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Effect of Family's Engagement in Music Therapy Early Intervention: A Literature Review

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Abstract

In early intervention programs, research has established the positive effect music therapy has on children with disabilities' ability to engage in environment more effectively. Also, family engagement is noted to benefit the music therapy process in early intervention. This thesis describes developmental disabilities in early childhood stages, and the relationships between music therapy and parent-child engagement. Music applied as an intervention helps the development of cognitive skills, language skills, social-pragmatic skills, and social-behavior skills (Greenspan, 2006). Sensory stimulations, caregivers' attention and response, nonverbal stimulations and communications skills from caregivers affect children's developmental stages. Six stages of floortime are used to engage the therapists, children, and parents in the intervention process. In this thesis, the parent-child interventions in music therapy for prenatal period, premature infants, rehabilitative period, and children with emotional/physical disorders are discussed. In this literature review I conclude that parent-child musical interventions has positive effects on children's development.

Effect of Family's Engagement in Music Therapy Early Intervention

Introduction

The effect and benefits of using music therapy with children who have developmental delays has been studied extensively in recent years. Music therapy has been used with children with disabilities including physical disabilities, mental disorders or multiple disorders (Aldridge, Gustroff, & Neugebauer, 1995, p. 197). The creativity of music can facilitate the clients' specific developmental changes of action and purposeful movement in pre-verbal or other important aspects in early intervention treatments (p. 204).

The developmental milestones of children with developmental delay have been reported in various studies. Those studies presented children's development in cognitive skills, language skills, social-pragmatic skills, and social-behavior skills. Greenspan's developmental stages shows that children before thirty-six months typically achieve skills including: regulation and interest in the world, attachments, Intentional two-way communication, behavioral organization, behavioral elaboration, representational capacity, representational elaboration, and emotional thinking (Wheeler & Stultz, 2008). Music therapy as an intervention treatment is not only used to improve the client's physical needs but also developmental and life needs. Music therapy can help individuals to achieve their developmental milestones, improve their quality of life, and strengthen functioning expression skill to communicate with others (Aigen, 1995). Music therapy can bring improvement on psychological and physiological health of human beings. There are five factors assumed which contribute to the effects of music therapy. These factors are attention, emotion, cognition, behavior, and communication (Koelsch, 2009, p. 374).

Music therapy offers people with developmental delays opportunities to achieve their life needs. Through music therapy, individuals can become aware of themselves fully while addressing typically psychotherapeutic goals, such as enhancing self-esteem, and gaining an entry point to deeper levels of emotional expression (Aigen, 1995, p. 44). The aim of this capstone project is to detail the connections between music therapy and children with developmental delays in early intervention and the effects of family engagement in music therapy early intervention. In this literature review, I explore music therapy assessments for children with developmental delays for each stage, the connection between application of music therapy methods and various developmental delays symptoms, the role of family engagement in child development, family-based music therapy interventions and the gap of recent articles related to this topic.

Literature Review

Music is a bridge between soul and art. Music offers a space where people can express themselves in unique ways and is an accessible resource in people's daily life. It includes history, culture, and personal style. Most people enjoy exploring themselves through music. Through music, people can find their humanity, as music connects their feelings, emotions, desires, and deepest thoughts. Music therapy is one of the arts therapies which utilizes music as a media in a treatment process. However, music applied in a therapeutic way may be more beneficial than the music itself.

Pavlicevic (1997) described music as "not an end in itself but is used as a means to an end" (p. 24). In music therapy, music therapists not only offer music or model the way to play it, but music therapists observe the ways the client(s) play their music or the way people feel while doing so. Music therapists provide clinical interventions based on the clients' strengths. Each in-

dividual has various feelings about the same music piece, exploring and connecting the relationships between therapists' feelings and the clients' feelings, which enhances music's therapeutic effect. Music therapy has also been described as "the controlled use of music in the treatment, rehabilitation, education and training of children and adults suffering from physical, mental or emotion disorder" (Bunt & Stige, 2014, p. 16). The therapeutic purpose of music therapy is to improve health, and the settings of the therapeutic process may impact the result of the treatment (pp. 16-19).

Seeing music therapy as a musical medicine treatment, rhythm, lyrics, tone, harmony, and melody may be applied in the treatment to achieve the clients' clinical goals. Brain and blood flow are found to be affected by different musical elements. Rhythm is activated in the areas of Cerebellum, Broca's area, and Basal Ganglia; tone activates the Right Hemisphere; harmony and pitch are activated in the Left Hemisphere; lyrics impact Broca and Werniche's Area; melody activates Hemispheres (Reiterer, Erb, Grodd, & Wildgruber, 2008, pp. 1-2). Musical stimulations may be used to impact the brain areas and various skills and functions might be activated in the process (Reiterer et al., 2008).

History of Music Therapy

History provides many examples of musical interactions for health and healing. For example, in Egyptian music in the Babylonian period (c. 1850 B.C.) was used to influence human's body (Horden, 2017). Music was believed to alter breath and even death through pitch and terrify sound. In Greece, Aristotle and Plato believed music to have a deeper influence on human's mood. They developed four music thoughts system, includes moving or imitating emotions, giving pleasure, disposing toward moral virtue, and fostering intellectual advancement (Horden, 2017).

