

Cigdem Aytekin<sup>1</sup>

Pinar Bayhan<sup>2</sup>

# Developing the Home-based Early Intervention Program: A Case Study\*

## Abstract

*The current study was aimed to develop a home-based early intervention program based from activity-based approach and to prove the effectiveness of the program on 18 month old child with developmental delay/risk of delay. Developmental delay was assessed with DENVER II Developmental Screening Test (DENVER II DST) at first. The child was also assessed in detail within the current study and it was determined that the child had developmental delay. After receiving family's approval, procedures were conducted according to the steps of early intervention. After detailed evaluations, filling the Individualized Family Service Plan and determining the goals for the child, researcher implemented the early intervention program. All of the family members were incorporated with the program and 36 developmental support programs were implemented in home environment. Results show that the early intervention program has a positive effect on the child's development and mothers' opinion is positive about the program.*

*Keywords: Development, developmental delay, home-based early intervention program, case study.*

## Introduction

Early intervention is defined as experiences and opportunities provided by the parents and other adults giving care to a child which aimed to be gained and used to have positive social experiences with people and the environment (Dunst, 2010). The child's opportunity to benefit from intervention is higher and problems that could be confronted at school period are prevented when intervention starts early as soon as possible (Kaur et al., 2006; Xu & Filler, 2005). Different application models have been developed about early intervention studies. Some of these models emphasize that daily activities are especially important to provide opportunities for children to practice existing abilities, develop newly gained abilities and gain new competences (Dunst et al., 2001). In this

---

<sup>1</sup> Ph.D., Department of Child Development, Faculty of Health Sciences, Hacettepe University, Ankara, TURKEY.  
e-mail: : cigdemcicek83@gmail.com

Correspondence concerning this article should be addressed to first Author.

<sup>2</sup> Ph.D., Professor, Department of Child Development, Faculty of Health Sciences, Hacettepe University, Ankara, TURKEY.

e-mail: : pinars@hacettepe.edu.tr

\*This study is derived from Cigdem Aytekin's doctoral dissertation.

context, researchers prove some principles for using children's daily activities and routines in part for learning. Each of these models regards adults who care with child (e.g. mother, father or teacher) as core practitioners for embedded intervention and regard early intervention practitioners as teachers of adults who care with child. One of these models is activity-based practice/approach (e.g., Pretti-Frontczak & Bricker, 2004) (Sawyer & Campbell, 2012).

Activity-based approach is a natural approach which uses daily routines and activities. It emphasizes meaningful functional and developmental interactions between child and the environment (Dada, Granlund & Alant, 2006) and integrates early childhood special education to regular early childhood education in the most effective way, presents a framework to use developmental appropriate applications with younger children with special needs and enables evaluation and intervention (Novick, 1993). Activity-based intervention aims to support child to gain, generalize and/or reinforce functional goals and targets. In particular, activity-based intervention is a child centered and operational approach that integrates several learning opportunities to real and previous activities and provides feedback to support functionality and gives productive abilities to child (Pretti-Frontczak & Bricker, 2007).

Children have lots of learning opportunities in daily life and most of these opportunities are at home environment which is the first environment for child to get information about world. To provide early intervention services at home environment gives an opportunity to family to use natural learning activities for supporting their child (Perry, 2001). Home environment gives important daily learning opportunities to support infants and children with developmental delay or disabilities. Also, home visits provide the opportunity to individualize the intervention to meet the needs of child and family (McBride & Peterson, 1997).

In this sense, the current study was aimed to plan and conduct the early intervention program at home environment and to prove effectiveness of the early intervention program which is most important for preventing developmental delays and reducing its negative effects. With this case study, it was intended to plan a home-based developmental early intervention program that is based from activity-based approach fundamentally and to prove the effectiveness of this program on child 18 months of age and with developmental delay.

## Method

This study conducted as a case study and with a boy and his mother.

### *Participant*

There were selection criteria for subjects to be included in research: (1) having developmental delay or delay risk, (2) being off prematurity or low birth weight, (3)

being off diagnostic about developmental disorders, (4) not having education at an institution, (5) residing in Ankara, (6) volunteering to attend the study.

A boy (named E.A.), 18 month old and meet the selection criteria, and his mother attended the study. He has lived in Ankara-Turkey with his father, mother and sister who does not have a developmental problem. Child Development Specialist who has worked in the state hospital assessed development of E.A. first when he was 16 month old, with DENVER II Developmental Screening Test (DENVER II DST) and directed him to department of neurology. Department of neurology stated that there was a minor damage on back of brain according to MRI and there was a high risk about developmental delay on motor and language area of brain.

Child Development Specialist then directed him to researcher with doubt of developmental delay. E.A. was 18 month old and was not diagnosed with developmental delay officially until included in the study.

Medical evaluation for diagnosis of developmental delay was continued throughout the implementation of early intervention program. After two weeks of the expiration of the early intervention program, E.A. had a diagnostic report about 50% mild mental retardation officially. E.A. has received special education at the special education institution with this report, so transition from early intervention to special education services was provided for E.A. Also, he started preschool program besides special education program.

### *Measures*

*DENVER II Developmental Screening Test (DENVER II DST; Frankenburg & Dodds, 1990).* It was formed to screen whether E.A. has developmental delay risk. The test detects slow development in four areas of development: personal-social, gross motor, fine motor and language. DENVER DST was published in 1967 first time by Frankenburg and Dodds to help health personnel to detect developmental problems which young children can have. Frankenburg and Dodds revised the test in 1990 (DENVER II DST). Yalaz, Anlar and Bayoglu (2010) standardized the DENVER II DST revised version in Turkey. The test consists of total 134 items. It is stated that concurrency between practitioners does not go down below %90 and concurrency of test-test does not go down below %86, when few practitioners test 10 different aged children at the same time and when compare results of tests that belong to same children and done five days later from first test (Yalaz et al., 2010).

Hacettepe University Child Development Department 0-36 months Children Development Evaluation Inventory (H.U. DAI 0-36 Months; Bayhan et al., 2012). This test was used to identify developmental level of E.A., to define developmental goals and to evaluate developmental progress during application as part of early intervention program. The inventory consists of five developmental areas (language, cognitive, visual perception, motor, social-emotional and self-care) and total 224 items. Its validity and

reliability studies were made in 2011 and according to Kappa analyses it is valid and reliable (Kappa value = .80) (Bayhan et. al., 2012).

*Individualized Family Service Plan (IFSP), Plan of Developmental Support Practice/Program, Homework Form, Homework Evaluation Form and Evaluation Form for Applications* are also used to collect data. All of these forms developed by the researcher. Three professions on child development and early intervention evaluated the form and done necessary modification on the forms.

