Effect of Parents' Involvement Interventions in Speech Language Delay among Late Talking Toddlers in Egypt: A Quasi-Experimental Study

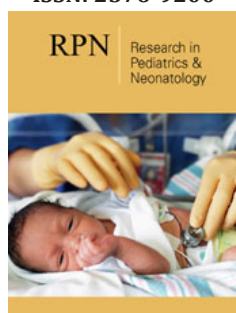Farrag S[1,2]*, Afolabi MO[3] and Rehab Abd El-Aziz El Sayed[4]

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Abstract

Background: Speech language delay is a common developmental problem among Egyptian children. There is paucity of reliable data on parent involvement interventions in speech language problems and of communication disorders in Egypt.

Objective: We evaluated the effect of parent involvement in language development intervention programmes on a population of late talking toddlers recruited from local kindergarten schools in Alexandria, Egypt, using interaction-promoting strategies which encourage children to take turns in a conversation, ask questions and wait for a response.

Methods: Seventy-nine mother-child pairs were randomly assigned into an experimental group where a validated Language Development Survey (LDS) was administered while study mothers assigned to control arm had routine care according to kindergartens policy in Egypt. Pre-and post-intervention assessments were conducted on all domains of the tool.

Results: Approximately one third (30.9%) of the study children in the experimental group had severe language delay pre-intervention and this decreased to 16.2% of children post-intervention. On the other hand, less than one quarter (18.2%) of the study children in the control group had severe language delay pre-intervention, this increased to about half (54.5%) of children post-intervention (p=<0.043).This showed that significant expressive language gains can be made by pre-school language-delayed children, through group parental-based language intervention.

Conclusion: Findings of this study suggest that parent involvement had positive outcomes in terms of language development in their late-talking toddlers. The study supports the concept of parent involvement as a viable model of language intervention for promoting short-term developmental progress in late-talking toddlers.

Keywords: Speech Therapy; Paediatric; Nursing; Parent Involvement; Language Delay

Introduction

Talking is one of the most important visible developmental achievements of early childhood [1]. Given that ability to make intelligible speech and language is an important correlate of child's overall development and intellect, the diagnosis of speech delay is made when a child does not achieve this developmental milestone at the expected age [2,3]. Globally, the prevalence of speech and language delay in children ranges from 5-15% [4]. In the United States and Canada, 8-12% of pre-school and 12% of school-age children experienced speech delay [5]. In Egypt and many countries in the Gulf regions; paucity of data exists on the burden of this important early childhood disorder. Nevertheless, empirical evidence showed that the quality of language learning during these early years of life does not only impact significantly on the development of oral language skills, but also on later success in literacy [6,7]. Language problems may result from mental retardation, physical handicaps, hearing loss, neurological problems, or environmental deprivations [7]. It has serious sequelae that may persist into adulthood in terms of educational, social, and emotional development [8]. When children fail to develop normal speech at appropriate time, it is therefore not surprising that they develop

psychosocial, emotional problems, beside the learning disabilities that might arise at later stages.

Communication development in the early years is closely linked with and dependent upon the input and stimulation received from parents and primary caregivers. When interactions between a parent/caregiver and a child are deranged, this places the child at risk for a communication disorder [9]. Hence, parents and caregivers play an important role in the early identification of language disorders. Parents and care-givers of children experiencing language delay are more likely to be reluctant in seeking medical advice at early age [10]. Four language teaching strategies have been identified by experts to improve children's language abilities. These are: pre-linguistic milieu teaching, which helps children make the transition from pre-intentional to intentional communication; milieu teaching which consists of specific techniques embedded within a child's ongoing activities and interactions; responsive interaction which involves teaching caregivers to be highly responsive to the child's communication attempts; and direct teaching characterized by prompting, reinforcing and giving immediate feedback on grammar or vocabulary within highly structured sessions [11]. Early parent involvement programmes have proved effective and have positive impact on children's language outcome [11]. Reliable data on parent involvement interventions in speech language problems and of communication disorders such as Delayed Language Development (DLD) are currently unknown in Egypt [12]. This study was designed to evaluate the effect of parent involvement in language development intervention programmes on a population of late talking toddlers whose families could not afford specialized consultations in private clinics, and where these services were not available in public hospitals in Egypt. We hypothesized that implementation of language training intervention would improve the children's language development.

