware of the given healthcare programs in this case. If the mother is not at home, she will be followed-up for three days frequently. Otherwise, when the mother is reluctant for participating in the study, she will be eliminated from the rest of the test. The home-visit program (intervention) is achieved for a week (every session 30-45min) and continues for consecutive four weeks. During the sessions, all necessary notes are trained according to the related manual. The educational context is subjected to the low birth infant traits, keeping the infant's body temperature and how to control the infant and other warning signs of diseases, yellow symptoms of the infant, how to feed the infant and other problems regarding to the mother chest, cloths of the infant and the location of keeping the infant and taking bath of the infant; these are the main ways for training mothers to keep their low birth infants. In the beginning of the sessions, the former studies have been reviewed potentially. After ending up the home-visit programs, the following-up indices of the infants' evolution are carried out to the end of the three months (every month) including the completion of a questionnaire for completing all mother tasks. During the completion of the study, these mothers could make a call with the researcher for evaluating the unpredicted requirements asking their own questions in this regard. Every month, the evolution indices are registered by a trained and skillful coworker for preventing any elimination of the related mothers from the study. There were no interventions in the observation group and only the evolution indices are registered and recorded such as the test group until three months; the entrance criteria of the study are subjected to infants having 1500-2500 g weight without any "The Neonatal Intensive Care"

background and the infant should live with his or her mother; the infant should not have any disease background not being twins and the mother has to be able to read and write in this case. The exile criteria of the study included the change of address, mother or infant's disease and the reluctance of participating in the study. They applied many various tools for evaluating the evolution that one of these most suitable tools is LWII questionnaire. In many studies, the validity (91%), sensitivity (90%) and the exclusiveness of the test (81-91%) have been confirmed in this case. This test includes 19 questionnaires in 60 months to two years old being completed by parents. Every question has two conditions for selection. First, this should be easily observable and being reported by the same parents. Secondly, this question should be taken at home without following any other cultural issue. Every questionnaire includes 30 questions divided into different sections such as five communicative, gross motor actions, fine actions and social-personal behaviours. For every question, there three options were given: Yes (when the child is able to achieve a task), not yet (when the child is not able to achieve a task) and sometime (when the child has got some abilities for achieving the related task). After completing the questionnaire, the researcher compares the obtained numbers with cut-off point. The response 'Yes' is considered as 10 scores and 'Not yet' is '5' and 'No' as '0' in this study. The total score for every five cases is evaluated compared with another one and when the score of the infant is little than the defined limitation, the infant would be establish in the same evolution-evaluation restriction. This questionnaire has got a general section for obtaining all parents' comments (Mu *et al*., 2008). The data gathering tool is subjected to a list including the demographical information and LWII questionnaire (Persian version of two months) being achieved by the verbal interview after postpartum and this is completed at every three months. The LWII

Table 1. Relative and absolute distribution of the low weight infants' demographical traits among both control and observation groups

Distribution of demographical features		Observation		Control		Result of K-square test with Fischer
		Number	Percentage %	Number	Percentage %	
Age of pregnancy	31-34weeks	4	10.3	4	9.3	P=0.89
	34-37weeks	20	51.3	23	53.5	
	Higher 37weeks	15	38.5	16	37.2	
	Mean	36.67		36.72		
	deviation	1.84		1.75		
Smoking habit of the father	Yes	10	25.6	18	41.9	P=0.94
	No	29	74.4	25	58.1	
	Total	39		43	100	
Age of mother	16-24	15	38.5	25	58.1	P=0.9
	24-32	16	41.0	15	34.9	
	32-40	8	20.5	3	7.0	
	Total	39	100	43	100	
	Mean	26.67		23.88		
	Deviation	6.20		5.64		
Age of father	20-30	19	48.7	28	65.1	P=0.12
	30-40	15	38.5	14	32.6	
	40-51	5	12.8	1	2.3	
	Total	39	100	43	100	
	Mean	32.46		30.05		
	Deviation	6.89		4.67		
Mother's education	Illiterate	5	12.8	4	9.3	P=0.129
	Primary	1	2.6	5	11.6	
	Guidance school	4	10.3	12	27.9	
	Diploma	20	51.3	17	39.5	
	Higher Diploma	8	20.5	5	11.6	
	Total	39	100	43	100	
Father's education	Illiterate	1	2.6	1	2.3	P=0.17
	Primary	16	41.0	23	53.5	
	Guidance school	11	28.2	12	27.9	
	Diploma	3	7.7	1	2.3	
	Higher Diploma	7	17.9	6	14	
	Total	29	100	43	100	
Mother's job	Housewife	36	92.3	42	97.7	P=0.34
	Working	3	7.7	1	2.3	
	Total	39	100	73	100	
Father's job	Employer	10	25.6	3	4.7	P=0.50
	Free	16	41	25	58.1	
	Other	10	25.6	15	37.9	
	Unemployment	3	7.7	1	2.3	
	Total	39	100	43	100	

questionnaire is confirmed by ten professors of Tabriz medical sciences faculty. Unfortunately, No studies were carried out for confirming the reliability of the questionnaire in Iran. During the sampling process, five