#### *Procedure*

To conduct the study, the required permissions were obtained from the Ministry of Health and Institutional Review Board of Hacettepe University. Researcher applied DENVER II DST to children who were directed with doubt of developmental delay risk by Child Development Specialist two weeks after first evaluation. These two assessments were compared and evaluated the consistency of raters. Identifying the child for the research took 10 months.

The current study was aimed to comprise home-based early intervention program by taking advantage of Activity-Based Approach. A home-based early intervention program is entitled as *Mission: Development (Developmental Early Intervention Program)*. Some other basic approaches and contexts which have been used and proved of effectiveness in early intervention practices such as *Developmentally Appropriate Program/Practice, Family-Based Approach, Natural Environment, Individualized Family Service Plan* underlie the program. 27 principles within the scope of these approaches were determined. The most basic of these principles are following:

- Practitioners handle the developmental support practice/programs in the content of early intervention program as planned and child-directed. Interest of child leads the adult. To apply the activities as natural activity and to use daily routines is considered important. To determine functional goals for child and family is another important context of the program (*Activity-Based Approach*).
- The developmental early intervention program recognizes that each child is unique and has specific development. Practitioners adapt the program according to characteristics of each child and family (*Developmentally Appropriate Program/Practice*).
- The program keeps at the forefront priorities and needs of child and family, considers opinions and ideas of family at the each step of program. It is aimed to conduct the program by determining strengths of child and family and by beginning to apply the program from these strengths (*Family Centered Approach*).
- It is important to apply support programs in natural environments such as home, park, and market. Observing home environment, child at home, and interactions

between members of family and recording all observation is important part of the developmental early intervention program (*Natural Environment*).

Researcher conducted the planned early intervention program considering the early intervention steps as well. These steps are following:

*Referral Stage* includes getting information about reason of referral, where family is directed, whether necessary medical assessment has been made, which medical department has supported the family. Accordingly, E.A. was initially assessed at 16 month old and referred to researcher when he was 18 month old. E.A.'s development was reevaluated at 18<sup>th</sup> month with the same screening tool (DENVER II DST). 16<sup>th</sup> and 18<sup>th</sup> months results from two different observers were similar. Researcher decided to include E.A. in the research who was found suitable for the research criteria.

*Evaluation Stage* includes assessing the child with developmental delay/disabilities in detailed, determining developmental performance level of the child and evaluating the child within early intervention process. Accordingly, researcher planned E.A.'s third development evaluation 2 week after the start of research but it was performed when E.A. was 20 month old because of child's medical problems. E.A.'s developmental evaluation results were compared with DENVER II DSTs at 16<sup>th</sup>, 18<sup>th</sup>, 20<sup>th</sup> months. E.A.'s development was stable and results interpreted as "abnormal". In order to evaluate E.A.'s developmental level and to set developmental goals, researcher evaluated E.A.'s development by using H.U. DAI 0-36 Months.

*Inform/Redirect Stage* includes informing family about early intervention and general developmental level of the child and whether child can be incorporated in early intervention program or not, redirecting family to appropriate services. Accordingly, family was informed in detail about E.A., the program and home observation.

*IFSP Meeting Stage* includes filling the IFSP form with family during the conversation, observing home environment and making required records in order to make detailed observations about child and the family, arranging home environment. E.A.'s developmental story (pregnancy, labor, after birth periods) and family information was recorded according to this form. Considering the developmental story, there was salient information for developmental delay risk such as miscarriage risk of the mother, developmental delay about two/three weeks in mother's womb, chronic illness (bronchitis, asthma, food allergy) and frequent hospital life in postnatal period. At IFSP meeting family is encouraged to express their feelings and thoughts; their priorities, expectations, goals, routines and daily activities are noted in the scope of family centered applications.

*Service Coordinator Stage* includes considering all meetings, evaluations, observations and records holistically and determining goals of intervention program for child and the family, fulfilling the IFSP form, planning and implementing Developmental Support Practice/Program and making Developmental Information Meeting with adult who care

with the child. Researcher focused on basic abilities that required support and had basis for other abilities while determining developmental goals. For example, E.A. had concentration problems and could not understand the given directives. He could not make enough eye contact with people during conversations, was not interested in toys and the environment. He had difficulty with abilities that require hand-eye and body coordination.

According to these developmental circumstance and families' expectations and resources, researcher determined following basic and functional goals for E.A. with the family: (a) concentrate attention on event, people and objects, (b) gain proficiency on abilities requires hand-eye coordination, (c) gain proficiency on abilities requires body coordination, (d) follow directives successfully, (e) gain proficiency on reasoning skills. Researcher prepared developmental support practices/programs to support these basic goals/skills, so these basic skills could have basis and facilitate the acquisition of other skills. For example, *finding toys* activity is about goals of *concentrate attention on event, people and objects* and *gain proficiency on reasoning skills*. *Racecourse* activity is about goals of *gain proficiency on abilities requires body coordination, follow directives successfully* and *gain proficiency on reasoning skills*. Besides support programs, researcher gave required suggestion and guidance to family. All planned support programs generally support 5 basic developmental goals and E.A.'s abilities required support are based on these 5 basic abilities.

Programs performed considering E.A.'s other early intervention service requirements. E.A. was directed to physiotherapist, department of neurology and language and speech disorders specialist according to his needs and programs planned with these expert opinions. (e.g., E.A. hand-eye and body coordination support activities were planned considering physiotherapist opinions about harmful activities for E.A.). Other professionals did not interfere about E.A. scope out this study; they only gave suggestion about circumstances relevant to their profession area to pay attention about E.A. Family contributed application planning and all decision processes. The mother was the primary caregiver, therefore The Developmental Information Meeting was done with her about important strategies on communication with the child and her questions were answered.

Researcher applied 36 developmental support practices/programs with E.A. and his mother in a year and in a particular direction. Practices/programs supported determined basic skills and were performed once a week for 1.5 hours at home environment. Researcher applied practices/programs according to specific steps: (a) Developmental support programs were performed with the mother, (b) first researcher performs the application and let the mother to observe, (c) application given to mother as homework and researcher observed mother during application and gave feedback to the mother, (d) application was reviewed with the mother, (e) mother performed the homework 1 week without forcing the child, evaluated the application and filled the homework evaluation form, (f) next week researcher evaluated application and decided with the mother to repeat the application or not, (g) researcher reviewed the mother's homework evaluation form and noted areas of difficulty for the mother. Required changes were made, (h) new

application for that week was performed in the same manner and same procedure was followed for all applications.

Most important feature of the practices/programs is not to force child but take advantage of the opportunities when child shows interest on the applications. Researcher was a role model for the mother giving suggestions that could be used in daily life to support E.A.'s other developmental needs, other than the developmental support programs/practices. Researcher motivated the family by highlighting the strong and positive sides of child and family (e.g. researcher told the mother "You are communicating very well with your child. Standing on a level suitable for eye contact is important and you know this"). It is important to incorporate other family members into the early intervention program, accordingly researcher encouraged father to prepare required material for practice and sister to start play with her brother by modeling.