Methods

Research design

This was a quasi-experimental study adopting a pre/post-test intervention design to evaluate speech intervention programmes among late talking toddlers recruited from six private local kindergarten schools in Alexandria city of Egypt.79 mother-child pairs were enrolled into the study and followed up over a six-week period. The study participants were randomly assigned into two groups: experimental group and control group. The experimental group enrolled 68 mothers of children with language delay who were exposed to the interventions, and the control group consisted of 11 mothers and children with language delay who were exposed to routine care according to the national policy on kindergartens education in Egypt [13,14].

Planned imbalances

Researchers intentionally recruited a greater number of participants in the experimental group than in the control group. The allocation of participants to intervention was predetermined rather than manipulated by the researchers. Reasons for the imbalance include inaccessibility to specialist care, financial cost of care and a relative lack of interest by parents of affected children:

- Accessibility problems
- Financial cost
- A relative lack of interest

Study population

The study children were selected randomly from various kindergarten schools operating in two municipal areas of AlMontaza District of Alexandria Governorate, northern Egypt. With a population of approximately 1.2 million people, AlMontaza district is the largest district of the governorate [15]. Public education system in Egypt consists of three levels: the basic education stage for 4-14 years old: kindergarten for two years followed by primary school for six years and preparatory school (ISCED Level 2) for three years. The Ministry of Education is responsible for making decisions about the education system with the support of three centers: the National Center of Curricula Development, the National Center for Education Research, and the National Center for Examinations and Educational Evaluation. Each center has its own focus in formulating education policies with other state level committees [14].

Study questionnaire

A semi-structured, pre-tested questionnaire was adapted by the researchers from Language Development Survey (LDS) [11,16]. LDS was a vocabulary checklist designed as a screening tool for the identification of language delay in toddler age children. The LDS consists of a one-page vocabulary checklist of about 309 words, and a question asking about combining two or more words into phrases. If a 2-year-old child has fewer than 50 words or no word combinations; the child is considered to have a language delay. This tool was translated to Arabic language by the first author (SF) who is a native speaker of Arabic language. The translated version was back-translated to English language to confirm that the original meaning of the contents of the document was retained.

The LDS formed the main instrument used during data collection and this checklist was used for first time in Egypt. The 309 different words included in the LDS are arranged in 14 semantic categories (191nominals and 118 non-nominals). The categories are 'food'(32 words), 'outdoors' (11 words), 'toys' (11 words),'animals' (21 words),'body parts' (21 words), 'places' (8 words), 'household'(31 words), 'personal' (14 words), 'people' (15 words), 'clothes' (17 words),'vehicles' (10 words), 'actions' (56 words), 'modifiers' (31 words) and 'other' (32 words). All words within these categories can be classified into five categories as nouns, people word, adjectives and modifiers, actions and closed-class words [17]. The LDS total scores of all words were calculated and classified according to language improvement into three categories: mild language delay, moderate language delay, and severe language delay. Two sections were added to complement the LDS questionnaire: the first section focused on the socio-demographic characteristics of care-giver/ parent including age, highest level of education attained, marital status of parent/caregiver, occupation, family history of language delay and socioeconomic status (total annual income) that was assessed by using a combination of socioeconomic status scales [18-

20]. The second section focused on the demographic characteristics of the study child which consisted of age, gender, birth order, number of siblings in the family and history of ear infections.

Validity and Reliability of Adapted LDS

Given that this was the first time LDS would be used in Egypt, face and content validity was conducted for the tool to assess its appearance regarding readability, clarity of words used, consistency of style and likelihood of the target study participants being able to answer the questions satisfactorily. The adapted LDS was reviewed by a panel of five experts who had experience in instrument validation, drawn from the pediatric nursing (Nursing Practices) department of Umm Al-Qura University, Makkah, Kingdom of Saudi Arabia. The experts confirmed the relevance and appropriateness of the adapted LDS to Arabian context. They also agreed unanimously that essential elements of speech language delay were addressed adequately in the tool.

Pilot study

A pilot study was carried out amongst a sub-set of the sample population. This represented 10% of the study sample (n=7 mothers and 7 children) to test the applicability, feasibility, clarity and time needed to complete the study tool. Findings from the pilot study were used to modify the adapted LDS. The mother-child pairs enrolled in the pilot study were excluded from the main study. Eligible parents and children who met the following criteria were included in the main study: parents of children aged between 18 and 30 months; children aged 18 and 30 months with normal non-verbal IQs (according to their medical records); children with no sensory, motor or social-emotional problems; children who had little or no expressive language, defined as having a vocabulary of 30 single words or less; children who have not been diagnosed with a general developmental delay; children who did not have any past history of otitis media; and children who had not received previous speech / language therapy.

