

DEVELOPMENT OF CHILDREN WITH DOWN SYNDROME FROM BIRTH TO  
SIX YEARS OLD BASED ON SIX AREAS OF DEVELOPMENT.

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*To my beloved mother, father & fiancé*

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## ABSTRACT

The aim of this research is to provide a general idea of development during the period from birth to six years. This research covers specific aspects of development, such as gross and fine motor, language, cognitive, social and self help development. This research is intended to help parents, families, teachers and other practitioners who work with children of fewer than six years old. Parents wish to know what developmental progress to expect for a child with Down syndrome and how to help the child progress as fast as possible. In this research the researcher used a survey research design whereby the instrument is questionnaire and given to the respondents. The sample of this research only focuses on the children with Down syndrome from the organization and society in Malaysia and typically developing children from birth to six years old. The validity was verified by expert in the education for children with Down syndrome. Finding shows that gross motor development ( $f= 5.128$ ,  $dF=17$ ,  $p= 0.038$ ), fine motor development ( $f= 1.228$ ,  $dF=13$ ,  $p= 0.290$ ), cognitive ( $f= 0.144$ ,  $dF=7$ ,  $p= 0.717$ ), language( $f= 3.699$ ,  $dF=9$ ,  $p= 0.091$ ), social skill ( $f= 2.813$ ,  $dF=5$ ,  $p= 0.169$ ), and self-help ( $f= 6.201$ ,  $dF=5$ ,  $p= 0.067$ ).The data can be interpreted by there is significant difference between children with Down syndrome and typically developing children across all the areas of development except for gross motor development. In conclusion, both children with Down syndrome and typically developing children will develop all the domains but at their own pace whereby the children with Down syndrome will delay their development.

## ABSTRAK

Tujuan kajian ini adalah untuk memberikan idea umum mengenai perkembangan kanak-kanak sindrom Down dan kanak-kanak normal dari lahir hingga enam tahun. Kajian ini meliputi aspek-aspek perkembangan, seperti motor, bahasa, kognitif, sosial dan bantuan perkembangan diri. Kajian ini bertujuan untuk membantu ibu bapa, keluarga, guru dan pengamal lain yang bekerja dengan kanak-kanak kurang daripada enam tahun. Ibu bapa ingin tahu perkembangan kanak-kanak sindrom Down dan bagaimana untuk membantu mereka. Kaedah tinjauan penyelidikan digunakan di mana instrumen soal selidik diedarkan kepada responden. Sampel kajian ini ialah kanak-kanak sindrom Down daripada organisasi dan masyarakat di Malaysia dari lahir hingga berusia enam tahun. Kesahihan telah disahkan oleh pakar dalam bidang pendidikan untuk kanak-kanak sindrom Down. Hasil kajian mendapati bahawa perkembangan motor kasar ( $f = 5,128$ ,  $dF = 17$ ,  $p = 0,038$ ), perkembangan motor halus ( $f = 1,228$ ,  $dF = 13$ ,  $p = 0,290$ ), kognitif ( $f = 0,144$ ,  $dF = 7$ ,  $p = 0,717$ ), bahasa ( $f = 3,699$ ,  $dF = 9$ ,  $p = 0,091$ ), kemahiran sosial ( $f = 2,813$ ,  $dF = 5$ ,  $p = 0,169$ ), dan bantuan sendiri ( $f = 6,201$ ,  $dF = 5$ ,  $p = 0,067$ ). Terdapat perbezaan yang signifikan di antara kanak-kanak dengan sindrom Down dan kanak-kanak normal pada kesemua perkembangan kecuali untuk perkembangan motor kasar. Kesimpulannya, terdapat perkembangan setiap domain kedua-dua kanak-kanak sindrom Down dan kanak-kanak normal tetapi pada kadar mereka sendiri dan kanak-kanak dengan sindrom Down adalah lebih lambat berbanding kanak-kanak normal.