*IFSP Six Months Review/Revise and Annual Update Stage* includes evaluating the results of programs in particular periods, revising of Developmental Support Practices/Programs and updating IFSP form. Accordingly, researcher evaluated the results of programs regularly. Mother and researcher noted when E.A. gained practiced skills. These notes were used to see developmental improvement of E.A. in addition to the general developmental evaluations. After each evaluation, researcher reviewed support practices/programs according to E.A.'s performance level, family opinions, and filled homework evaluation forms and regulated required revision of practices/programs and continued to apply. Annual update stage was performed with 34<sup>th</sup> month evaluation. To verify the results at 34<sup>th</sup> month another specialist made evaluation of E.A.'s development at 35<sup>th</sup> month with the same evaluation tool researcher used.

*Transition Stage* includes planning of transition from early intervention program to another appropriate program (special education, preschool programs, etc.) according to last IFSP review. Accordingly, 1.5 months before the end of the program applications, researcher planned transition for E.A. with family. E.A. started to a special education institute and preschool chosen with the family according to researcher's suggestions.

#### *Data Analysis*

Researcher made eight evaluations in total: three before implementation of the program, three during implementation of the program (23<sup>rd</sup>, 28<sup>th</sup> and 30<sup>th</sup> months), one after implementation of the program (34<sup>th</sup> month) and one for verification (35<sup>th</sup> month). Another child development specialist interviewed the mother about developmental early intervention program. Besides that, researcher interviewed with father, aunt and grandparents to learn their opinion about early intervention program. All results of collected data were shown with tables and graphics.

## Results

The skills of E.A. which was expected to be acquired until 20 months chronologically but yet not to be acquired and required support according to H.U. DAI 0-36 Months were examined. Accordingly, development of E.A. was below the expected level of age and needs of developmental support were predominant (see Table 1).

Table 2 shows the information about observation of home environment and developmental arrangement in the family's home made by researcher and the mother. Information about the observations of home environment showed that home was not appropriate for supporting development and there was not enough stimulation for development.

Basic and functional goals were determined for E.A. and developmental support practice was conducted. Effectiveness of conducted practices was evaluated at 23rd, 28th, 30th months. At the end of practices, at 34th month, development of E.A. was reevaluated with H.U. DAI 0-36 Months. Results showed that E.A. has gained proficiency on the skills required support towards developmental support practices and suggestions given to mother. Figure 1 demonstrates the evaluation results which were made before practices were began at 20th month and after practices were ended 34th month with H.U. DAI 0-36 Months at five development areas (motor, cognitive, language, social-emotional, self-care) (red boxes mean skills required support, green boxes mean skills gained proficiency).

According to Figure 1, it was expected that E.A. had gained proficiency on 51 motor development skills at 20th month. However, it seems that E.A. generally has gained proficiency on 29 skills (green boxes in the Figure 1) and needed support on 22 skills (red boxes in the Figure 1). Considering the results of developmental evaluation in the motor development area at 34th month, E.A. has gained proficiency on total 19 skills which were required support towards developmental support practices, early intervention program and suggestion given to mother (some evaluation results which are red at 20th month seems green at 34th month and this shows that E.A. has gained proficiency on the some skills seemed red). Skills gained proficiency after the practices could be followed from Figure 1. For instance, skills gained proficiency began are as follows: "holding the glass with both hands, putting the objects inside wide container, throwing the ball with both hands, and etc.

It was expected that E.A. had gained proficiency on 41 language development skills with respect to evaluation at 20th month. However, it seems that E.A. generally has gained proficiency on 16 skills (green boxes in the Figure 1) and needed support on 25 skills (red boxes in the Figure 1). Considering the results of developmental evaluation in the language development area at 34th month, E.A. has gained proficiency on total 14 skills. Skills gained proficiency after the practices could be followed from Figure 1.

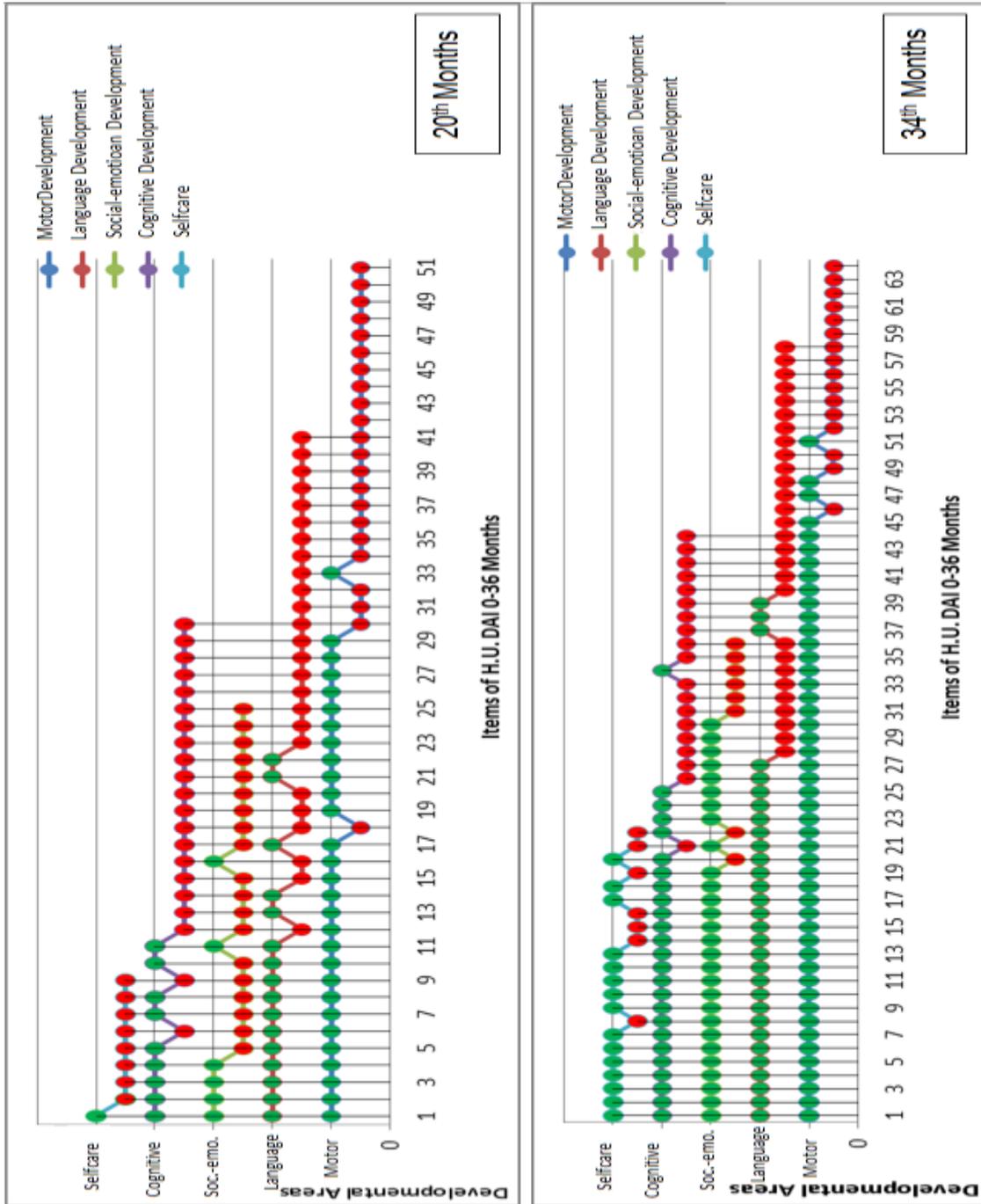
**Table 1.**  
*Informations about E.A.'s skills required developmental support*