Data collection for this study was undertaken from April to May 2019. After the study purpose and procedures have been explained to the study mothers, each mother and child provided verbal consent that they voluntarily agreed to participate in the study along with their children. The study mothers were subsequently invited to attend an initial assessment and interview. With the support of a trained research assistant, each study mother was requested to mark on the list of words in the adapted LDS which her child said spontaneously, indicate if the child had language delay. Also, if the child used phrases and sentences, the study mother wrote down five of the child's best phrases, and completed the question items on parent and child's socio-demographic characteristics.

Intervention Group: Parental Training Procedures

The study mothers who were randomly assigned to the intervention arm attended group speech and language therapy training sessions twice a week, over a six weeks' period. Twelve sessions were held in total, with each session lasting about 45-60 minutes. In each session, specific language objectives were set for the mothers to work on at home. The mothers were asked to use daily routines with their children. Flexibility in approach to each language objective was encouraged during the sessions through the use of small group work. The main aim for the six weeks' period of the group sessions was to increase the child's linguistic ability from a single word level to the level of producing three-to-four word utterances. The study mothers were taught about language therapy application so that they could carry out the procedure and follow-up at home. Intervention effects were reported by nursery school nurses and the study mothers for a broad range of language measures, including vocabulary acquisition, development of multiword sentences, and speech sound development.

Control group

Study mothers assigned to control arm had routine care according to kindergartens policy in Egypt [13,14]. This consisted of a set of educational activities aimed at achieving the comprehensive development of the children and preparing them for school [14].

Ethical considerations

Ethical approval for this study was obtained from the Vice-Deanship of Postgraduate Studies and Scientific Research, Faculty of Nursing, Umm Al-Qura University. Written permission to conduct this study was also obtained from AlMontaza Education authorities, Alexandria. Given the low risk involved in this study, verbal consent was obtained from the study mothers after informing them about the purpose and procedures of the study. Voluntary participation, confidentiality, anonymity and rights to withdraw from the study at any time were explained to each mother before starting data collection.

Data analysis

Data were analysed using Statistical Package for the Social Sciences (SPSS) version 21.0 (ed. Chicago: SPSS Incorporation. 2016). Descriptive and inferential statistics were performed. Continuous variables were summarized and presented using the mean (±SD) for normally distributed variables. Categorical variables such as sex, age category, socio-economic status were summarized and presented using proportions and percentages, as applicable. The differences between mean (±SD) of continuous variables were compared using independent Student t-test or Analysis of variance (ANOVA). The differences between proportions and percentages of categorical variables were compared using the Pearson's chi-squared ($\chi2$) test. The first step in the analysis was to divide the study children in each sample into six vocabulary size classes (<50 words, 50-99 words, 100-149 words, 150-199 words, 200-249 words and 250 words or more). Next, the words on the validated LDS were re-grouped into five basic word class categories (common nouns, people words, verbs, adjectives and closed-class words), drawing on definitions suggested by Bates E, et al. [21]. Comparison between the control and the experimental group's findings was done to evaluate the effect of parent-involvement in language intervention/speech therapy program on a sample of late talking toddlers. Statistical significance was established when probability value (p) was less than 0.05.

Results

Table 1: Parents' characteristics.

	Experimental (n= 68)		Control (n=11)		Chi Square Test	
	N	%	N	%	X_2	P
Age						
<20 years	8	11.8	2	18.2		
20-40 years	43	63.2	7	63.6		
>40 years	17	25	2	18.2	0.491	0.782
Educational level						
Illiterate	3	4.4	0	0		
Basic	36	52.9	7	63.6		
Higher	29	42.6	4	36.4	0.774	0.679
Marital Status						
Married	53	77.9	10	90.9		
Divorced	8	11.8	1	9.1		
Widowed	7	10.3	0	0	1.391	0.499
Child's care giver						
Biological mother	56	82.4	10	90.9		
Family member	12	17.6	1	9.1	0.504	0.478
Occupation						
Unemployed	45	66.2	7	63.6		
Manual jobs	12	17.6	3	27.3		
Professional jobs	11	16.2	1	9.1	0.784	0.676
Family history of language delay	19	27.9	5	45.5	1.373	0.241
Annual Income						
Good	11	16.2	3	27.3		
Average	48	70.6	5	45.5		
Low	9	13.2	3	27.3	2.778	0.249
Parent attended group speech and language therapy training sessions						
12 sessions	32	47.1	-	-		
8 - 11 sessions	28	41.2	-	-		
4 - 8 sessions	8	11.8	-	-	-	-