Table 2. Statistical analysis of the samples for the progressive three months after birth of the infants

Group-score of the evolution fields			Intervention	Control	Result of t-independent test
Communication	1st month	Mean	42.69	41.74	P=0.79
		Deviation	14.04	18.22	
	2nd month	Mean	53.08	49.53	P=0.12
		Deviation	9.97	10.62	
	3rd month	Mean	58.46	53.95	P=0.02
		Deviation	3.99	8.35	
Gross motor	1st month	Mean	43.72	43.60	P=0.97
		Deviation	14.13	15.24	
	2nd month	Mean	52.95	50.93	P=0.37
		Deviation	9.29	10.81	
	3rd month	Mean	57.56	53.11	P=0.04
		Deviation	5.11	8.48	
Fine motor	1st month	Mean	47.82	50.58	P=0.31
		Deviation	10.62	13.33	
	2nd month	Mean	54.61	53.83	P=0.71
		Deviation	9.48	9.50	
	3rd month	Mean	57.56	56.16	P=0.35
		Deviation	7.79	5.65	
Problem solving	1st month	Mean	36.92	40.69	P=0.35
		Deviation	17.23	19.38	
	2nd month	Mean	54.48	48.95	P=0.04
		Deviation	9.37	13.99	
	3rd month	Mean	58.33	53.48	P=0.01
		Deviation	4.34	10.99	
Personal-social	1st month	Mean	45.00	45.81	P=0.79
		Deviation	12.67	14.67	
	2nd month	Mean	58.33	52.55	P<0.001
		Deviation	4.18	9.65	
	3rd month	Mean	58.97	56.27	P=0.02
		Deviation	3.66	5.98	
Total score of infant's evolution	1st month	Mean	216.153	222.44	P=0.63
		Deviation	52.13	65.25	
	2nd month	Mean	255.81	273.46	
		Deviation	40.22	35.06	
	3rd month	Mean	290.89	275.00	
		Deviation	16.85	24.08	P=0.001

samples of the test group and three cases of the observation group are ignored from the study due to the change of their location address. K-square statistical tests and U-Mann Whitney and Wilcox On tests are also applied in order to analyze the related data in this study. T-independent test is also applied in order to compare the growth indices during three months between two related groups; otherwise, the non-parametric tests such as Wilcox On are applied in this regard. SPSS Ver.13.5 is used in order to analyze the statistical data in this study and the degrees are considered significantly at P<0.05.

RESULTS

The mean weight of intervention group is ranging between 2313.08 ± 223.12 and control group is obtained between 230.84 ± 247.61. The gender of half of the research units regarding to both groups (observation 61.5%) and control (55.8%) female. The

age of pregnancy of half of the groups (observation 51.3%) and (control 53.5%) are taking place between 34 -37 weeks and the mean age of pregnancy in intervention group is 36.72±1.75 and control group 36.67 ± 1.84. T tests and K-2 tests showed that there is no significant difference between the birth weight, age of pregnancy, gender and group; for the reason, both groups are homogenous regarding to the same factors. Type of dwelling of one-third units of the study is 43.6% for control and 46.5% for the observation group living into their own personal homes. The location of one-third of the units is 89.7% for observation and 74.42% for control group; the degree of the families' income is 41.0% for the observation group and 37.2% for control group as insufficient for these related groups. The birth rates of these units are 48.7% for observation and 52.5% for the control group; the number of the family is 48.7% for observation and 52.5% for control group. The core problem observed is smoking in the observation group (74.4%) and for the control group (58.1%). The obtained results of the study from the demographical data of the under-study units showed that there observed no significant statistical difference between the personal traits and the variables of the dwelling location, age of pregnancy, gender and weight of infant, race, rate of birth, parents' education, age of mother and father, parents' job, degree of family monthly income, smoking of father and mother, addiction of parents, type of dwelling, number of family, weight, height, chest and head sizes in both control and observation groups. In other words, both groups are homogenous regarding to these features (Table 1). The results of 't' independent tests showed that there is no significant difference between the birth weight, age of pregnancy, gender and group; for the reason, both groups are homogenous regarding to the same factors. In other words, both groups are homogenous regarding to the features (Table 1). The results of t-independent test showed that the mean score