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**LIST OF SYMBOLS**

IQ	-	Intelligence Quotient
DS	-	Down Syndrome
MLU	-	Mean Length of Utterance
CA	-	Chronological Age
MA	-	Mental Age
PPVT	-	Peabody Picture Vocabulary Test
HELP	-	Hawaii Early Learning Profile
BCP	-	Behavioral Characteristics Progression Instructional Activities
ANOVA	-	Analysis of Variance
M	-	Mean

## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1.1 Preamble**

Human development is the complex process of growing and acquiring skills. The foundations of developments are in babies' genetic make-up and their environment. Development is a life's long process that is a result of the complex interplay of biological, physiological, cultural and environmental factors. With each person influenced by so many variables, it is logical that everyone develops in a unique way (Quinn, 1995).

According to Santrock (2010), the endpoint of development is not a predetermined and unchanging level of ability. Instead, a development is an evolving process subject to both positive and negative influences. If we view development as a process by which an individual realizes her potential then we presented with the challenge of how we can best foster the process.

Development can and should be monitored in order to optimize positive factors, such as personality traits and a supportive family environment, and to reduce the impact of negative influences such as heart conditions, health problems and other chronic

illness. Although the developmental process cannot be totally controlled, it can be dramatically affected by direct intervention (Herbert, 2005).

The process of development has been described in many different ways. One common approach is to divide the process into six areas: (1) gross motor, (2) fine motor, (3) language, (4) cognition, (5) social skill and (6) self-help (McConnaughey & Quinn, 1995). Although each area has its own developmental sequence, they all are closely interrelated. Progress in one area affects progress in others in obvious and subtle ways. For example, the child's ability to speak will be a major factor in his/her social and play skills; his/her dexterity will affect his/ her self-help skills significantly.

Through gross motor development, a child learned to move her body by using his large muscles, including those in the arms, legs and abdomen. Sitting up, crawling, walking and climbing are all important gross motor skills. These skills allow the child to move around, explore his world and lay a foundation for growth in each area (Gestwicki, 2007).

Nonetheless, development in fine motor is also crucial. It involves the skills to control his small and detailed movements. Typical fine motor muscles include the muscles in the fingers and hands. Skills like picking up a small object, using the index to probe and poke others, and squeezing soft objects are important fine motor skills. The control of eyes muscle as well as facial and tongue movements are also important parts of the fine motor repertoire (McConnaughey & Quinn, 1995).

Next is the language. According to Rondal and Buckley (2003), learning to communicate is one of the most important and remarkable accomplishments of childhood. Language development is usually divided into two areas, which are receptive language and expressive language. Receptive language is the ability to understand words and gestures. While expressive language is the ability to use gestures, words and written symbols to communicate. In the acquisition of language skills, the understanding of a

word as in the receptive skills usually precedes the ability to express the word. It is not uncommon to hear a parent saying that their children understand more than their saying. In analyzing our own language, we will realize that we have a far greater receptive vocabulary than the number of words we use in everyday conversation (Brock & Rankin, 2008).

Subsequently, cognition has been the subjects of many books and its definition the object of much debate. In a practical study of development, cognition can be viewed as the ability to reason and solve problems. In children, these skills include the ability to understand object permanence, to understand cause and effect, and to draw conclusions from the direct experience and later from observation or recall. These complex and abstract concepts take time to learn and the children usually learn them from play and interactions. As an example, finding hidden objects teaches object permanence; spilling a container teaches causes and effect; stacking blocks provides the opportunity to experience the concepts of size and shape. Each and every of these skills helps to build the important foundation of concepts that the child needs to understand how the world work, how the objects relate to one another, and how he might manipulate the environment.

Another area is social development. Social development is the ability to functioning in relationship to others. From birth onward, babies learn how to respond appropriately to themselves and relate to others. They learn how to play with people and objects, become attached to people, and learn ways to assert their individual independence (Gestwicki, 2007). As toddlers, they began functioning in a society of peers. These are the foundation skills that enable babies to mature into functioning members of society.

The last area is self-help. It is the ability to take care of oneself, and is an important area of development. At birth, babies are totally dependent on others for their

care. As they grow and develop, they acquire like feeding, dressing and toileting which allow them to be more independent.