The study children were classified into three phases of expressive language acquisition according to child age (22): first words for children at age of 12-<19 months; word combinations for children at age of 19-<30 months; sentences for children at age of 30-<48 months. The socio-demographic characteristics of the study parents were illustrated in Table 1. Less than two thirds of the mothers (63.2%) in the experimental group were in the age group (20-40 years). More than half of the mothers (52.9%) had basic educational level, and more than three quarter (77.9%) of mothers in experimental group were currently married. In addition, majority of the mothers (82.4%) were the biological mothers of the study children. Approximately two thirds of mothers (66.2%) were unemployed. Also, 70.6% of study mothers in the experimental group had an average annual income, according to the national socioeconomic status scale [20]. More than one quarter (27.9%) of the study mothers in the experimental group had family history of language delay. Approximately half (47.1%) of the mothers attended group speech/language therapy training sessions.

Table 2: Child's characteristics.

	Experimental (n= 68)		Control (n=11)		Chi Square Test	
	N	%	N	%	X_2	p
Age (months)						
12 -<19	10	14.7	2	18.2		
19 - <30	54	79.4	7	63.6		
30 - <48	4	5.9	2	18.2	2.266	0.322

Sex						
Girl	20	29.4	6	54.5		
Boy	48	70.6	5	45.5	2.709	0.1
Birth order						
1st	27	39.7	3	27.3		
2nd-4th	31	45.6	6	54.5		
More than 4th	10	14.7	2	18.2	0.623	0.732
History of ear infection	29	42.6	2	18.2	2.377	0.123
Number of siblings*						
1-3	27	65.9	5	62.5		
4-5	14	34.1	3	37.5	0.033	0.855

*n=41 for experimental group; n=8 for the control group.

The demographic characteristics of the study children were illustrated in Table 2. Of the 78 children enrolled into this study, 53 (67.9%) were boys. More than three quarter of the study children (79.4%) in the experimental group were within the age group of 19-<30 months. Regarding to birth order, approximately half (45.6%) of the children were in range of 2nd-4th birth order and about two thirds (65.9%) of them had 1-3 siblings. Less than half of children (42.6%) in the experimental group had history of ear infection. The mean values of each word category relative to all types of vocabulary expression categories in experimental and control groups pre and post-intervention, (according to the study mothers' reports),were illustrated in Table 3a. Post-intervention, the mean value (SD) of 'nouns' was (39.9±7.8 & 32.7±6.3) in the experimental and control groups, respectively (p= 0.005). Similarly, the mean of 'people words' were (4.4±1.2 & 4.1±1.1) respectively in the intervention and control groups, post-intervention (p= 0.402). The mean value for 'action category' was (4.1±0.9 & 3.1±1.3) respectively in the intervention and control groups post intervention (p<0.003). The mean values of 'closed-class' words were (5.0±1.2 & 4.0±0.6) in intervention and control groups, respectively (p<0.007).

Table 3a: Comparing Experimental and Control Groups regarding vocabulary expression categories according to mothers' report.

	Experimental (n= 68) Mean ±SD	Control (n=11) Mean ±SD	Student`s t Test	
			T	P-value
Nouns				
Pre	18.3 ±4.4	16.6 ±3.9	1.138	0.259
Post	39.9 ±7.8	32.7 ±6.3	2.902	*0.005
People words				
Pre	2.2 ±0.7	2.1 ±0.4	0.176	0.861
Post	4.4 ±1.2	4.1 ±1.1	0.843	0.402
Adjectives and modifiers				
Pre	1.3 ±0.7	1.5 ±0.5	1.303	0.196
Post	2.7 ±1.2	2.8 ±0.9	0.412	0.681
Actions				
Pre	1.8 ±0.5	1.6 ±0.9	0.983	0.329
Post	4.1 ±0.9	3.1 ±1.3	3.042	*0.003
Closed-class words				
Pre	2.4 ±0.7	2.1 ±0.3	1.52	0.133
Post	5.0 ±1.2	4.0 ±0.6	2.756	*0.007

according to mothers' report.

