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# The effectiveness of an educational program in enhancing parents' level of knowledge about normal growth indicators in the development of children and determining the indicators which delay development in children from birth to three years old

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**The aim of this study is to investigate the effectiveness of an educational program in improving the level of knowledge of parents about natural growth indicators in the development of children and determining the indicators which delay development in children from birth to three years old. The sample of the study consisted of 60 volunteers who were randomly and equally assigned to control and experimental groups. The educational program consists of 15 sessions; each session's duration is two hours. The results of the study showed that the level of parents' knowledge of natural growth indicators for children from birth to three years is low. There were differences on the level of knowledge of parents about developmental delay indicators due to the educational program. The study recommended the need for further studies on the importance of raising the level of knowledge of parents about development risk indicators of natural growth of children.**

**Key words:** Educational program, early normal growth indicators, indicators delaying development of children.

## INTRODUCTION

Human growth is affected by a combination of genetic and environmental factors, and one or more of these factors lead to a disorder or malfunction in a child's growth and development. The disorder appears in the form of an illness or developmental delay compared to that of peers of the same age group. Growth is a systematic and integrated process consisting of successive and interrelated phases. Each stage is the result of the previous stage and the start of the next stage; it is a process that includes quantitative and qualitative changes that will last a lifetime from the moment of fertilization to the moment of death (Kafafi, 2009).

Growth is done in several connected and interrelated

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aspects: physical growth means gradual changes, weight and size increase for different body organs and appropriate motor responses. Mental growth is the improvement and growth of mental abilities and capabilities, thinking ability, problem solving and so on. Emotional growth is the development and growth of different emotions and the ability to judge emotional expressions and interpret emotional stimuli and confront different psychological conflicts. Social growth refers to the ability of the individual to acquire socially acceptable behavior, which qualifies one to interact with others; and language development is a gradual acquisition of an individual vocabulary and expressions and language structures, concepts, and increase in vocabulary to be able to communicate with others and express oneself clearly (Ajaj, 2008).

The process of identifying and measuring developmental requirements and indicators according to the age range of children has received medical, psychological and educational attention. These requirements have been divided into three categories, from birth to the beginning of the three years; from three years to the beginning of five years and from five to eight years (Kafafi, 2009).

**Problem of the study**

Family's participation in the early detection of disabilities is considered an important and effective one in recognizing children with abnormal development indicators. Hence they are referred to as the right diagnoses in order to get suitable medical and educational treatment. Parents' role, especially the mother, is clear in recognizing abnormal and deviated growth indicators through viewing and understanding the natural developmental aspects of the children in different fields: Kinetic, mental, emotional, social and linguistic.

The process of providing information to parents is very important, for its paramount effect in facilitating child's development process, and its role in reducing stress for families. In order for parents to do the expected role they need a supporting system which helps them in gaining necessary knowledge and skills to rise and educate their children effectively. That can be through information, physical, psychological and social support, which will make them feel, appreciate and care for others.

**Objectives of the study**

1). The objective of the program is to improve parents' knowledge of developmental indicators for children from birth to three years.
2). The study aims to improve parents' knowledge of developmental indicators for children by age group (from birth to 3 months), (from 4 months to 7 months) and (from 8 to 12 months) and from different, interrelated and connected aspects of growth: Mental, emotional growth, social growth, and linguistic growth.

**Hypotheses of the study**

The researcher proposed the following hypotheses:

1). The educational program is effective in improving the cognitive level of parents about normal growth indicators and indicators delaying development of children from birth to three years.
2). Parents' level of knowledge of the developmental indicators of the children from birth to three years depends upon,

(a) Educational program
(b) Gender of the parents
(c) Interaction between both genders
(d) Educational qualifications of the parents
(e) Interaction between the more qualified and the less qualified parents.
(f) Kind of educational program training offered

**LITERATURE REVIEW**

A study by Safadi et al. (2016) aimed to detect Jordanian mothers' knowledge of child rearing exercises and milestones of development, the socio-demographic relevance to knowledge variables, and the information source that guide childrearing exercises. They use a design that is cross-sectional with a modified version of MacPhee's 'Knowledge of Infant Development Inventory' to evaluate 400 mothers' knowledge of infants' childrearing and milestones of development, in Amman, Jordan. Mothers were found to be more knowledgeable in safety, physical skills and less in emotional, parent-infant interaction, and cognitive skills. Parental education, age-parity and of the pregnancy planned had limited impact on milestones of development of knowledge. Different information sources were used for observing traditional societies.