Asking questions about development is natural for all parents. “What will my baby do and when should she do it? How can I help my baby learn the skills he needs?” By learning basic sequence of human development that is the progression of learning skills, parents can begin to put their child’s growth and learning. Every children preferred ways of learning. For instance, one child may learn best using trial and error. Most will choose to learn new tasks on the way that us easiest for them. Because of the unique characteristics of children with Down syndrome, they often need special guidance to help them master the same skills other children acquire (McConnaughey & Quinn, 1995). Parents or trainers may need to discourage the child from taking the path of least resistance. For example, when the baby may completely finish a bottle that is propped for her, but would do better if parents or trainers encouraged her to hold the bottle with both her hands herself. By doing so, it may involve a great deal of intervention initially, but will be rewarded in both fine and gross motor progress.

If parents or trainers aware of the child’s strength and weaknesses, they will be better able to give the child the help that he may need to develop optimally. If we know the stumbling blocks, we will have better chance of devising ways to overcome or minimize them. Children with Down syndrome can have specific characteristics that hinder the development. Therefore, we need to identify and specify them in order to have a smooth child’s development.

## **1.2 Background of Study**

Development is the process whereby a young baby and child explores and learns and grows into adulthood. Individual skills are built up and combined to produce ever more sophisticated achievements (such as walking, talking, playing, thinking and

communicating). Development is a difficult concept and many theories exist to explain how development occurs. Many books have been written to contribute to our knowledge and there is still much to learn about the developing child. Development takes place at the greatest rate in the early childhood years. Many skills emerge during these early years and there is wide variation in the timing of milestones from child to child. There are five main groups of skills that make up the developmental milestones. A child may have a developmental delay in one or more of these areas.

- i. **Gross motor:** using large groups of muscles to sit, stand, walk, run, etc., keeping balance, and changing positions.
- ii. **Fine motor:** using hands and fingers to be able to eat, draw, dress, play, write, and do many other things.
- iii. **Language:** speaking, using body language and gestures, communicating, and understanding what others say.
- iv. **Cognitive:** Thinking skills including learning, understanding, problem-solving, reasoning, and remembering.
- v. **Social:** Interacting with others, having relationships with family, friends, and teachers, cooperating, and responding to the feelings of others.

Usually, there is an age range of several months where a child is expected to learn these new skills. Some skills need to be developed before new skills can be learned. For instance, children must learn to crawl before they can walk. If the normal age range for walking is 9 to 15 months, and a child still isn't walking by 20 months, this would be considered a developmental delay. Yet, regardless of the rate, every child develops continuously according to his or her own pattern. Despite variability from child to child, there is a general order in the progressive development of individual skills. Simple skills precede the more difficult ones. For example, infants reach out and touch objects before grasping and playing with them. Noises and gestures convey meaning before words are spoken. Toddlers scribble before they begin to draw shapes such as faces. Growth in each area of development is related to growth in the other areas. So if there is a difficulty

in speech and language, it is likely to influence development in other areas such as social or cognitive development.

Parents and others become aware of delay when the child does not achieve some or all of the milestones at the expected age. Other children may present with behaviour problems which may be associated with delayed development. The term developmental delay is often used until the exact nature and cause of the delay is known. The significance of the delay is often only determined by observing the child's development over time.

Children with Down syndrome diagnosed as genetic cause may be having this developmental delays. Therefore it is important to do a research in the development of these children in order to see the development of the areas as compared to the typically developing children.

It is important to identify development of children early so that treatment can minimize the effects of the problem or an intervention can be applied in order to help the children. Many developmental delays can be treated early so that by the time a child is in school, he or she has caught up to his or her peers. However, since many delays are not diagnosed until a child is in school, this creates a greater impact on the child since the window for early intervention has been lost. Once a child is diagnosed and a proper treatment plan is in place, many children are still able to overcome the impact of their developmental delays.