*statistically significant (p= <0.05).

Table 3b: Comparing Experimental and Control Groups regarding vocabulary expression categories according to nurses' report.

	Experimental (n= 68) Mean ±SD	Control (n=11) Mean ±SD	Student's t test	
			T	P-value
Nouns				
Pre	17.8 ±4.3	16.3 ±3.7	1.092	0.278
Post	38.7 ±7.6	32.1 ±6.1	2.736	*0.008

People words				
Pre	2.18 ±0.69	2.09 ±0.40	0.42	0.676
Post	4.31 ±1.19	4.06 ±1.09	0.653	0.516
Adjectives and modifiers				
Pre	1.27 ±0.69	1.47 ±0.49	0.922	0.359
Post	2.65 ±1.18	2.76 ±0.88	0.537	0.593
Actions				
Pre	1.75 ±0.49	1.56 ±0.89	1.047	0.298
Post	3.98 ±0.87	3.19 ±1.29	2.599	*0.011
Closed-class words				
Pre	2.30 ±0.67	2.04 ±0.33	1.258	0.212
Post	4.8 ±1.19	3.96 ±0.59	2.287	*0.025

according to nurses' report.

*statistically significant (p= <0.05).

Table 4a: Expressive language development for children regarding their age, according to mothers' report.

	Experimental Mean ±SD	Control Mean ±SD	T test	
			T	**P-value**
First words total score for children at age of 12 –<19 months				
Pre	22.1 ±5.2	20.5 ±0.7	0.419	0.684
Post	44.2 ±8.1	39.5 ±0.7	0.794	0.446
Word combinations for children at age of 19 –<30 months				
Pre	1.26 ±0.44	1.29 ±0.49	0.147	0.883
Post	1.93 ±0.26	1.57 ±0.54	2.912	*0.005
Sentences for children at age of 30 – <48 months				
Pre	2.25 ±0.50	1.5 ±0.71	1.549	0.196
Post	2.50 ±0.58	1.5 ±0.71	1.886	0.132

*statistically significant (p= <0.05).

Table 3b showed the mean values of each word category relative to all types of vocabulary expression categories in the experimental and control groups at pre and post-intervention, according to the nurses' report. The mean values of 'nouns' was (38.7±7.6 & 32.1±6.1) respectively in the experimental and control groups (p<0.008).The mean values for action category mean were (3.98±0.87 & 3.19±1.29) in the intervention and control groups, respectively (p<0.011). Similarly, the mean values of closed-class words were (4.8±1.19 & 3.96±0.59) in the intervention and control groups, respectively (p=<0.025). The mean values of word combinations for study children in the age group of 19 -<30 months were (1.93±0.26 & 1.57 ±0.54) in the intervention and control groups, respectively (p=0.005).On the other hand, the mean values of 'sentences' for study children aged 30-<48 months was (2.50±0.58 & 1.5±0.71) respectively in the intervention and control groups (p= 0.132).

Table 4b: Expressive language development for children regarding their age, according to nurses' report.

	Experimental Mean ±SD	Control Mean ±SD	T test	
			T	**P-value**
First words total score for children at age of 12 –<19 months				
Pre	20.7 ±5.1	19.5 ±0.7	0.323	0.754
Post	42.8 ±7.9	38.5 ±0.7	0.743	0.475
Word combinations for children at age of 19 – <30 months				
Pre	1.24 ±0.43	1.14 ±0.38	0.571	0.57
Post	1.96 ±0.19	1.71 ±0.45	2.596	*0.012
Sentences for children at age of 30 –<48 months				
Pre	1.75 ±0.5	1.5 ±0.7	0.516	0.633
Post	1.75 ±0.5	1.5 ±0.7	0.516	0.633

*statistically significant (p=<0.05).

Table 5: Comparing experimental and control groups across the six weeks period.