<b>Area</b>	<b>Skills which was required support</b>	<b>Area</b>	<b>Skills which was required support</b>
<b>Gross motor</b>	*Throwing the ball with both hands	<b>Language</b>	*Understanding his name and reacting
	*Collecting the object from the ground without falling		*Making syllable repetition like a 'da-da, ma-ma'
	*Kicking the ball		*Understanding words of 'no'
	*Climbing up and down stairs while holding a hand		*Specifying requests using voice and gesture
	*Pulling and pushing objects while walking		*Imitating the person's voice
	*Climbing up to chair		*Speaking one word like a 'mom, dad'
	*Opening the door		*Showing the body parts when asked
<b>Fine motor</b>	*Running	<b>Social-emotional</b>	*Following simple directions
	*Holding the glass with both hands		*Listening the story
	*Putting least 3 cubes inside wide container		*Clinging to familiar people
	*Scribbling by the strokes on paper		*Responding to emotional reactions
	*Hanging circle to stick		*Reaching out to be lap
	*Building tower with two cubes		*Smiling to familiar people
	*Taking the object with the thumbs and forefingers		*Simulating simple movements
	*Turning the page of book one by one		*Waving hand meaning goodbye
	*Making noises on the image in the mirror		*Drinking water from glass
	*Making simple movements when asked		*Playing ball with adult
<b>Cognitive</b>	*Finding tucked away object in the visual field	*Specifying requests without crying	
	*Removing the small objects from the inside of glass one by one	*Showing resistance when blocked	
	*Signing with index finger	*Moving to the rhythm of music	
	*Looking at pictures in the book	*Simulating simple housework	
	*Searching for objects removed while looking where that hid the first	*Repeating the movements which make laugh and attract attention	
	*Using the object fit for purpose	*Playing alone	
	*Finding the toys where are hid	*Playing with one toy frequently	
	*Showing the least two of body part when asked		
	*Trying the different ways to achieve the object		
	*Following two directions when said consecutively		
*Showing picture which is asked			

**Table 2**

*Information about observation of home environment and arrangements as part of developmental early intervention program*

<b>Home environment before application</b>	<b>Arrangements about home environment during the application of program</b>
Generally, there are no stimulations for supporting development; for example no table on the wall, no mirror in environment, no plant, no conspicuous object, etc.	Researcher and the mother arranged home environment to support development; for example to place conspicuous and harmless object, toys in environment in the manner that seen easily by E.A., to past different picture of animals, foods, vegetables, fruits and family members on the walls in the manner that seen easily (family changed picture every three or four days), to hang pier glass on the wall pertinent to body height of E.A..
There are no books for E.A. at home.	Researcher wants mother to get picture books for E.A. which are appropriate to his age. Books for E.A. are placed to be seen and reached by E.A. easily. So, E.A. has an opportunity to reach and take books when he wants.
Toys are in the box invisibly at his sister's room and there are no toys to under E.A.'s very nose.	Toys are placed at home environment to be seen and reached by E.A.. Interesting toys are placed at appropriate corners and places at home. Researcher wants to mother to chance toys and call E.A.'s attention this different toy. Also, different harmless object that is attractive is placed at home environment.
Mother does houseworks when E.A. is sleeping. So, E.A. does not have opportunity to observe daily routines.	Researcher want mother to do housework when E.A. is awake and do houseworks with E.A.. Thus, E.A. has an opportunity to observe and attend to daily routines. Attending to daily routines is important to develop basic skills and social skills.
E.A. is often at home, his family does not want to go out with him because of his illness. Because his father does not allow to welcome to guest at home, E.A. does not have an opportunity to spend time with his peers and other adults.	Researcher suggests that E.A. must be together with his peers, cousin and people to interact and imitate a model. Researcher explains that it is very important to be together with peers for development. Researcher also explains how mother can help E.A. to interact with his peers.
Because of not welcoming to guest and not opening television or radio, mother says that there is a soundless environment at home.	Researcher wants mother to listen and accompany to children musics with E.A.. Researcher explains how mother spends qualified time with her children (singing songs, making musics with objects, talking about actions and nature, examining toys or object together catchily, etc.).



**Figure 1.** Comparison of results according to H.U. DAI 0-36 Months at 20th and 34th months.

Note: Items of skill which are red and required support to gain at first evaluation (20th month), are shown in green at 34th month to indicate gained skills after applications.

It was also expected that E.A. had gained proficiency on 25 social-emotional development skills at 20th month. However, it seems that E.A. generally has gained proficiency on 6 skills (green boxes) and needed support on 19 skills (red boxes). Considering the results of developmental evaluation in the social-emotional development area at 34th month, E.A. has gained proficiency on total 21 skills.

E.A. had gained proficiency on 30 cognitive development skills with respect to evaluation at 20th month. However, it seems that E.A. generally has gained proficiency on 9 skills (green boxes in the Figure 1) and needed support on 21 skills (red boxes in the Figure 1). Considering the results of developmental evaluation in the cognitive development area at 34th month, E.A. has gained proficiency on total 16 skills.

It was expected that E.A. had gained proficiency on 9 self-care skills at 20th month. However, it seems that E.A. generally has gained proficiency on 1 skill (green boxes) and needed support on 8 skills (red boxes). Considering the results of developmental evaluation in the self-care at 34th month, E.A. has gained proficiency on total 7 skills.

In addition, E.A.'s gained skills' relationships with related applications were evaluated. In Table 3, it can be seen that when E.A. must gain skills and when related applications were started and when E.A. gained skills.