### **1.3 Problem Statement**

Development refers to change or growth that occurs in a child during the life span from birth to adolescence. This change occurs in an orderly sequence, involving

physical, cognitive , and emotional development .These three main areas of child development involve developmental changes which take place in a predict-able pattern (age related), orderly, but with differences in the rate or timing of the changes from one person to another.

The first years of life are important, because what happens in early childhood can matter for a lifetime. Science shows us what children must have, and what they need to be protected from, in order to promote their healthy development. Stable, responsive, nurturing relationships and rich learning experiences in the earliest years provide lifelong benefits for learning, behavior and both physical and mental health.

The aim of this research is to provide a general idea of development during the period from birth to six years. This research covers specific aspects of development, such as gross and fine motor, language, cognitive, social and self help development. This module is intended to help parents, families, teachers and other practitioners who work with children of fewer than six years old. Parents wish to know what developmental progress to expect for a child with Down syndrome and how to help the child progress as fast as possible.

These two main questions are addressed, with milestones for development included, and a discussion of the wide range of individual differences in rates of development of children with Down syndrome. In order to answer the question of how to help children to progress, the reasons for their developmental profile are outlined as far as they are known, as this information should help to identify effective therapy and teaching strategies. The question of how to help also leads to a discussion of early intervention, what interventions are effective and the importance of balancing family needs with the needs of the baby with Down syndrome. However this research only focuses children with Down syndrome developmental milestone.

In order to understand the ways in which having Down syndrome affects children's development it is necessary to consider what is known about the development of typically developing children. In the last thirty years, there have been considerable advances in our understanding of the processes of development, particularly in the areas of social learning, cognition and language. The greater our understanding of normal development, the easier it is to begin to understand the effects of a disabling condition such as Down syndrome on the processes of development. As we identify the specific effects of Down syndrome on development, we are in a better position to develop effective interventions and teaching strategies.

As a result, that is why we need to identify the development of Children with Down syndrome from birth to six years old and compare to the normal development.

#### **1.4 Objectives of Study**

The objectives of this study are as follow:

- 1.4.1 To identify the six areas of development ((i) gross motor, (ii) fine motor, (iii) language, (iv) cognition, (v) social skill and (vi) self help) of children with Down syndrome from birth to six years old.
- 1.4.2 To identify the six areas of development ((i) gross motor, (ii) fine motor, (iii) language, (iv) cognition, (v) social skill and (vi) self help) of typically developing children from birth to six years old.
- 1.4.3 To make a comparison between Down syndrome and typically developing children from birth to six years old based on the six areas of development.

## **1.5 Research Questions**

The research questions of this study are as follows:

- 1.5.1 What are the developmental milestones of ((i) gross motor, (ii) fine motor, (iii) language, (iv) cognition, (v) social skill and (vi) self help) of children with Down syndrome from birth to six years old?
- 1.5.2 What are the developmental milestones of ((i) gross motor, (ii) fine motor, (iii) language, (iv) cognition, (v) social skill and (vi) self help) of typically developing children from birth to six years old?
- 1.5.3 Is there any significant different between children with Down syndrome and typically developing children from birth to six years old based on the six areas of development?

## **1.6 Research Hypothesis**

The research hypothesis of this study is as follows:

- H<sub>0</sub>1: There is a significant difference between children with Down syndrome and typically developing children from birth to six years old based on the six areas of development.

## **1.7 Significance of Study**

This research indirectly attempts to gauge, in the Malaysian context, the extent which the development of today's children including normal and Down syndrome from birth to six years old. Apart from that, the findings of this research may also propose some guidance for parents, caretakers, trainers and also teachers. It is also to show people on how their children develop even though with disability but might have better

educational opportunities, better health practices and better laws to protect the rights of their children.

## **1.8 Scope of Study**

The scopes of the study include:

- 1.8.1 The respondent of this study is only limited to normal and Children with Down syndrome of age from birth to six years old.
- 1.8.2 The areas of development only focusing on the six areas which are (1) gross motor, (2) fine motor, (3) language, (4) cognition, (5) social skill and (6) self help

## **1.9 Definitions**

There are some terms that need its definition and being used in this study. The definitions are as follows:

### **1.9.1 Children**

By definition, children are young human being below the ages of 18 years old and full physical development. In this study, the research only focuses on the children of age six years old and below.