In the study of Weerden (2016), a different method-combination design was used to study the effect of parental training 'We are Parents', on approved parenting practices, such as responsiveness, stimulation and affection. Pre- plus post-test data of 31 parents with children less than 18 years were collected using a questionnaire (quantitative), and interviews (qualitative) from 10 parents after the training. The results showed that parents remarkably increased their positive parenting practices, as better outcomes were found between pre-test plus post-test data for positive and approved parenting as a whole, and each of the components of responsiveness, stimulation and affection. Interviews did

support the high outcome in positive parenting. Parents' feedback was that they had learned many things, and were able to make changes in their parenting practices, with regard to responsiveness, stimulation and affection. The recent study shows the evidence of effective programs of parenting in developing countries, and offers useful applications for more comprehensive research in the parenting field. In addition, the study shows the possibility for enhancing positive parenting in developing countries by the use of parenting programs, like 'We are Parents', for both parents.

Dukhan and Hasballah (2015) conducted a study aimed at measuring the effectiveness of a skills training program for mothers of autistic children. The study focused on helping mothers in measuring the level of communication for their children with autism. The sample consisted of (12) mothers of an autistic child from Gaza Strip in Palestine. The sample was selected based on their low scores in the non-verbal communication scale; the age and educational levels of mothers of the children were also considered. The researcher used the non-verbal communication scale of the researcher, which consists of 4 domains: (Tradition, common attention, recognition and understanding, and reference to what is desirable), a training program built on the PECS image exchange program. The study showed statistically significant differences in the mean scores between the tribal measurement and the telemetry in favor of the post measurement of the mothers of children with autism disorder. The results also showed statistically significant differences between post-measurement and follow-up and in favor of a training program.

Al – Hawarneh (2012) conducted a study entitled "Studying some of the variables associated with the delayed development of language in kindergarten children". This study aimed at identifying the variables associated with the delayed development of the language of Kindergarten children, such as: "Socioeconomic level of family, intelligence, gender, family size, fears, Gregorian order." The battery of psycho-linguistic tests of the kindergarten children was applied to 100 children, of 4-6 years. Four children were selected, the first and the second children who received the best degree in psycho-linguistic abilities, the third and fourth children, who received the lowest level of psychosocial abilities, and conducted a case study on them. The following results were obtained: The lower the cultural level of the family, the slower the development of language in the children; the lower the socio-economic level, the slower the development of language in the children; the lower the socio-economic level of the family, the slower the development of language in the children; the lower the intelligence, the slower the growth of language in children; the higher their fears, the slower the growth of language in children; the language of the children who are late in language development is characterized by brief, unspecified answers, short sentence length, low vocabulary, lack of communicative competence, and low use of names.

A study by Jarrah et al. (2012) aimed to explore the knowledge level and infants' caring practices of Jordanian mothers during and after birth period. This study used quota sampling method to illustrate the geographical regions (center, north and south) in Jordan. The sample of n= 240 mothers was chosen from the maternal and child health care centers and face-to-face interviews were taken between January and April 2009. A specially designed structured tool that contained eight infants' health problems with 39 appended items of possible caring practices was used for the data collection. Responses varied from 1 (disagree) to 3 (agree), where 3 denoted a correctly positive caring practice. The results showed that mothers had somewhat low level of knowledge (60%) and a combination of traditional and biomedical infants' caring practices. Some of the traditional (using herbs) and biomedical (using un-prescribed medicine) practices were considered harmful. Additionally, mothers were using problem solving strategies to solve infants' health problems before asking for help of doctors, mothers or mothers-in-laws. Plus there were a limited differences of infants' caring practices (n=8) in relation to mothers' unity, family income, and level of education. Results showed nurses need to understand mothers' healthcare practices of their infants' health problems and develop health education programs and policies to prevent harmful practices and increase beneficial ones.