When E.A. was 35 month old, another Child Development Specialist evaluated of E.A.'s development with H.U. DAI 0-36 Months to observe the persistency of skills after applications and consistency of evaluation results made by researcher at 34<sup>th</sup> month. The results of evaluation at 35<sup>th</sup> and 34<sup>th</sup> months and two evaluations were observed to be consistent with each other and E.A.'s gained skills have been persistent. As a result of two evaluation observers recorded that they observed same skills as gained by E.A.

Finally, Table 4 represents information about mother's assessments of developmental early intervention program generally. Considering the mother's answers to question for assessment, it was observed that mother was satisfied from early intervention program and believed that her child was benefited from it.

### Discussion, Conclusion and Suggestions

In the current study, a home-based developmental early intervention program was developed under cover of activity-based approach. The study aimed to prove effects of the program on 18 month old boy (E.A.) with developmental delay.

It is found that E.A. has a developmental delay according to results of detailed developmental evaluation and there are some signs of risk for developmental delay according to developmental story of E.A. . E.A. has a hazardous developmental story at prenatal and postnatal periods. It is considered that existing developmental delay about two/three weeks in mother's womb is an important sign for developmental delay for subsequent periods. Despite the important sign at prenatal period, anyone leads the

**Table 3.**  
*Information about E.A. 's gained skills' relationships with related applications*

Gained Skills		Developmental Acquisition (Month)	When related application was started (Month)	When E.A. gained skills
Cognitive	Searching for objects removed while looking where that hid the first	12 <sup>nd</sup>	21 <sup>st</sup>	22 <sup>nd</sup>
	Finding the toys where are hid	18 <sup>th</sup>	21 <sup>st</sup>	24 <sup>th</sup>
	Looking at pictures in the book	12 <sup>nd</sup>	22 <sup>nd</sup>	24 <sup>th</sup>
	Removing the small objects from the inside of glass one by one	12 <sup>nd</sup>	24 <sup>th</sup>	27 <sup>th</sup>
	Following two directions when said consecutively	18 <sup>th</sup>	22 <sup>nd</sup>	29 <sup>th</sup>
	Showing 2 pictures which is asked	24 <sup>th</sup>	22 <sup>nd</sup> , 30 <sup>th</sup>	32 <sup>nd</sup>
	Showing the nose, hair and eyes when asked	18 <sup>th</sup>	23 <sup>rd</sup>	32 <sup>nd</sup>
Language	Imitating person's voice	12 <sup>nd</sup>	21 <sup>st</sup>	23 <sup>rd</sup>
	Following basic direction	18 <sup>th</sup>	22 <sup>nd</sup>	25 <sup>th</sup>
	Making syllable repetition like a 'da-da'	9 <sup>th</sup>	21 <sup>st</sup> , 25 <sup>th</sup>	25 <sup>th</sup>
	Understanding his name and reacting	9 <sup>th</sup>	21 <sup>st</sup> , 25 <sup>th</sup>	25 <sup>th</sup>
	Pronouncing words of 'mom' and 'dad'	12 <sup>nd</sup>	21 <sup>st</sup> , 25 <sup>th</sup>	26 <sup>th</sup>
	Following direction comprised of 3-4 words	24 <sup>th</sup>	22 <sup>nd</sup>	32 <sup>nd</sup>
	Putting the objects inside wide container	12 <sup>nd</sup>	21 <sup>st</sup>	23 <sup>rd</sup>
	Taking the object with the thumbs and forefingers	24 <sup>th</sup>	22 <sup>nd</sup>	23 <sup>rd</sup>
	Turning the page of book one by one	24 <sup>th</sup>	22 <sup>nd</sup>	23 <sup>rd</sup>
	Opening the door	18 <sup>th</sup>	21 <sup>st</sup>	24 <sup>th</sup>
Motor	Pulling and pushing objects while walking	18 <sup>th</sup>	21 <sup>st</sup>	25 <sup>th</sup>
	Climbing up and down stairs while holding a hand	18 <sup>th</sup>	21 <sup>st</sup> , 23 <sup>rd</sup>	26 <sup>th</sup>
	Playing ball with adult - throwing the ball	18 <sup>th</sup>	24 <sup>th</sup>	27 <sup>th</sup>
	Putting 6 cubes into glass	24 <sup>th</sup>	24 <sup>th</sup>	27 <sup>th</sup>
	Hanging circle to stick	18 <sup>th</sup>	24 <sup>th</sup>	27 <sup>th</sup>
	Running	18 <sup>th</sup>	21 <sup>st</sup> , 23 <sup>rd</sup> , 26 <sup>th</sup> , 27 <sup>th</sup>	28 <sup>th</sup>
	Walking backwards	14 <sup>th</sup>	21 <sup>st</sup> , 23 <sup>rd</sup> , 26 <sup>th</sup> , 27 <sup>th</sup>	28 <sup>th</sup>
	Climbing up to chair	18 <sup>th</sup>	21 <sup>st</sup> , 23 <sup>rd</sup> , 26 <sup>th</sup> , 27 <sup>th</sup>	28 <sup>th</sup>
	Collecting the object from the ground	18 <sup>th</sup>	21 <sup>st</sup> , 23 <sup>rd</sup> , 26 <sup>th</sup> , 27 <sup>th</sup>	29 <sup>th</sup>
	Crouching and standing up	18 <sup>th</sup>	21 <sup>st</sup> , 23 <sup>rd</sup> , 26 <sup>th</sup> , 27 <sup>th</sup>	29 <sup>th</sup>
	Throwing the ball with hands to adult	18 <sup>th</sup>	24 <sup>th</sup> , 27 <sup>th</sup> , 28 <sup>th</sup>	31 <sup>st</sup>
	Kicking the ball	18 <sup>th</sup>	24 <sup>th</sup> , 27 <sup>th</sup> , 28 <sup>th</sup>	31 <sup>st</sup>
	Throwing the ball with both hands	18 <sup>th</sup>	24 <sup>th</sup> , 27 <sup>th</sup> , 28 <sup>th</sup>	31 <sup>st</sup>
	Scribbling	18 <sup>th</sup>	29 <sup>th</sup>	33 <sup>rd</sup>
	Building tower with two cubes	18 <sup>th</sup>	32 <sup>nd</sup>	35 <sup>th</sup>
	Imitating simple movements	9 <sup>th</sup>	22 <sup>nd</sup> , 23 <sup>rd</sup>	24 <sup>th</sup>

family. If the family could be led through the required services in time and development of E.A. could be monitored, developmental delay can be identified earlier and there can be opportunity for interfering to E.A.. Also, E.A. has chronic illness and he is hospitalized frequently at the postnatal period. It is considered that another negative factor which effect development of E.A. is frequent hospital life and chronic illness because of separation of his life in terms of development. Illness and hospital life in the most important period of child, which child start to learn the world and discover the environment, would prevent to get enough stimulation from environment, so it can cause difficulties on child development. The father's below expression, which he indicated at the interview, also supports this idea:

*“After each time E.A. started to say mom-dad, when he was 1.5-2 years old, he stayed at hospital and returned to his older stage and stopped talking after hospital. He gets sick and stays at hospital when he starts talking.”*

Both neurological and MR results and disability health report taken from a university hospital supports E.A. has developmental delay. Also information from IFSP form and E.A.'s story and home environment have strong clues about developmental delay.