### **1.9.2 Typically developing children**

Typically developing children are children do not have any physical and mental disabilities. They are healthy in terms of following the norm of development from birth. In this context typically developing children that form birth to six years old that do not have any disabilities physically and mental.

### **1.9.3 Children with Down syndrome**

The children that have being diagnosed with disability from birth with Down syndrome by the doctor. Their developmental growths are occupied with much other impairment such as vision, hearing, physical and also mental. In the context of research, children with Down syndrome are children who are diagnosed with this disability and aged below six years old.

### **1.9.4 Development**

Development is the study of how children develop on physical, intellectual and social levels. In the context of the study, development referring to how children with Down syndrome and typically developing children develop in six areas which are gross motor, fine motor, cognitive, language, social skill and self help.

### **1.9.5 Gross motor development**

According to Encyclopedia of Nursing and Allied Health, Gross motor skills encompass the abilities required to control the large muscles of the body for walking, running, sitting, crawling, and other activities. The muscles required to perform gross motor skills are generally found in the arms, legs, back, abdomen, and torso. Gross motor skills involve control of the extremities (arms, legs, hands, and feet) and torso.

There is an orderly sequence for development of these muscles. Although norms for motor development have been charted in great detail by researchers and clinicians over the past 50 years, the pace of development varies considerably from one child to the next. As skills become more complex, the degree of variation increases among typically developing children. The normal age for learning to walk has a range of several months, while the age range for turning one's head, a simpler skill that occurs much earlier, is considerably shorter. In addition to variations among children, an individual child's rate of progress varies as well, often including rapid spurts of development and frustrating periods of delay. Although rapid motor development in early childhood is often a good predictor of coordination and athletic ability later in life, no strong correlation has been demonstrated between a child's rate of motor development and intelligence. In most cases, a delay in mastering a specific motor skill is temporary and does not indicate a serious problem. However, medical advice should be sought when children lag significantly behind their peers in motor development or if they regress and lose previously acquired skills. However, in this research, the criteria set for gross motor are, head movement, rolling, sitting, standing, crawling, walking, running, jumping and multimovement.

### **1.9.6 Fine motor development**

According to Encyclopedia of Nursing and Allied Health, Fine motor skills encompass the abilities required to control the smaller muscles of the body for writing, playing an instrument, artistic expression, and craft work.

The muscles required to perform fine motor skills are generally found in the hands, feet, and head. Fine motor skill involves deliberate and controlled movements requiring both muscle development and maturation of the central nervous system. Although newborn infants can move their hands and arms, these motions are reflexes that a baby cannot consciously start or stop. The development of fine motor skills is crucial to an infant's ability to experience and learn about the world and thus

plays a central role in the development of intelligence. Like gross motor skills, fine motor skills develop in an orderly progression, but at an uneven pace characterized by both rapid spurts and, at times, frustrating but harmless delays. In most cases, difficulty with acquiring certain fine motor skills is temporary and does not indicate a serious problem. However, medical help should be sought for children who are significantly behind their peers in multiple aspects of fine motor development; or if they regress, losing previously acquired skills. In this research, fine motor is define only to visual contact, arm movement, fingers coordination, holding objects, body movement, locating object, and writing

### **1.9.7 Language development**

According to the Encyclopedia of Children's Health, language development is the process by which children come to understand and communicate language during early childhood. From birth up to the age of five, children develop language at a very rapid pace. The stages of language development are universal among humans. However, the age and the pace at which a child reaches each milestone of language development vary greatly among children. Thus, language development in an individual child must be compared with norms rather than with other individual children. In general girls develop language at a faster rate than boys.