Al-Hassan and Lansford (2011) assessed the "Better Parenting Program (BPP)", which has been conducted nationally in Jordan to improve parents' knowledge, behaviors and attitudes that are related to caring for young children. Participants consisting of N = 337, 94% female were randomly allocated to either experimental group or control group. The first group, experimental group participated in the BPP and the control group did not. All parents answered questionnaires to evaluate their knowledge in important areas of child development, discipline practices, activities with their children, and perceptions regarding behaviors that compose child neglect and abuse, before and after BPP. Gradually, experimental group participants only improved their parenting knowledge, spending more time with their children playing and reading, using more negotiating techniques during the course of disciplining their child, and correctly perceiving behaviors that compose child neglect. Results pointed out good beneficial effects of participation in the Better Parenting Program.

Al-Ayed (2010) evaluated the level of mothers' understanding on certain characteristics of child health care and if there is any relation between mothers' level of knowledge and the formal education they have. He used a questionnaire of two-parts. The 1st part contained information about mothers' age, nationality, level of education, work and number of children, besides sourcing

health information and the role of school education in the matters of child health. Second part included 40 statements of different features of child's health matters. A well-structured interview conducted with the mothers who came with their children at the clinic of pediatric outpatients of King Khalid University Hospital in Riyadh during July and August 2007 was directed by a non-medical trained research assistant using the statements and items of the questionnaire. A score on knowledge level was gathered from the number of correct answers. The highest score was 40. A 25 score was considered satisfactory. The results were that three-hundred-seventy-three questionnaires were conducted successfully. The average score of the total sample was 25 (out of 40), the least score calculated was 14, and the maximum was 36. So, 58% scored 25 or higher. Survey of individual items on the questionnaire showed high and serious gaps in the mothers' knowledge. There was no statistically important correlation found between mothers' knowledge of child health related matters and age, level of education, or number of children.

## STUDY METHODOLOGY

Semi-experimental approach was used in this study.

### Population of the study

The study community consists of all parents of children with disabilities who enrolled in the eight special education centers in ShafaBadran area, north of the capital, Amman in 2017/2018 academic year.

### Sample of the study

To determine the sample of the study, three centers of special education were selected in the random manner, and the number of parents of children with disabilities who are able to read and write was limited to 300 fathers and mothers.

In order to identify the parents who had little knowledge of developmental indicators for children in the developmental stage (birth to 3 years), the parents' knowledge scale was distributed to the sample of 300 mothers and fathers. The number of questionnaires retrieved was 240; 80% of them were from 135 mothers and 105 fathers.

### Study tools

To achieve the objectives of the study, the researcher used the following tools.

### Checklist of parents' knowledge of development indicators for children in the developmental stage (birth - 3 years)

The scale is based on the Developmental Checklists - Birth to Five of the Early Childhood Direction Center of Syracuse University in New York, USA and the scale includes 60 paragraphs. The scale was divided into five developmental stages:

From birth to 3 months: includes (12) paragraphs.
4 - 7 months: includes (12) paragraphs.
8 - 12 months: includes (12) paragraphs.
12 - 24 months: includes (12) paragraphs.
24 - 36 months: includes (12) paragraphs.

These paragraphs cover the different developmental aspects of each stage: motor growth, language development, mental development, emotional / social growth, with three paragraphs per side in each developmental stage. And the scale consists of two parts: Part 1: Includes information about the parents' age, and educational level. The second part includes the scale paragraphs of (60).

### Validity of the scale

The indicators of the validity of the scale were extracted by using the virtual truth; the scale in its preliminary form was presented to a group of 17 arbitrators from the teaching staff of the Jordanian universities and the private education employees. This was done to judge the clarity of the paragraphs and their relevance, formulation, accuracy and suitability for the purpose which they were designed for. And 80% of the agreement proportion was adopted.

### Reliability of the scale

In order to verify the stability of the scale, the researcher used the internal consistency method of the paragraphs using the Cronbach Alpha formula. The stability coefficient arrived at is 0.94. The regression method was applied to a sample of 25 parents from outside the study sample, with a time interval of two weeks, and a stability factor reached was (0.95). These values were considered suitable for the objectives of the study.