Despite the signs of risk for developmental delay, most important factor that blocks to identify and intervene developmental delay earlier is the lack of a systematic early intervention system in Turkey. Diken and colleagues (2012) also mentioned there is no systematic nationwide developmental disability screening other than hearing and phenylketonuria. Also there is no nationwide early intervention and early special education evaluation program and there is no systematic model for infants with or with risk of developmental delay. In order to serve an effective and systematic early intervention program in Turkey, developmental screening and monitoring processes must be handled seriously and families must be directed to correct departments as early as possible. It is thought that more effective support could be given to E.A. and his family if E.A.'s developmental situation was followed starting from pregnancy period. Moreover, families are late to identify problems and consult to an expert and 0-3 year old children with developmental delay are being late to start early education services (İncesoy-Ozdemir, 2005). Directing children to developmental evaluation after each routine health check is a must to support to identify developmental problems in early years. Beside these statements, suitable conversation language with the family and proper advising are important parts of developmental evaluation process. Families learning their children's developmental problems have a complicated psychological state with sadness (Coskun & Akkas, 2009) and request to learn details about the developmental situation (McWilliam & Scott, 2001). Families enter a very sensitive period after learning their children's developmental disabilities. Making correct and proper explanations are important to keep them calm. E.A.'s mother's expressions about the conversation with the doctor when they learn E.A.'s situation and their feeling also support these ideas. Mother expressed the explanations of neurologists about E.A.'s MR result as follow:

*“... she said, looking at the result, there is a damage at the back side of the brain, is he talking or understanding?, he can't understand, she asked and then answered, didn't let me to answer questions. At that moment I think she wanted to say that this child is autistic. I understand it later, because she asked if E.A. is playing with spherical object. I think autistic child has interest on spherical objects that is why she asked. She answered all his questions before I answered them. She said, she will redirect E.A. to special education. I did not want it because he was just 13 month old. I asked what is wrong with my child and she said there is damage at the back side of the brain and this kid can't walk and talk. ”*

This first explanations made by the neurologist can be thought to drive family into a complicated psychological state with sadness according to mothers expressions.

Researcher prepared developmental support programs according to determined functional aims/goals, family's resources, priorities, opinions, individual properties and IFSP form in the scope of developmental early intervention program. According to developmental evaluation, E.A. was not able give enough attention to environment, objects and people before applications. This ability was supported primarily to perform other applications. To support the ability, colorful and attractive materials were hung on door handles and pictures were put up on the walls to attract his attention. He also could not put objects in a large box, to hang circles on a stick, to make scribble and build tower with cubes. It is thought that primary reason of these insufficiencies is E.A.'s insufficiency in hand-eye coordination and hand usage coordination and developmental support started with basic applications supporting hand-eye coordination and finger muscles. For example, to gain this ability, spoon stirring in the pot applications was performed and hand usage and hand-eye coordination was supported with putting spoon in the pot and making circular movements.

Effectiveness of the performed developmental support programs was evaluated with 20<sup>th</sup>, 23<sup>rd</sup>, 28<sup>th</sup>, and 30<sup>th</sup> months developmental evaluations during applications, 34<sup>th</sup> and 35<sup>th</sup> months evaluations after applications (see Figure 1). Accordingly, E.A. has gained proficiency on several abilities after applications and developmental suggestions given to mother (red boxes turning into green boxes after next evaluations shows ability gain in Figure 1). When time of gaining proficiency on skills is considered according to months and starting time of the applications (see Table 3), it can be seen that ability proficiencies are gained after applications. But proficiency gaining time varies according to difficulty of E.A.'s individual properties and application frequency due to his health. For example, E.A. gained proficiency on ability of putting objects to large boxes at 23<sup>rd</sup> month and application started at 21<sup>st</sup> month. Also, E.A. gained proficiency on ability of hanging circles to stick at 28<sup>th</sup> month and application started at 24<sup>th</sup> month; etc. It is important to note that during the applications, E.A. did not receive another support program besides the applied program. It is observed that E.A. gained abilities which were required support when researcher gives support and applies the related support practice/program. He did not gain some abilities without support which must be gained

at the same age group with acquired abilities. So it can be said that E.A. gains the abilities as a result of developmental support not as a result of nature of development.

It can be said that developmental support practices/programs have positive effects on E.A.'s development according to evaluations and family's opinions as well. Sample explanations are below:

Mother: *“Mrs. Cigdem gave suggestions on how to act, as I followed her suggestions it really worked. In the past I used to force E.A. to do something but she told me not to do so. She advised me to let E.A. do the activities when he wants to do them and advised me to work with him as soon as he started an activity by himself. She said when he grabs a toy leave whatever you are doing and show him how to play with it. As I follow her suggestions I saw that it works and E.A. really showed some progress. Mrs. Cigdem really helped me to learn how to act and communicate with my child. If she hadn't helped me, maybe I could not achieve this progress.”*

Grandmother: *“E.A. is better now compared to past. He didn't understand some directives previously now he understands, like when you say give me that thing and he brings it to you, previously he didn't understand it now he understands, it is an improvement.”*

According to general view of mother's opinions written on the application evaluation form filled by mother after the end of applications, she is satisfied and pleased with the results of applied early intervention program.

Mother: *“I didn't know how to interact with my child if I didn't take this education”, “Applications supported my child's development, he gained basic abilities with homework”, My child didn't understand me before applications and stare at me for a long time. Now he can follow directions”.*

Epley, Summers & Turnbull (2011) was stated that families getting early intervention services had positive opinions on the services both for themselves and their children (e.g. Bailey et al., 2005; Hebbeler et al., 2007; Summers et al., 2007).

After applications were finished, the permanency of the gained abilities were verified with evaluating E.A.'s development using H.U. DAI 0-36 Months on 34<sup>th</sup> month by researcher and on 35<sup>th</sup> month by another child development specialist. Both evaluations have given similar results. These parallel results verify the evaluation and show the permanent gains in E.A.'s abilities.

Results of the study show that, applications applied with E.A. in the content of “Mission: Development” Developmental Early Intervention Program have a positive effect on

E.A.'s development and gained proficiency on support needed abilities. Four developmental evaluations made during the applications show the improvement at E.A.'s development. Also positive results of the both evaluation made by researcher at 34<sup>th</sup> month and by another specialist at 35<sup>th</sup> month supports that E.A.'s gained abilities are consistent. Mother's evaluation shows that she is pleased with the applications and thinks that applications are useful for her child.