	Months						ANOVA
	1	2	3	4	5	6	Test
First words total score for children at age of 12 – <19 months							
Experimental	25.2 ±5.6	28.6 ±6.2	32.2 ±6.9	35.4 ±7.5	38.1 ±8.1	44.2 ±8.1	F=9.161
							**P<0.001
Control	24.0 ±1.4	28.0 ±1.4	30.5 ±0.7	33.0 ±1.4	35.5 ±0.7	39.5 ±0.7	F=48.440
							**P<0.001
Word combinations for children at age of 19 – <30 months							
Experimental	1.37	1.48	1.57	1.64	1.75	1.96	F=11.944
	±0.49	±0.50	±0.49	±0.48	±0.43	±0.19	**P<0.001
Control	1.29	1.43	1.43	1.57	1.71	1.71	F=0.800
	±0.49	±0.53	±0.53	±0.53	±0.45	±0.45	P=0.557
Sentences for children at age of 30 – <48 months							
Experimental	1.5	1.5	1.5	1.65 ±0.4	1.75 ±0.3	1.75 ±0.3	F=0.339
	±0.50	±0.50	±0.50				P=0.882
Control	1.5	1.5	1.5	1.58	1.58	1.65	F=0.023
	±0.70	±0.70	±0.70	±0.50	±0.40	±0.40	P=0.998

** High statistically significant (p= <0.001).

Table 6a: Expressive language development (ELD) for children regarding their sex, according to mothers' report.

	Girls Mean ±SD	Boys Mean ±SD	T test	
			T	P
First words total score for children at age of 12 –<19 months				
Experimental				
Pre	22.8 ±5.9	21.7 ±5.2	0.306	0.767
Post	51.8 ±8.3	37.2 ±8.5	2.685	*0.028
Control				
Pre	-	-	-	-
Post	-	-	-	-
Word combinations for children at age of 19 – <30 months				
Experimental				
Pre	1.40 ±0.52	1.25 ±0.38	1.169	0.248
Post	2.05±0.20	0.85 ±0.23	2.961	*0.005
Control				
Pre	1.50 ±0.58	1.33 ±0.58	0.378	0.721
Post	2.25±0.50	1.17 ±0.58	2.651	*0.045
Sentences for children at age of 30 – <48 months				
Experimental	2.0 ±0.2	1.5 ±0.58	1.155	0.312
Pre				
Post	2.9 ±0.2	1.6 ±0.58	2.931	*0.043

*statistically significant (p=<0.05).

Table 6b: Expressive language development for children regarding their sex, according to nurses' report.

	Girls Mean ±SD	Boys Mean ±SD	T test	
			T	P
First words total score for children at age of 12 –<19 months				
Experimental				
Pre	22.8 ±5.9	21.7 ±5.2	0.306	0.767

Post	51.8 ±8.3	37.2 ±8.5	2.685	*0.028
Control				
Pre	-	-	-	-
Post	-	-	-	-
Word combinations for children at age of 19 – <30 months				
Experimental				
Pre	1.37 ±0.53	1.21 ±0.38	1.237	0.222
Post	1.99±0.38	1.67 ±0.45	2.437	*0.018
Control				
Pre	1.46 ±0.61	1.27 ±0.62	0.405	0.702
Post	2.15±0.48	1.14 ±0.53	2.642	*0.046
Sentences for children at age of 30 – <48 months				
Experimental	1.99 ±0.21	1.51 ±0.59	1.153	0.313
Pre				
Post	2.91 ±0.21	1.62 ±0.59	2.928	*0.044

*statistically significant (p= <0.05),

Table 7: Comparing child's (language delay severity) response in experimental and control groups to nurse and parent or care giver.

	Experimental (n= 68)		Control (n=11)		Chi Square Test	
					X_2	P
Pre						
Mild delay	16	23.5	4	36.4		
Moderate delay	31	45.6	5	45.5		
Severe delay	21	30.9	2	18.2	1.141	0.565
Post						
Mild delay	35	51.5	2	18.2		
Moderate delay	22	32.4	4	27.3		
Severe delay	11	16.2	5	54.5	6.294	*0.043

*statistically significant (p= <0.05),

Expressive language development (ELD) for children regarding their ages, according to nurses' reports was illustrated in Table 4b. The mean values of the total score of 'first words' uttered by the study children aged12-<19 months were(42.8±7.9 & 38.5±0.7) in the experimental and control groups, respectively(p= 0.475). In the study children aged 19-<30 months, the mean values of word combinations were(1.96 ±0.19 & 1.71±0.45) in the intervention and control groups (p=0.012), while the mean value of sentences for children aged 30 - <48 months was (1.75±0.5 & 1.5±0.7) respectively in both groups (p=0.633). Table 5 showed that comparing experimental and control groups across the six weeks' period, there was a statistically significant improvement (p=<0.001) in first words total score for study children aged 12-<19 months across six weeks in both groups In addition, towards combinations for study children aged 19-<30 months, a statistically significant improvement (p=<0.001) was observed in experimental group compared with no statistical significant improvement (p=0.557) in the control group. Among study children aged 30-<48 months, no statistical significant improvement was observed in the experimental and control groups.