### Checklist of indicators of developmental delay in children from birth to three years

The scale is based on the Developmental Checklists (Birth to Five) of the Early Childhood Direction Center of Syracuse University in New York, USA and may be in the final form of 61. A section represents potential risk indicators according to the developmental stage of the children and in different aspects of growth: motor development, linguistic growth, mental development, emotional / social growth:

From birth to 3 months: includes 11 paragraphs.
4 - 7 months: includes 17 paragraphs.
8-12 months: includes 11 paragraphs.
12 - 24 months: includes 11 paragraphs.
24 - 36 months: includes 11 paragraphs.
Answering process takes 30 min.

The scale needs answers to be given by yes / no to each of the scale paragraphs, where (yes = 1 mark, no = 0).

### Validity of the scale

The validity of the measure was obtained by using the virtual truth, which presents the standard in its preliminary form to a group of 17 arbitrators from the faculty members of the Jordanian universities and private education workers. This was done for the purpose of judging the clarity of the paragraphs, their suitability, formulation, accuracy and suitability for the purpose for which they were designed, and (80%) of the proportion of the agreement was adopted.

**Table 1.** Program sessions.

| Program session | Procedural objectives of the session |
|---|---|
| Session 1 | (i) Identify the researcher herself and introduce participants to each other.<br>(ii) Finding the objectives and content of the program.<br>(iii) Introduce participants to the rules that will be followed during the program.<br>(iv) Identify the goals that parents hope to achieve by attending this program. |
| Session 2 | Introducing the basic concepts: growth, development, behavior, maturity, learning, Personal. |
| Session 3 | Theories of Human Development and Growth |
| Session 4 | Factors of human growth: - Genetics and biological factors - Environmental factors. |
| Session 5 | Factors of human growth: - Psychological factors - Family factors. |
| Session 6 | Factors of human growth: - Economic and technological factors - Social factors. |
| Session 7 | Characteristics and importance of developmental stage from birth to 3 years, And the early intervention. |
| Session 8 | Growth in the developmental stage from birth to 3 years: its manifestations, How to observe and measure it. |
| Session 9 | Psychological growth in the developmental stage from birth to 3 years: Manifestations and how to observe and measure. |
| Session 10 | Social growth in the developmental stage from birth to 3 years: Manifestations and how to observe and measure. |
| Session 11 | Knowledge growth in the developmental stage from birth to 3 years: Manifestations and how to observe and measure. |
| Session 12 | Linguistic growth in the developmental stage from birth to 3 years: Manifestations and how to observe and measure. |
| Session 13 | Parent's role in dealing with human development stages of all kinds. |
| Session 14 | Parent's role in dealing with human development stages of all kinds. |
| Session 15 | Introducing participants to the mother and child centers in the capital Amman And its activities. |

### Reliability of the scale

In order to verify the reliability of the scale, the researcher used the internal consistency method of the paragraphs using the Cronbach Alpha formula. The stability coefficient reached 0.93. The regression method was applied to a sample of 25 parents from outside the study sample, with a time interval of two weeks; the stability factor reached 0.96. These values were considered suitable for the objectives of the study.

### Educational program for developmental indicators for children from birth to three years

The researcher adopted theoretical literature on child development and the psychology of growth and development, as well as previous relevant studies, educational programs and early intervention programs. Target groups of the program were parents with little information about developmental indicators for children from birth to three years (Table 1). The number of sessions of the program: (15) session, the duration of each session is two hours. The researcher used the following strategies: lecture, discussion and dialogue, brainstorming, working in groups. The teaching means used were: slide projector, video display, posters, pamphlets, brochures, educational flyers.

### Program validity

The program was presented in its preliminary form to (15) arbitrators in the field of specialists of children, women and obstetrics in the Faculty of Medicine and Nursing at the University of Jordan, and in the field of special education and the field of psychology of growth and psychology in Jordanian universities. This was done to take their opinion on the appropriateness of the content of the program, methods used, the duration of the program and any amendments they consider appropriate. The amendments proposed by the arbitrators were made to finalize the program.