Results of research and literature about approaches and contexts that are used within the scope of the planned developmental early intervention program prove that these approaches have positive effects in early intervention studies such like results of the current study. For example, developmental early intervention program was designed as a home-based support program because child's first environment is home and home is a *natural environment* for child (Dolunay-Kesiktas et al., 2009) and child's first experiences are important for his/her development. Home environment contains several natural learning opportunities and educational activities to support child's learning and development (Mendoza, 2008). Because of these characteristics, the early intervention program is formed as home-based program. Also, home-based programs require family participation to activities. So, family contribution is also handled as an important feature of this research. It is thought to be extremely important, to teach developmental support practices/programs to parents and use them fundamental assistants, for early intervention studies. There are evidences to support this suggestion (Bac-Karaaslan & Bal, 2002; Birkan, 2001; 2002). People taking care of the children also stated that learning strategies for child care is helpful for them and results showed that they use these strategies successfully at supporting child's development (Sawyer & Campbell, 2012). And the mother's opinion supports these results.

*Activity Based Approach* is one of the approaches used in developmental early intervention programs. Basic purpose of the activity based approach is to gain children proper functional and developmental abilities. In this study, functional goals for E.A and his family were aimed at primarily according to this basic purpose (concentration, follow directives, hand-eye and body coordination). Also, developmental support programs was planned to be as daily activities and to support child's participation with his/her willingness. Activity-based approach, using natural, daily and routine activities to support children's development is stated as an effective method in ability gaining with other studies (Kurt, 2006; Bakkaloglu, 2004; Dunst et. al, 2001).

In the content of *Developmental Appropriate Programs* approach come into prominence in the planned developmental support programs, and applications are performed considering the developmental properties of the age group. Wong (2001) stated that according to Doriscoll and Nagel (1999), developmental appropriate programs have to consider children's development, growth and interest levels. For example, in the current study, E.A. was an 18 month old child and these age group children are expected to act with curiosity as a property of normal development. E.A. was encouraged to participate in applications to activate his curiosity and discover the environment (e.g. encouraging

him to contribute activities, hanging plastic bags to door handles to get his attention, etc.).

*Family Centered Approach* is another important approach in the developmental early intervention program. In early intervention services, studying with every family individually and planning intervention programs considering family's properties and opinions effect results positively. Primary principle of the family centered approach is composed of focusing family's strengths, respect family's differences and values, letting family to decide and support their authority, communicating with the family in an open and cooperative way and having a flexible approach on supplying services (Bailey, Raspa & Fox, 2012). In the current study, all of these properties are considered during the applications.

According to results and previous studies, providing the required developmental support at correct time and directing families properly is very important in early intervention studies. Brorson (2005) stated that studies that evaluated the effectiveness of early intervention mention a single point: Early intervention has a positive effect on infants and young children. When all these early intervention studies are considered, applications in this study, serves to early intervention applications/programs for 0-3 age group. In our country, there is limited number of studies especially for 0-3 age group. A study by Gul & Diken (2009) also supports this idea. They investigated postgraduate studies in Turkey and did not find any study about teaching ability to 0-3 age group children with developmental delay or disability.

This study is thought to be important for early intervention studies for 0-3 age group children with/with risk of developmental delay or developmental disability. According to results of the current study, it can be suggested to design a new "Early Intervention" regulation for 0-3 age group children and their families to guarantee their rights and opportunities; to develop a new systematical early intervention program incorporated with Ministry of Health to identify and redirect children with developmental delay or disability; to plan early intervention programs for 0-3 age group children according to natural environments, support them primarily in home environment or social environments and plan their transition to required institute based programs after 3 years old; to consider, evaluate and reorganize home environment according to developmental requirements when studying with children with developmental delay or disability; to accept individualized family education applications as a part of the early intervention program, plan it to contribute family into developmental support practices/programs and consider it as a family centered approach; to study early intervention applications in cooperation with related field specialists and according to transdisciplinary approach. More studies about early intervention programs and model suggestions for 0-3 age group children with developmental disability must be done in Turkey. Families must be consulted how to support their children's development in their natural environment, whether child has institute-based or home-based support. Appropriate home based support programs must be prepared according to family's individual properties.

### Limitation of the Study

Conducted research was limited with single participant. Also, selection criteria, using of DENVER II DST and Hacettepe University Department of Child Development-Developmental Assessment Inventory for Children 0-36 Months was the limitations of research. In addition, some cases that was encountered in subject determination process limited the research: (1) parents of children with developmental delay did not want to participate in the study, (2) parents refused to accept the status of developmental delay in their children and so they declined to attend the study, (3) most families that meet the criteria lived outside of Ankara, (4) families cannot be referred to the study unit until the diagnosis is determined because of the long duration of assessment process in hospitals, (5) most children, between the age of 12-36 months and diagnosed with developmental delay, have been receiving special education, and this condition could affect results of the study, so these children could not be included the study.

### References

- Bac Karaaslan, T. & Bal, S. (2002). *Çok düşük doğum ağırlıklı prematüre bebeklerin gelişimine ev merkezli erken eğitim programlarının etkisinin incelenmesi* [Evaluation of the effect of home-based early intervention programs on the development of very low birth weight premature infants]. Ankara: Hacettepe Üniversitesi Ev Ekonomisi Yüksekokulu Yayınları, No:12, Araştırma Serisi: 12.
- Bailey, D. B., Raspa, M. & Fox, L. C. (2012). What is the future of family outcomes and family-centered services? *Topics in Early Childhood Special Education, 31*(4), 216-223. DOI: 10.1177/0271121411427077.
- Bakkaloglu, H. (2004). *Etkinliğe dayalı müdahale programının 3-6 yaş gelişimsel geriliği olan çocukların geçiş becerilerine etkisi* [The effectiveness of activity-based intervention program on the transition skills of children with developmental delays aged between 3 and 6] (unpublished doctoral dissertation). Ankara University, Ankara-Turkey.
- Bayhan, P., Magden, D., Metin, N., Artan, I., Turan, F., Dogan, O. et al. (2012, February). *Hacettepe Üniversitesi Çocuk Gelişimi Bölümü 0-36 ay çocuklar için gelişim değerlendirme envanteri* [Hacettepe University Department of Child Development of child developmental assessment inventory for children ages of 0-36 months]. With International Participation 1st National Interdisciplinary Congress on Early Intervention, Antalya-Turkey.
- Birkan, B. (2001). *Küçük Adımlar Kursu'nun gelişim geriliği olan çocuğa sahip annelerin küçük adımları uygulama becerilerini kazanmalarına etkisi* [The effectiveness of small steps training program for parents of children with developmental delay] ((unpublished doctoral dissertation). Anadolu University, Eskişehir-Turkey.
- Birkan, B. (2002). Erken özel eğitim hizmetleri [Early special education services].. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Özel Eğitim Dergisi, 3*(2), 99-109. DOI: 10.1501/Ozlegt\_0000000062.
- Brorson, K. (2005). The culture of a home visit in early intervention. *Journal of Early Childhood Research, 3*(1), 51-76. DOI: 10.1177/1476718X05051346.