Table 6a showed the mean values of the total score of first words for study children aged12-<19 months were (51.8±8.3 & 37.2±8.5) in girls and boys in the experimental and control groups, respectively (p= 0.028).The mean values of word combinations for children aged19-<30 months were 2.05±0.20 & 0.85 ±0.23 in girls and boys, respectively in the experimental group (p=0.005), and (2.25±0.50 & 1.17±0.58) in girls and boys, respectively in the control group (p=0.045). The mean value of sentences for children aged 30-<48 months was (2.9±0.2&1.6±0.58) in girls and boys, respectively in the experimental group (p= 0.043). Table 6b showed the mean values of the first words total score for the study children aged 12-<19 months were(50.25±8.22 & 36.83±8.42) in girls and boys, respectively in the experimental group (p= 0.038). The mean values of word combinations for the study children aged 19-<30 months were(1.99±0.38 & 1.67±0.45) respectively in girls and boys, respectively in the experimental group(p= 0.018), and (2.15±0.48 & 1.14 ±0.53) respectively in girls and boys, respectively in the control group (p= 0.046). The mean values of sentences for the children aged 30-<48 months was (2.91±0.21 & 1.62±0.59) respectively in girls and boys, respectively, in the experimental group (p=0.044). Table 7 showed that when the parents and nurses' responses for the study children's language delay severity across the experimental and control groups were compared, approximately one third (30.9%) of the study children in the experimental group

had severe language delay pre-intervention and this decreased to 16.2% of children, post-intervention(p=0.043) Figure 1. On the other hand, less than one quarter (18.2%) of the study children in the control group had severe language delay pre-intervention, this result increased to about half (54.5%) of children post-intervention (p=<0.043).

Adapted from: Language Development Survey

Please circle each word that your child says SPONTANEOUSLY (not just imitates or understands) and that you have heard at least 3 times. It's OK to count words that aren't pronounced clearly or are in "baby talk" ("baba" for bottle). There is space in each section to list other words your child uses.

FOODS: apple, banana, bread, butter, cake, candy, cereal, cheese, chips, coffee, cookie, crackers, drink, egg, food, grapes, gum, hamburger, hot dog, ice cream, juice, meat, milk, orange, pizza, pop, pretzel, raisins, soda, soup, spaghetti, toast, water

PEOPLE: aunt, baby, boy, brother, daddy, doctor, girl, grandma, grandpa, lady, man, mommy, own name, pet name, sister, uncle

CLOTHES: belt, boots, coat, diaper, dress, gloves, hat, jacket, mittens, pajamas, pants, shirt, shoes, slippers, sneakers, snowsuit, socks, sweater, tights

MODIFIERS: all done, all gone, bad, big, black, blue, broken, clean, cold, dark, dirty, dry, good, green, happy, heavy, hot, hungry, little, mine, more, nice, orange, pretty, purple, red, stinky, that, this, tired, wet, white, yellow, yucky

ANIMALS: alligator, bear, bee, bird, bug, bunny, camel, cat, chicken, cow, deer, dinosaur, dog, duck, elephant, fish, frog, giraffe, gorilla, hippo, horse, kitten, lizard, monkey, mouse, pig, puppy, rabbit, sheep, snake, squirrel, tiger, turkey, turtle, zebra

OUTDOOR: cloud, flower, grass, house, moon, rain, rock, sidewalk, sky, snow, star, stick, street, sun, tree

ACTIONS: breakfast, bring, catch, clap, close, come, cough, cry, cut, dance, dinner, eat, feed, finish, fix, get, gimme, give, go, have, help, hit, hug, jump, kick, kiss, knock, look, love, lunch, make, nap, open, outside, pattycake, peekaboo, peepee, poop, push, read, ride, run, see, show, shut, sing, sit, sleep, stop, take, throw, tickle, walk, want, wash, yell

HOUSEHOLD: bathtub, bed, blanket, bottle, bowl, chair, clock, crib, cup, door, floor, fork, fridge, glass, knife, light, mirror, pillow, plate, potty, radio, room, sink, soap, spoon, stairs, table, telephone, towel, trash, TV, window