### Study procedures

(i) Preparation of study tools: 1. a measure of parents' knowledge of developmental indicators for children in the developmental stage (birth - 3 years). 2. Indicators of developmental delay in children in the age group (birth - 3 years), and 3. Educational program for child development indicators (from birth to three years)
(ii) Limit parents' number according to their abilities to read and write and identify their educational level by communicating with them via telephone.
(iii) Perform a pre-application of the developmental indicators scale about knowledge of children by parents (birth - 3 years). Parents whose average performance on the scale was high and medium were excluded and low-average parents were retained.

The program was applied to the experimental group at a rate of (15) sessions, and the duration of each session is an hour and a half. The total educational hours were 30. After completing the application of the program, the scale of knowledge of developmental indicators for children in the developmental stage (birth - 3 years) was re-applied to both groups: Experimental and control, and the developmental delay indicators in children in the age group (from birth to three years) on the experimental group. Questionnaires were collected, discharged and processed using the SPSS system. Mean and standard deviations were used; T test was used for independent samples, and binary variance analysis test was performed.

## HYPOTHESES VERIFICATION AND RESULTS ANALYSIS

### In relation to Hypothesis 1

The mean and standard deviations of parents' level of knowledge were calculated using developmental indicators for children in the developmental stage from

**Table 2.** Parents' level of knowledge about developmental indicators of the children.

| Parents knowledge level | Arithmetic mean | Standard deviation | Rank | Arithmetic mean level |
|---|---|---|---|---|
| 1-3 Months | 1.95 | 0.71 | 5 | Low |
| 4-7 Months | 2.11 | 0.60 | 4 | Low |
| 8-12 months | 2.29 | 0.68 | 3 | Low |
| 12-24 months | 2.33 | 0.70 | 2 | Low |
| 24-36 months | 2.40 | 0.73 | 1 | Low |
| Mean of All stages | 2.22 | 0.66 | - | Low |

**Table 3.** Level of parental knowledge of normal growth indicators according to the performance in the post-test.

| Group | Mean | Standard deviation |
|---|---|---|
| Experimental | 3.64 | 0.79 |
| Control | 2.95 | 0.30 |

birth to three years (Table 2).

Table 2 shows that the total arithmetic mean of parents' level of developmental indicators was 2.22, with a standard deviation of 0.66; it indicates that parents' knowledge of developmental indicators is low.The parents' knowledge of the developmental indicators in the developmental stage (24 - 36 months) was better with first rank and an arithmetic mean of 2.40 and a standard deviation of 0.73. While the parents' knowledge of developmental indicators in the developmental stage (1 - 3 months) was low and came in fifth place with a mean of 1.95 and a standard deviation of 0.71. This low result can be explained by the lack of awareness and education of parents about the natural aspects of child development. This may be due to the lack of awareness and education services provided by health centers, hospitals, media, lack of experience of parents and training to observe development aspects.

The lack of knowledge among parents is particularly evident in the early developmental stages of the child; this may be due to the child's small age, the rapid growth and the difficulty in observing the developmental aspects by parents, where most parents tend to explain any imbalance or difference in growth that the child is still growing and developing. Comparing the means of Table 2 with the details of program sessions, it can be found that the results indicate that parents have a lack of knowledge of all aspects of growth: physical, mental, emotional, social and linguistic.

**In relation to Hypothesis *2(a)***

The arithmetical means and standard deviations of the parents' performance were calculated on the level of knowledge of the natural growth indicators in the post-test (Table 3). Table 3 shows that there are differences in the arithmetic means between the experimental and control groups on the knowledge scale of the indicators of normal growth in the post-test where experimental group ranked better with arithmetic mean of 3.64. The educational program includes experiences and activities that affected the parents. The activities match the parents' abilities. Parents' seriousness, follow-up, and desire to attend educational sessions continuously provide feedback on their understanding and acquisition of the required information.

**In relation to Hypothesis *2(b)***

Table 4 shows that there are differences in the arithmetic mean which neatly show the gender-wise differences in the level of knowledge of the normal growth indicators in the development of children. For females, the post test mean was 3.25 and for males, the post- test mean was 2.88.