- Coskun, Y. & Akkas, G. (2009). Engelli çocuęu olan annelerin sürekli kayęı düzeyleri ile sosyal destek algıları arasındaki ilişki [The relation between anxiety level of mothers who have disabled children and social support]. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi (KEFAD)*, 10(1), 213-227. Retrieved from <http://dergipark.ulakbim.gov.tr/aeukefd/article/viewFile/5000086432/5000080386>.
- Dada, S., Granlund, M. & Alant, E. (2006). A discussion of individual variability, in activity-based interventions, using the niche concept. *Child: Care, Health and Development*, 33(4), 424-431. DOI:10.1111/j.1365-2214.2006.00700.x.
- Diken, İ., Bayhan, P., Turan, F., Sıpal, F., Sucuoglu, B., Ceber-Bakkaloglu, H., et al. (2012). Early childhood intervention and early childhood special education in Turkey within the scope of the Developmental System Approach. *Infants and Young Children*, 25(4), 346-353. DOI: 10.1097/IYC.0b013e318268541d.
- Dolunay-Kesiktas, A., Sucuoglu, B., Keceli-Kaysili, B., Akalin, S., Gul, G. & Yildirim, B. (2009). The home environments of young children with and without disabilities. *Infant & Young Children*, 22(3), 201-210. DOI: 10.1097/IYC.0b013e3181abe1ae.
- Dunst, C. J., Bruder, M. B., Trivette, C. M., Hamby, D., Raab, D. & McLean, M. (2001). Characteristics and consequences of everyday natural learning opportunities. *Topics in Early Childhood Special Education*, 21(2), 68-92. DOI: 10.1177/027112140102100202.
- Dunst, C. J. (2010). Early intervention for infants and toddlers with developmental disabilities. In S. L. Odom, R. H. Horner, M. E. Snell & J. Blacher (Eds.). *Handbook of developmental disabilities* (pp. 161-180). New York: Guilford Press.
- Epley, P. H., Summers, J. A. & Turnbull, A. P. (2011). Family outcomes of early intervention: Families' perceptions of need, services, and outcomes. *Journal of Early Intervention*, 33(3), 201-219. DOI: 10.1177/1053815111425929.
- Gul, S. O. & Diken, I. (2009). Erken çocuklukta özel eğitime ilişkin Türkiye'de gerçekleştirilmiş lisansüstü tez çalışmalarının gözden geçirilmesi [A review of master and doctoral dissertations in the field of early childhood special education in Turkey]. *International Journal of Early Childhood Special Education (INT-JECSE)*, 1(1), 46-78. Retrieved from [http://www.int-jecse.net/assets/upload/pdf/20150930231945\\_intjecse.pdf](http://www.int-jecse.net/assets/upload/pdf/20150930231945_intjecse.pdf)
- Incesoy-Ozdemir, S. (2005). *Erken çocukluk döneminde gelişimsel sorunları olan çocukların özel eğitim ve rehabilitasyon hizmetlerine ulaşmalarını etkileyen etmenlerin ve ulaştıkları hizmetlerin niteliğinin değerlendirilmesi* [Determining the barriers and facilitators that effects getting special education services at early childhood period and determining the qualifications of receiving services] (unpublished master's thesis). Ankara University, Ankara-Turkey.
- Kaur, P., Chavan, B. S., Lata, S., Kaur, A., Tinku, S., Arora Y. & Ratnam, V. (2006). Early intervention in developmental delay. *Indian Journal of Pediatrics*, 73(5), 405-408. Retrieved from <http://link.springer.com/article/10.1007/BF02758561>.
- Kurt, O. (2006). *Otistik özellikler gösteren çocuklara zincirleme serbest zaman becerilerinin öğretiminde gömülü öğretim yaklaşımıyla sunulan sabit bekleme*

- süreli öğretimin ve eşzamanlı ipucuyla öğretimin etkililik ve verimliliklerinin karşılaştırılması* [A comparison constant time delay and simultaneous prompting within embedded instruction on teaching chained leisure skills to children with autism] (unpublished doctoral dissertation). Anadolu University, Eskişehir-Turkey.
- Mendoza, J. M. (2008). *Parental beliefs, home learning environment, and school readiness in the Latino population: Does the parents as teachers program influence these three variables?* (Master's thesis). Available from ProQuest Dissertations and Theses database. (UMI No. 1460155).
- McBride, S. L. & Peterson, C. (1997). Home-based early intervention with families of children with disabilities: who is doing what?. *Topics in Early Childhood Special Education*, 17(2), 209-233. DOI: 10.1177/027112149701700206.
- McWilliam, R. A. & Scott, S. (2001). A support approach to early intervention: A three-part framework. *Infants and Young Children*. 13(4), 55-66.
- Novick, R. (1993). Activity based intervention and developmentally appropriate practice: Points of convergence. *Topics in Early Childhood Special Education*, 13(4), 403-417. DOI: 10.1177/027112149301300405.
- Perry, J. M. (2001). *Insights regarding early intervention from the perspective of mothers and home-visitors*. (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3013011).
- Pretti-Frontczak, K. & Bricker, D. (2007). *An activity-based approach to early intervention*. London: Paul H. Brookes Publishing Co.
- Sawyer, B. E. & Campbell, P. H. (2012). Early interventionists' perspectives on teaching caregivers. *Journal of Early Intervention*, 34(2), 104-124. DOI: 10.1177/1053815112455363.
- Wong, P. S. S. (2001). *The issues of developmentally appropriate curriculum: Relevance and application to the early childhood curriculum in Hong Kong*. Retrieved from <https://www.ln.edu.hk/osl/newhorizon/abstract/v43/9.pdf>.
- Yalaz, K., Anlar, B. & Bayoglu, B. (2010). Denver II Gelişimsel Tarama Testi Türkiye standardizasyonu el kitabı [Denver II Developmental Screening Test Handbook]. Ankara: Anıl Grup Matbaacılık.
- Xu, Y. & Filler, J. W. (2005). Linking assessment and intervention for developmental/functional outcomes of premature, low-birth-weight children. *Early Childhood Education Journal*, 32(6), 383-389. DOI: 10.1007/s10643-005-0008-4.