



Review Article

Which aspects of Child Development are Related to the Home Environment? : A Narrative Review

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ABSTRACT

Background: The home environment is the first context where children have experience, so in the present review article, important aspects of the child development that are influenced by home environment are analyzed, and common questionnaires were used to evaluate them.

Review of Literature: The method applied in the present study was a narrative review. Initially, a variety of different sources were employed to find the related literature. The sources included; web-based browsers of Science Direct, PubMed, Scopus, ProQuest & Google Scholar, OT Seeker, Magiran and Iranmedex with keywords combination of “Development”, “child”, “home environment”, “Measurement” & “Questionnaire” and word related to Medical Subject Headings (MeSH) adaptation. A total of 13 articles were included to be studied in detail in order to find the impact of home environment on the child developmental skills, including cognition, movement, emotion and interaction with regard to common home environment measurement.

Discussion: All aspects of the home environment such as; physical space, toys, play, and learning materials, and child-adult interaction relationship stimulate motor, emotional and cognitive development and are influential on child developmental skills. The home environment is dependent on family culture, ethnicity, social economic status, and poverty.

Conclusion: Most common questionnaires (The Home Observation for Measurement of the Environment (HOME) in domains of cognitive and social development and the Affordance in the Home Environment for Motor Development (AHEMD) in the domain of motor development) were set up to evaluate the home environment.

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Background

Human development is the process of positive changes from conception until death. Child cognitive, behavior, motor, emotion and relationship skills develop during the growth. The complex interaction between heredity and environmental-ecological features makes the outcome of the child development, which is more dependent

on heredity in infancy and decreases during growth [1, 2]. The “environment” in occupational therapy is a significant field. There are various models which highlight the interaction between Person, Environment, and Occupation as it is an important factor for human being and development. It includes two general dimensions of the human environment (physical) and non-human environment (social) which can be divided into some sub-components such as time, culture, physical, social, personal, and even virtual characteristics [3, 4].

Over the past five decades, home environment has become a central focus of inquiry in human development

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[3]. Children living in different environment tend to encounter different actions, behaviors, objects, and events and as result have different outcomes. Dynamic system theories suggest that there are a host of subsystems within the child physical and social environment which contribute to child development [5]. Complexity and multi-dimensionality of the home environment make the evaluation of contributors to child development and behaviors difficult [1]. Parents, siblings and family members, and their interaction make the human and social environment of the home that affects the behavioral and cognitive development. This interaction is defined as co-occupation in occupational science [4, 6]. Bronfenbrenner believed that family context is a microsystem of the child development environment [7] including maternal sensitivity, support for autonomy, discussion of emotional states, and quality of the father-child interaction that make a frame for emotional expression, language development, intelligence, and executive function [8].

Furniture, house decoration, toys, learning materials, child and parents interaction, and positions used in handling the child which are the majority of physical aspects of home and are defined as affordance by Gibson [9, 10] contribute to motor development with regard to problem-solving and cognitive skills. From Gibson's point of view, the "environment" refers to "resources and opportunities for action". He believes that a human infant learns via events that happen around and the quality of the child interaction with the physical environment. Therefore, Gibson defines the environment as a context for perceptual learning. The aim of this article was to review the related literature to find the effect of home environment on child development from birth to five years, and also to introduce the common home environment questionnaires.

Review of Literature

In order to find the valid resources related to the home environment, child development and its related questionnaires, a variety of relevant sources were searched including, web-based browsers of Science Direct, Pubmed, Scopus, Proquest, Google Scholar, OT Seeker, Iranmedex & Magiran. The keywords (individually and combinational) searched in this study were as follow; "Development", "child", "home environment", "Measurement", "questionnaire" and word related to Medical Subject Headings (MeSH) adaptation. The interval between year 2000 and 2018

(the time of conducted study) was considered. Overall, 1281 articles were found in the search engine at the first stage. The inclusion criteria were applied and duplicated articles were ruled out. Therefore, 44 articles remained. In the second stage, they were reviewed thoughtfully and finally, 13 appropriate articles were considered for a profound analysis (Table 1).

After inclusion criteria adaptation, 13 related articles to the aim of this review were studied in details. Some of the important points are as follow:

Home Environment and Motor Development

In a cross-sectional study by Abbott, A.L. et al. (2000), 43 homes were evaluated by Home Observation for Measurement of the Environment (HOME) and their 8-month-old infant's motor development was evaluated by Alberta Infant Motor Scale (AIMS). There was no significant relationship but results indicated that a more supportive home environment was associated with higher infant motor performance [5]. Miquelote has assessed the home environment of 32 infants and found significant positive correlations between the dimensions of the home (daily activities and play materials), global and fine motor performance. The results indicated a positive association with fine-motor performance [11]. Saccani found a moderate relationship between the home and motor development [12].