**In relation to Hypothesis *2(c)***

Table 5 shows that there are differences in arithmetic means for both males and females in the level of knowledge of normal growth indicators in post-test due to exposure to the educational program. Both fathers and mothers have benefited equally from the program, because the program sessions were designed to suit the abilities and needs of both parents and were presented in a simplified manner suitable to their abilities and experiences. They were provided with basic and necessary information in an equal manner, and the activities and dialogues were provided in a participatory

**Table 4.** Level of knowledge of the parents about the indicators of normal growth of the children, gender wise.

| Variable | Variable category | Arithmetical mean | Standard deviation |
|---|---|---|---|
| Gender | Male | 2.88 | 0.69 |
| | Female | 3.25 | 0.60 |

**Table 5.** Level of knowledge of the parents about the normal growth indicators in children due to the interaction of gender and group variables.

| Group | Variable category | Arithmetic mean | Standard deviation |
|---|---|---|---|
| Pre-program | Male | 2.84 | 0.61 |
| | Female | 3.03 | 0.62 |
| Post-program | Male | 3.25 | 0.58 |
| | Female | 3.31 | 0.60 |

**Table 6.** The results of Scheffe test for post-comparisons of parents' level of knowledge of the normal growth indicators according to academic qualification of the parents.

| Academic qualification categories | Arithmetic mean | High school or below | Diploma | Bachelor and above |
|---|---|---|---|---|
| High school or below | 2.90 | - | 0.48* | 0.61* |
| Diploma | 3.33 | - | - | 0.18 |
| Bachelor and above | 3.46 | - | - | - |

manner between parents and with the necessary brochures and pamphlets.

**In relation to Hypothesis *2(d)***

Table 6 shows that there are differences among the arithmetic means between the academic qualification categories for the higher category (Bachelor's degree and above) with arithmetic mean of 3.46, followed by the Community College Diploma (3.33), the general secondary category or below, where the mean was 2.90. This result can be explained by the fact that parents with higher academic qualifications are more aware of and follow information related to normal growth indicators, and may be exposed to some courses directly and indirectly related to the aspects of normal growth during their university studies. They are also aware of the importance of learning and its impact on life, and their sense of the path towards limited education and educating others the aspects of normal growth and developmental risk indicators in the developmental phase from birth to three years. They were also the most interactive with the educational sessions and the activities that took place, as well as in participating in the dialogue and teamwork, which contributed in improving their level of knowledge more than other educational groups.

**In relation to Hypothesis *2(e)***

Table 7 shows that there are differences in the arithmetic means according to academic qualification category in the level of knowledge of the normal growth indicators in the post-test due to exposure to the educational program. To detect these differences statistically, ANCOVA was used. Table 8 indicates that there are no statistically significant differences in the interaction between categories with academic qualification and the group in the level of knowledge of normal growth indicators. This is due to the decrease in the F value calculated from the table value at the level of significance (0.05), where it reached (f=2.76) at the level of significance (0.20). This result is due to the program which provided information that the parents needed, regardless of their level of education, although higher levels were better than lower levels.

**In relation to Hypothesis 2(f)**

Arithmetical means and standard deviations of parental performance were calculated in the experimental and control group on the developmental delay indicators in the age group (from birth to three years) (Table 9). Table 9 indicates that there are no statistically significant

**Table 7.** Level of knowledge of the parents with academic qualification categories and group variables about the normal growth indicators in the Development of children.

| Variable | Variable category | Arithmetic mean | Standard deviation |
|---|---|---|---|
| Academic qualification | High school or below | 2.90 | 0.79 |
| | Diploma | 3.33 | 0.70 |
| | Bachelor and higher | 3.46 | 0.68 |
| The group variable | Pre-program | 2.87 | 0.63 |
| | Post-program | 3.88 | 0.59 |

**Table 8.** Covariation analysis of the interaction between categories of the academic qualifications and the group in the level of knowledge of the normal growth indicators.

| Variance source | Freedom degree | Total squares | Squares mean | F-Value | Level of significance |
|---|---|---|---|---|---|
| Prior group | 1 | 1.04 | 1.04 | 0.10 | 0.80 |
| Academic qualification | 2 | 7.13 | 3.57 | *5.22 | 0.00 |
| The group | 1 | 11.20 | 11.20 | *5.55 | 0.00 |
| Gender × the group | 2 | 3.90 | 1.95 | 2.76 | 0.20 |
| Error | 55 | 43.50 | 0.79 | | |
| Total | 59 | 66.77 | | | |

*Statistical significance at significance level of (α≤0.05).