BODY PARTS: arm, belly button, bottom, chin, ear, elbow, eye, face, finger, foot, hair, hand, knee, leg, mouth, neck, nose, teeth, thumb, toe

PERSONAL: bath, brush, comb, glasses, key, money, paper, pen, pencil, penny, tissue, toothbrush, umbrella, watch

TOYS: ball, balloon, blocks, book, bubbles, crayons, doll, picture, present, slide, swing, teddy bear

VEHICLES: bike, boat, bus, car, motorcycle, plane, stroller, train, truck

PLACES: church, home, hospital, library, park, school, store

OTHER: A,B,C, etc., 1,2,3, etc, animal sounds, away, boo-boo, bye-bye, down, excuse me, here, hi, hello, in, me, meow, my, myself, night-night, no, off, on, out, please, shut up, thank you, there, under, up, welcome, what, where, why, yes, you, yum, yum

FAVORITE TV/MOVIE/BOOK CHARACTERS

Does your child combine two or more words into phrases? (e.g. "more cookie," "car bye-bye," etc.)? _____Yes ___No

On the back of this page, please write down three of your child's longest and best phrases or sentences.

Figure 1

Discussion

To our knowledge, this is the first study reporting the effects of parents' involvement language intervention programmes on speech language delay in Egyptian toddlers. Of the 79 toddlers enrolled into the study, more than three quarter of the study children (79.4%) randomly assigned to the experimental group were within the age group of 19-<30 months. This is not surprising given that this is the peak age in which speech language delay has been widely reported in previous studies. [22,23,24] The mean scores for girls in all domains of LDS were greater than boys and reached statistical significance. Previous findings on the role of gender in speech language disorder has been inconclusive; while some studies reported association of gender, others reported no influence of gender on speech language delay in children. Our findings contrast with study conducted by Akbari and colleagues [25] who reported that the risk of developmental delay is higher in boys. Conversely, Kerstjens, et al. [26] reported about 2-5 higher increased risk in girls compared to boys while Piek, et al. [27] reported that gender had no influence on developmental delay, consistent with Kapci, et al. [28] who reported no significant differences between male and female children in their study. Despite these conflicting findings, experts have reported an increased tendency towards speech language delay in male children might be related to X-linked disorders more frequently seen in male children [29].

Our study showed that approximately two thirds of the study mothers (66.2%) were unemployed and in low socio-economic strata, with 70.6% of the mothers in the experimental group having an average annual income. This resonates with previous findings which reported association of low maternal education and socio-economic level with speech language delay [23,30]. Plausible reason cited for this was the financial challenges posed by low educational and socio-economic status which limit the purchasing power of the mothers to provide necessary materials required to nurture and support child's speech development. Majority of the study mothers (63.2%) in the experimental group were in the age group of 20-40 years while more than one quarter (27.9%) had family history of language delay. This is consistent with findings which reported increased risk of development delay in children delivered by mothers at ages above 35 years [31,32]. Although, we found that about 40% of the study children in the experimental group had a history of ear infection compared to about 20% in the control group, this finding supports previous studies which reported similar observations [2,29]

Our study has a couple of strengths and limitations. The quasi-experimental design of this study made it possible to demonstrate the effect of parents' involvement interventions in late talking toddlers. We also adapted and validated the LDS tool [11] to objectively assess the improvement of the study children following exposure to a battery of interventions that actively were facilitated by study mothers. This tool developed and used amongst ethno-linguistically diverse South African toddlers [11] was successfully adapted and validated cross-culturally to establish the relevance of the vocabulary of (LDS) in Egyptian late talking toddlers.

The relatively small sample size in our study is a major limitation in generalizing the findings to the population of Egyptian toddlers with speech delay. Also, inability to monitor the level of compliance of the study mothers and depending solely on their self-reports about the performance of the children may over or under-estimate the actual speech status of the children. Nevertheless, our study has contributed to the small but important body of knowledge on the relevance of parents' involvement intervention in late talking toddlers.

Conclusion

Our study has demonstrated that parents' reports provided some useful ideas about their involvement and its positive effect in terms of language development of their late-talking toddlers. We also found that parent involvement in language interventional/ speech therapy program is a viable model for promoting short-term developmental progress in late-talking toddlers. Further studies using randomized controlled design are needed for evaluation and long-term follow-up of this important strategy for children with speech language delay.

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