of the evolution regarding to the communication field is (p=0.79), gross and fine actions (p=0.97), problem solving (p=0.31), personal-social (p=0.35) and total score of the evolution has reached to p=0.97 in this study. The low birth infants did not show any significant difference in first month according to LWII form. The results of t-independent test showed that the mean score of the evolution regarding to the communication is p=0.12, gross and fine actions are p=0.37 that these low birth infants did not show any significant difference in the second months according to LWII form but the mean score regarding the problem-solving is p=0.04, personal-social p<0.0001 and total score of the infants evolution has reached p=0.04 in the second month based on LWII list so that the mean score of the problem-solving, personal-social fields and infants evolution regarding the communication field is higher than the observation group in the second month on compared to the control group. The results of t-independent test showed that the mean score of the evolution regarding the communication is p=0.49, gross and fine actions are p=0.04 that these low birth infants did not show any significant difference in the second months according to LWII form but the mean score regarding the problem-solving is p=0.01, personal-social is p<0.0001 and the total score of the infants evolution has reached to p=0.35 in the second month based on LWII list so that the mean score of the problem-solving, personal-social fields and infants evolution regarding the communication field are higher than the observation group in the third month on compared to the control group.

DISCUSSION

The results of t-independent statistical test showed that the mean score of the evolution regarding to the communication, gross and fine actions, problem-solving and personal-social fields of the low birth infants did not show any significant statistical difference

at the first month. In a study led by Nina *et al.* (2012), there carried out the cognitive aspects, gross motor and infants' behavioural consequences in 36 months after birth that the intervention could not influence on the above-mentioned aspects using LWII list along with other related questionnaires in this field. The researcher of the study concluded that the probability of the lack of the intervention influence regarding to the low birth infants is subjected to the following features:

- Being near to the term
- The problems of infants such as low weight
- Higher pregnancy age
- Brain hemorrhage (Kynø *et al.,* 2012)

In the present study, the weight of all births are ranging between 1500-2500 g and none of these infants had special problems in the hospital bed at the first day of the delivery.

The results of t-independent statistical test showed that the mean score of the evolution regarding to the communication, gross and fine actions, problem-solving and personal-social fields of the low birth infants did not show any significant statistical difference at the second month. However, the mean score regarding to the problem solving and personal-social fields showed significant difference. In a study led by Karimi *et al.* (2011), there carried out the low birth infants' indices and the normal weight ones using LWII questionnaire. They concluded that the low weight birth is one of the most risky factors of the evolution retard (Karimi *et al.*, 2011). In the present study, the intervention could influence on the increase of infants' evolution score positively. In the comparison of the evolution indices of the both related groups, three months after the completion of the program, the results of t-independent test showed that the mean score regarding to the fine actions did not show any significant difference but regarding to the communication, gross motor, problem solving and personal-social fields showed significant difference in

this study. Also, the mean score regarding to the fine motor actions of the observation group is higher that it is not significant statistically. In the study of Poets and Southall (1991) the supportive intervention programs were carried out after postpartum as home-visit for two to four sessions. In these visits, there have been given some information regarding to the kangaroo care, massage, taking bath the infant as written to all mothers and the intervention could also increase the mean scores of LWII in the intervention group during 24 months after postpartum (Alur *et al.*, 2000). Edraki *et al.* (2013) in a study at Iran, the home-visit processes were carried out in order to reduce the infants' hospital bed in six months after delivery. They suggested that the home-visit process should be established as one of the most crucial programs for the health plans for reducing the infants' hospital bed (Saad and Fraser, 2010). Due to the significance of the total scores of the low birth infants in the second and third months, there obtained no results regarding to reject the completion of the home-visit programs and it can be stated with 95% confidence that the completion of the home-visit programs can recover and increase the indices of the low weight infants evolution process potentially. In this study, the changes have been considered only for the completion of the home-visit process regarding to the low weight birth of infants and their evolution issues after second month of the postpartum delivery. For this reason, it is better to carry out some important approaches for increasing the importance of the healthcare issues regarding the low weight infants after the postpartum process. When some family members prevent the intervention programs, these will never have the best consequences regarding to the low weight infants making some other problems in this regard; thus, it is suggested for all family members to co-operate with the healthcare centers in order to increase the health of the low weight infants.

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