**Table 9.** Parents' performance on developmental delay indicators scale of knowledge to the age group (birth to three years) in the pre and post-test.

| Test | The group | Number | Arithmetic mean | Standard deviation |
|---|---|---|---|---|
| Pre | Experimental | 30 | 2.57 | 3.20 |
| | Control | 30 | 2.73 | 4.40 |
| | Total | 60 | 2.65 | 3.26 |
| Post | Experimental | 30 | 5.33 | 4.22 |
| | Control | 30 | 2.97 | 2.62 |
| | Total | 60 | 4.15 | 3.10 |

differences in the pre-test for parents of Control and Experimental groups in the level of knowledge about the developmental delay indicators in children in the age group (from birth to three years). There are statistically significant differences in post-test in favour of the experimental group which has been through the educational program. To determine whether these apparent differences between the experimental and control groups were statistically significant, the co-variation analysis was performed as shown in Table 10.

Table 10 shows statistically significant differences between the experimental and control groups of parents in the level of knowledge of developmental delay indicators in the age group (from birth to three years) in the post-test and for the benefit of the experimental group. This indicates that increasing parents' knowledge of the natural growth indicators in the age group (from birth to three years) will increase their ability to identify indicators of developmental delay in their children in the same age group. The researcher attributed this result to the effectiveness of the educational program in providing parents with the necessary information and training and the methods to determine the risk indicators of their children. The educational program also provided an opportunity for parents to discuss their ideas and beliefs about natural growth, and eliminate some of the traditional habits and ideas about child development, and how to deal with any differences or variances in child-growth; it also contributed in enhancing parents' ability of early detection and referral process in the event of

**Table 10.** Co-variation analysis to indicate the differences between the experimental and control groups in the level of knowledge about the developmental delay indicators in children of the age group (from birth to three years).

| Variance source | Freedom degree | Sum of squares | Mean of squares | F value | Significance level |
|---|---|---|---|---|---|
| Pre | 1 | 0.72 | 0.72 | 0.43 | 0.75 |
| The group | 1 | 5.41 | 5.41 | 6.02* | 0.00 |
| Error | 57 | 58.08 | 1.02 | | |
| Total | 59 | 64.21 | | | |

*Statistical significance at significance level of (α≤0.05).

suspicion of a developmental problem in their children, because parents have an effective role in detection and prevention and early intervention.

## DISCUSSION

Safadi et al. (2016) found that mothers were more knowledgeable in safety, physical skills and less in emotional, parent-infant interaction, and cognitive skills. Parental education, age-parity and planned pregnancy had limited impact on milestones of development of knowledge. But the findings of the hypothesis 2(e) of this study show that there are differences in the arithmetic means according to academic qualification category in the level of knowledge of the normal growth indicators in the post-test due to exposure to the educational program.

The results of the study of Weerden showed that parents remarkably increased their positive parenting practices, as better outcomes were found between pre-test plus post-test data for positive and approved parenting as a whole. In the present study, the educational program includes experiences and activities that affected the parents. The activities match the parents' abilities. Parents' seriousness, follow-up, and desire to attend educational sessions continuously provide feedback on their understanding and acquisition of the required information. The mean performance of the experimental group of parents who underwent an educational program was significantly higher than that of the control group.

## RECOMMENDATIONS

It is suggested to conduct more studies of preventive educational nature to prevent the risk of various disabilities by raising parents' awareness of natural growth and development risk indicators in other age groups. Further studies are needed on the important role of mother and child centers and the role of nursing colleges through community health nursing in raising the level of knowledge of parents about natural growth and developmental risk indicators.

## Conclusion

There are differences in the level of knowledge of parents about developmental delay indicators due to the educational program. But the program has to be well planned and conducted.

## CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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