Home Environment and Cognitive and Behavioral Skills

In a cross-sectional study by Bradley, R.H (2001), 6283 homes evaluated by HOME, in children from 0 to 14 years old and their behavioral pattern, were qualified by interviewing. There is an age and ethnicity-related trend in the correlation of home environment which co-operate with behavioral development [7], review of literature by Iltus also showed that the availability of books, play materials in the home, stimulating home, parental interaction, and reading book were more related to social and cognitive development [13].

In a cohort prospective study, 102 child-parent dyads were assessed by HOME, from birth to 4 months, 6 months, and 2–3 years of age. Then their mastery motivation of children were measured at 2 and 3 years of age by Revised Infant Temperament Questionnaire and Comprehensive Developmental Inventory for Infants and Toddlers. The quality of home environment in infancy appeared to have a significant impact on the toddler's mastery motivation [6].

In a cross-sectional study by Kavousipor, cognitive skills were weakly correlated with inside physical

Table 1: Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Normal developing child	Environment-related to school, neighborhood.
Environment-related to home, family context, physical space of the home,	Obesity, addiction, asthma, <i>Acquired Immune Deficiency Syndrome</i>
Related to 1 aspect of the cognitive, motor or behavioral development	(AIDS) child abuse,...
Availability of the abstract or full text of the article	Related to language development
	animal research
	Parenting or parental rearing and related psychological issue
	Related to the social economic status of the family
	Related to questionnaire development and psychometric properties

space of home and gross motor toys in a sample of 140 infant-mother dyad [14]. Tomalski studied the home environment of 83 infants and revealed that the presence of crowd, confusion, noise, as well as the lack of routines and high unpredictability lead to more attention deficit and low cognitive function [15].

Prospective Studies

Prospective cohort study on 302 children in Austria studied the correlation of breast-feeding duration and home environment (home screening questionnaire-HSQ) on an intelligence questionnaire (IQ- Stanford-Binet Intelligence Scale) in industrial countries. They found that both factors were a strong predictor of IQ and cognitive function at 4 years [15].

A birth cohort study followed up 122 child-parent dyads from birth and then when the children were 4 months, 6 months, and 2.5 years old. Among all of the body functions, birth weight and involuntary movement reaction were the most determinants of child global development. Only infant temperament was related to home environment [6].

In a cohort study, 295 children and their families were assessed when the children were 2 and 4 years of age by McCarthy Scales of Children's Abilities (MSCA) and Haezi Etxadi Scale (home measure). The aim was to evaluate child cognitive development in relation to the social and emotional environment. The subscales of stimulation of cognitive-linguistic development, and socio-emotional development were significantly related to the child cognitive development [15].

Home Environment Related to Culture and Social Economic Status

Williams compared the home environment between American and Thai mothers by HOME scale, he found that parental factors are similar between both communities but

stimulation factors, organization and play material in Thai family were significantly lower than American population [17]. In a review, Venetsanou also mentioned that socio-economic status, mother's educational level, social-cultural context, and the existence can be counted as influence. A literature review found that environmental factors including, socio-economic status, mother's educational level, social-cultural context, and the existence of siblings can affect children's motor competence [18]. These factors which are very different among the countries may disturb cognitive development [19].

All the questionnaires of home environment evaluation used by reviewed articles are available in a table for readers (Table 2).

Discussion

According to this review, it seems that the home environment of a healthy normal child could be effective in child development. Child home environment is a complex context including, physical space and human context [4]. Human context is very dependent on culture, so the relationship between family members and child that contribute to emotional, behavioral and social development are related to the cultural context [17, 19]. On the contrary, home context as a physical and interpersonal agent is related to social economic status. Therefore, a family from a high level of social class in a developed countries have a larger physical space, more learning material and appropriate developmental output for their children [7-9]. These families also experience a high level of welfare and healthy interpersonal relationship according to parent educational level [16]. Thus the complexity of the home environment is formed by many factors related to parent education level, social economic status, ethnicity, culture, and the number of children. This kind of variables must be considered

Table 2: Characteristics of questionnaires to evaluate home environment related to child development