Receptive language development (the ability to comprehend language) usually develops faster than expressive language (the ability to communicate). Two different styles of language development are recognized. In referential language development, children first speak single words and then join words together, first into two-word sentences and then into three-word sentences. In expressive language development, children first speak in long unintelligible babbles that mimic the cadence and rhythm of adult speech. Most children use a combination these styles. In the context of this research, language development is only emphasize on the vocalize ability, verbalize ability, and express thoughts or feeling, and communication.

### **1.9.8. Cognitive development**

Cognition or cognitive development refers to how a person perceives, thinks, and gains understanding of his or her world through the interaction of genetic and learned factors. Among the areas of cognitive development are information processing, intelligence, reasoning, language development, and memory.

Historically, the cognitive development of children has been studied in a variety of ways. The oldest is through intelligence tests, such as the widely used Stanford Binet Intelligence Quotient (IQ) test first adopted for use in the United States by psychologist Lewis Terman (1877–1956) in 1916 from a French model pioneered in 1905. IQ scoring is based on the concept of "mental age," according to which the scores of a child of average intelligence match his or her age, while a gifted child's performance is comparable to that of an older child, and a slow learner's scores are similar to those of a younger child. IQ tests are widely used in the United States, but they have come under increasing criticism for defining intelligence too narrowly and for being biased with regard to race and gender.

In contrast to the emphasis placed on a child's native abilities by intelligence testing, learning theory grew out of work by behaviorist researchers such as John Watson (1878–1958) and B. F. Skinner (1904–1990), who argued that children are completely malleable. Learning theory focuses on the role of environmental factors in shaping the intelligence of children, especially on a child's ability to learn by having certain behaviors rewarded and others discouraged. However, in this research the researcher only limits the definition to perception, concentration, logical thinking and memory.

### **1.9.9 Social Skill Development**

Social skill development refers to the social, emotional, and cognitive skills and behaviors that children need for successful social adaptation. Despite this simple definition, social competence is an elusive concept, because the skills and behaviors required for healthy social development vary with the age of the child and with the demands of particular situations. A socially competent preschool child behaves differently from a socially competent adolescent. Conversely, the same behaviors (e.g., aggression, shyness) have different implications for social adaptation depending on the age of the child and the particulars of the social context.

A child's social competence depends upon a number of factors including the child's social skills, social awareness, and self-confidence. The term social skills describes the child's knowledge of and ability to use a variety of social behaviors that are appropriate to a given interpersonal situation and that are pleasing to others in each situation. The capacity to inhibit egocentric, impulsive, or negative social behavior is also a reflection of a child's social skills. The term emotional intelligence refers to the child's ability to understand the emotions of others, perceive subtle social cues, "read" complex social situations, and demonstrate insight about others' motivations and goals. Children who have a wide repertoire of social skills and who are socially aware and perceptive are likely to be socially competent.

Social competence is the broader term used to describe a child's social effectiveness. It defines a child's ability to establish and maintain high quality and mutually satisfying relationships and to avoid negative treatment or victimization from others. In addition to social skills and emotional intelligence, factors such as the child's self-confidence or social anxiety can affect his or her social competence. Social competence can also be affected by the social context and the extent to which there is a good match between the child's skills, interests, and abilities and those of peers. For example, a quiet and studious boy may appear socially incompetent in a peer group full

of raucous athletes but may do fine socially if a more complementary peer group can be found for him, such as children who share his interests in quiet games or computers. In the context of the research, it defines as the development of social, emotional and play of the children.

#### **1.9.10. Self-help Development**

This term can be defined as “those basic skills needed to take care of one’s own needs.” Examples of self-help skills include brushing teeth, washing hands, using a tissue, buttoning/ unbuttoning buttons, etc. However, in the research, self-help development only refers to personal hygiene, dressing and feeding.

#### **1.10. Conclusion**

In this chapter, the researcher has made the introduction of the research, that is the development of children with Down syndrome and typically developing children based on the six areas of development, namely gross motor, fine motor, cognitive, language, social skill and self help. In addition, this chapter the researcher explained about the background of study, objectives of the study, scope of study, significance of study and all the definition of terms.

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