Abstract

Background: The initial years of life, particularly the first two years, are considered the most important for brain development and timely interventions profoundly affect the health of the child and families.

Aims: This study aimed to determine the effect of maternal health education on motor, social and cognitive development in infants less than two years old, and to identify the factors that could affect normal development.

Methods: Two hundred and ten mothers and their infants (109 interventions, 101 controls) were recruited from maternal and child health centres in Assiut Governorate, Egypt, in 2017. The maternal training programme has been taught to mothers of infants in intervention groups twice per month and up to five months’ duration; however, routine services are provided to control groups only. Bivariate and multivariable analyses were performed to identify the most important predictors of normal development.

Results: There were significant improvements in early childhood developmental domains for the intervention groups after five months comparable to the base line assessment. Percent of normal development among intervention groups in communication subscale increased from 46.8% to 76% to 97.9% compared to 50.5% to 46.8% to 57.4% in the control groups (baseline, after two month and after five months assessment respectively). The intervention was a significant predictor in normal development.
Conclusions: There was an improvement in early childhood developmental domains for the intervention groups after applying maternal training programme. Designing educational interventions for routine health care services that reach all children will provide mothers with the opportunity for improvement in early childhood developmental.

Keywords: early childhood development; maternal training; intervention; ASQ-3, Egypt

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Introduction

Child development is defined as those aspects of growth that involve physical, mental, emotional and social changes (1). Developmental delay is a condition in which the child is not developing and/or does not reach skills in accordance with the sequence of predetermined stages (2). Approximately 5–15% of all children in the general population show developmental disorders (3) and are classified into different categories (gross motor, fine motor, social skill, speech and mental skill) (4). A study undertaken in the United States of America reported that nearly one in six children had developmental delays (5). Systematic reviews of the scientific literature demonstrate effectiveness of early childhood development programmes in preventing developmental delay (6).

Following the emphasis on home environment and the importance of the role of parents in educating children using toys appropriate to their age, Nagar and Sharma (2009) found that
there was a statistically significant relationship between developmental age and psychomotor development concerning home environment (7). In an intervention on the importance of the role of playing in improving developmental skills in infants between 13 and 17 months of age, a significant relationship was revealed in improving mental and motor developmental skills in the intervention group rather than in the control group (8). Increasing detection of developmental disorders at an earlier age through intervention services are cost effective and improve the developmental prognosis, resulting in short and long-term benefits (9). Currently, there is little awareness about the problem of delayed development and there is no strategy to improve development of disadvantaged children or how to provide mothers with relevant skills in early childhood developmental. This study assessed the impact of early childhood developmental support services on caregivers (mothers) with regard to motor, social and cognitive development of children and to identify those factors that could affect normal child development.

**Methods**

**Study design and setting**

A pre-test / post-test control group study was conducted in Assiut Governorate, Egypt at two urban and two rural maternal and child health centres. Data were collected from July 2016 to March 2017.

**Sampling technique**

The sites were chosen based on data and approvals from the Ministry of Health, since these sites have sufficient numbers of patients, availability of well-trained nursing staff, equipped for the conduct of health education classes, proper assessment of growth and development, and practical distance from Assiut University. Mothers and their children were recruited from immunization clinics of urban and rural maternal and child health centres (two urban and two rural), randomly assigned into intervention and control groups, and excluding children with congenital and neurological diseases.

**Sample size**

Two hundred and ten participants were interviewed at the baseline survey (109 interventions, 101 controls); 190 (90.5%) successfully completed the study after two months (96 interventions, 94 controls), and 188 (89.5%) successfully completed the study after four months (94 intervention, 94 control). Twenty-two (10.5%) women dropped out during the study period after baseline assessment due to refusal to complete to the end line assessment, especially those in urban settings and those travelling outside their countries. Rural areas had lower dropout rate because rural outreach workers (Raedat Rifiyat) had communication with most mothers and therefore reminded them before each class.

**Study design**
Data were collected using two questionnaires (one for the mothers and the other for children). For mothers the questionnaire was semi-structured and administered through personal interview. Information collected included:

Background information of the child and mother (age of the mother, marital status, education, occupation, father’s age, education, occupation, child age, sex and birth weight).

Evidence of maternal social support (help from husband, as well from immediate family and others).

Pattern of breast feeding, time of start breast feeding, exclusive breast feeding, and foods given to the baby after six months.

Child morbidity and exposure to any health problems in the previous two months.

Children were interviewed using the Ages and Stages Questionnaires, 3rd edition ASQ-3. ASQ-3, which is a screening tool that assesses a child’s development from 2 to 60 months of age; it evaluates five domains of development:

1. Communication: this refers to a child’s language, listening and comprehension skills.
2. Gross motor: this refers to a child’s use and coordination of arm and legs.
3. Fine motor: this refers to a child’s movements and coordination of hands and fingers.
4. Problem solving: this refers to a child’s problem-solving, learning and play skills.
5. Personal–social: this refers to a child’s self-learning skills and interaction skills with others.

Each domain has a set of six items and parents rate the most appropriate answer for each skill: “Yes,” “Sometimes,” “Not yet,” with point values of 10, 5, or 0, respectively. The total score for each skill is obtained by adding the scores of the six items and comparing with the cut-off points, which vary for all skills and ages (3). The ASQ-3 English version was translated into Arabic and back translated to ensure accuracy. For each domain results are reported as “normal” or “suspect developmental delay”, indicating that a particular milestone attainment was not evident and further evaluation is recommended.
Cut-off points for each subscale are provided to indicate whether the score falls within a normal developmental range based on chronological age, or if it represents “at risk” or delayed development. ASQ-3 has established reliability and validity for practical use in a written questionnaire and has widespread use in clinical and research settings (10,11); Cronbach’s alpha for total score was 0.86.

Children in intervention groups were entered into maternal health education programmes; routine services were provided to control groups only.

**Description of intervention**

The period of intervention was five months and was delivered by the researchers and assisted by two trained nurses. Approximately 10–15 mothers and their children were present per class, creating 3 groups in each intervention site. The groups were classified according to child age (2 –