Questionnaire	Sub Scales	The target population	Type of evaluation
HOME	RM	IT(0-3years)	Observation of child at the home. parents interview (standard process needed for learning session and certification)
	ARP	EC(3-6years)	
	OE	MC (6-10years)	
	APM	Adolescent	
	MI	(10-15years)	
AHEMD	VDS	Care center version Disability version (22).	Evaluation is based on parents report on the colored questionnaires sheet
	PS	AHEMD-IS	
	VS	(3-18 month)	
	GMT	AHEMD- SR(18-42 month)	
Home screening questionnaire		0-3 years /3-6 years	Evaluation is based on parent report
Haezi Etxadi Scale	1- of cognitive and linguistic 2- socio-emotional 3-Organisation		direct observation, a structured interview, a joint questionnaire, and individual questionnaires
Chaos, Hubbub and Order Scale	using a 4-point scoring system that consists of 15 statements	Infants Young Children Teenagers	Evaluation is based on parent report

RM: Responsibility of mother; ARP: Avoidance of restriction and punishment; OE: Organization of the environment; APM: Appropriate play materials; MI: Maternal involvement; VDS: Variety in daily stimulation; PS: Physical Space, (Inside and Outside of home); VS: Variety of stimulation; GMT: Gross Motor Toys; FMT: Fine Motor Toys; IT: Infant/Toddler; EC: Early Childhood; MC: Middle Childhood; IS: Infant Scale; SR: Self Report; IC: Internal Consistency; ICC: Interclass Correlation Coefficient; Ref: References

in the researches related to contextual factors of child development [1, 3, 4].

Home environment which correlated to child gross and fine motor development was evaluated by Alberta Infant Motor Scale, and Bayley Ages, and Stages Questionnaire. Researchers found a correlation between the home environment and cognitive development evaluated by Bayley as well [11-13], since a child cognitive and motor development are not unrelated phenomena and there is a strong association between them [9]. Therefore, the home could be effective for motor and cognition skills. It means a more challenging home environment with less physical support including an assistive device to carry the child, and furniture with different height, creates more opportunities for postural control adaptation, gross & fine motor skills, higher level of attention, perception, and consequently problem-solving abilities [10].

Child behavior, emotion, and temperament correlate to the regularity of family routine, the amount of the chaos and disturbance in the family context. So, it seems that high-risk family including single parents, substance abuser, divorces and other similar kinds of irregularities lead to behavioral and emotional disruption, with regard to the cognitive ability and finally motor development [8, 12].

They found that the home environment could be an effective factor during growth in a different way and there is also an age-related trend. Infants are more affected by the human aspects of the home while toddlers are more affected by toys and learning materials [7, 20].

In some prospective study, it has been shown that home context could be a predictor for child IQ, temperament, cognitive, linguistic and motor skills. Therefore, it is a reliable line of research and there is a clinical application for health promotion program in normal and disabled children [15].

For evaluation of the home environment, 5 scales mentioned in Table 2 were applied. Reviewing of the articles showed that HOME questionnaire is used by researchers to evaluate the effect of the home environment on the child cognitive, social and motor development, but the results related to the relationship between motor development and HOME scores are not significantly valuable, so AHEMD was designed for more sensitive and related research. Although AHEMD was designed to evaluate affordance in the home environment for motor development, it is also employed for cognitive development. It appears that HOME is a golden, comprehensive and the most common measure to evaluate whole aspects of the home. AHEMD is relatively a new one, specific in motor development opportunities and is more user-friendly than HOME. Hence, some of its applications are running for cultural adaptation, psychometric properties in Iran and other countries [18, 19]. However, it is necessary to pay attention to HOME more than in the past. Iranian national health system has to make a courageous decision to act upon child safety and wellbeing rigorously by introducing an act to law enforcement in order to empower the Occupational therapists more upon home

visit. At first, it is recommendable to produce an Iranian version of HOME adjusted for Iranian clients. There are many risk factors within Iranian families that lead to the interference in child development, such as; poverty, lack of child developmental knowledge, addictions, and lack of regular monitoring of parents performance. Child abuse must be tackled and it requires more intervention in a health promotion program. Since there are many points of view surrounding the home environment, therefore it is essential to choose an appropriate assessment according to the aim of the study or clinical application [21].

Conclusion: All aspects of home environment must be taken into account in relation to child development. There is some consideration in such a complex issue for research and clinical application. Considering the culture, human relationship in the family, physical and learning material, they are essential and have influence on outcome. Fortunately, many questionnaires were developed to evaluate home context and environment. Health promotion program is a field of rehabilitation that can be incorporated to the home environment intervention as a new field of research and possible clinical application.

Conflict of interest: None declared.

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