In modern music therapy history, Austrian music therapy training was established in 1959. However, the United States was the first country to develop music therapy as a modern profession and discipline. Music was found to be applied in a London hospital in the mid-to late-twentieth-century. At that time, musicians were not able to have communication with patients. There were reports in both *Lancet* and the *British Medical Journal* that music can reduce pain and calm the patients during the treatment (Bunt & Stige, 2014, p. 5). In the early twentieth century, physicians believe that music not only could activate metabolic functions but also sooth patients and music was used in the hospital to bolster soldier's morale.

The World War II was the great divide for the development of music therapy as a modern discipline and profession. The United States, as the first country to develop music therapy as a modern profession and discipline, had amounts of veterans sent into the hospital. The needs of musicians made hospitals start to hire musicians regularly. However, as reported by physician and musician George W. Ainlay (as cited in Bunt & Stige, 2014, p. 7) the health value of music was not easy to accept by Euro-dominant medical fields until the 1940s and 1950s. Moreover, lacking knowledge of assessment procedures, medical background, and physiological knowledge gave musicians more challenges to achieve their treatment goal. The awareness of this problem led to the creation of professional music therapy education, and the first training curriculum was established in 1944 in Michigan State University (Bunt & Stige, 2014, pp. 5-7).

Principles of Music Therapy

There are many principles in music therapy that are based on the treatment setting and goals yet foundational principles do exist that inform many music therapy practices, specifically: the Iso-principle, protocol planning, the many faces of changes. The first principle to be dis-

cussed in this project is the ISO principle which based on matching music to the clients' demonstrated behaviors and emotions. Ira Altshuler (1948) further developed this principle to include "iso-moodic," which is also called the principle of entrainment. This principle states that feelings and individuals' conditions can be connected together through music. Music therapists usually choose the matched music style for each treatment and adjust meter, volume, and duration to achieve the clients' needs. There are three common situations to apply this principle in music therapy: habilitation, rehabilitation, and therapy. The "need for habilitation is to develop skills that are needed but not already present; need for rehabilitation is to reestablish lost skills or to replace old skills with new ones; need for therapy is to change behaviors on a more immediate basis to provide relief for troubling conditions" (Donald & Pinson, 2012, pp. 27-28).

The second principle is *protocol planning*. The idea of protocol planning is the process of removing and rebuilding. During the music therapy treatment, music therapists will determine the level of stress and distress level of the individuals through scales or observation, and design a specific plan for each individual based on scales and their medical history. Through the preparation, the result of the assessment usually shows individuals' strength and weakness that help music therapists to identify the best way to achieve individuals' needs. This principle is beneficial for both sound stimulus and social needs (Donald & Pinson, 2012, p. 29).

The third principle is The Many Faces of Change. During the process of growing up, individuals have to get through many times of depositing skills and behaviors and replace them with new skills and behaviors. Music therapists will help the individuals to develop all aspects of skills that they need and help them to identify themselves during the process. Moreover, music therapists can offer an environment to match the clients' needs and provide a basic support through music-making experiences (Donald & Pinson, 2012, p. 31).

Early Intervention

Early intervention is defined as the provision of support to families of infants and young children from members of informal and formal social support network members that impact both directly and indirectly upon parent, family, and child functioning (Dunst, as cited by Dunst, 2000). The purpose of early intervention is to help children with developmental difficulties to improve daily quality of life. The assessment activities of intervention might be designed differently from individual to individual. Ramey and Ramey (1998) believe early intervention and children's development should be seen as intertwined. Early intervention should be designed based on family's factors and individual's developmental needs. Through observation and evaluation of the child's background, the intervention itself can support children's developmental improvement (Ramey & Ramey, 1998).

The impact of family is one focus in early intervention program, and family's engagement is often dependent on various levels social support influenced by parents' health and income and the support recipients. Along with the eruptive knowledge of early intervention in the recent years, we know that the process of early intervention needs supports and connections from the family, social net, and children themselves. For example, family resource is not the only source of support in early intervention. Support itself includes the inner and outer strengths from family; for example, parenting style might be seen as one of the important factors to children's development. Moreover, parents' behaviors in daily life and parents' development experience are also included as environmental factors (Dunst, 2000, p. 99).

Age development. According to Greenspan's (2006) developmental stages, the connection between intervention and human development can be divided in three parts: the biological and genetic makeup, the social environment, and the core developmental capacities. Biological

factors impact children's strengths or weaknesses, including language skills, motor skills, sequencing, sensory and affective modulation. Social environment, such as cultural background and family factors, helps children to shape their personal character, including thoughts, feelings, and behaviors. Core developmental capacities, which is a combination of biological and social environment makeup, includes interaction with others, self-regulation, preverbal two-way effective communication, and use of symbols. Lacking of these abilities may bring out developmental delays or symptoms (Greenspan, 2006, p. 3).

Functional emotional developmental levels are used to evaluate children's daily capacities in Greenspan's (2006) development theory. Functional emotional developmental levels include shared attention and regulation, engagement and relating, two-way intentional affective signaling and communication, long chains of coregulated emotional signaling and shared social problem solving, creating representations or ideas, and building bridges between ideas those six levels.

From 0 month to 3 months, infants are experiencing self-regulation, interest with the world, and sensory organization, which is called shared attention and regulation level. In this stage, sleep–wake cycles, cycles of hunger and satiety are important to infants. A routing schedule helps infants to adapt to the environment quicker. In this stage, infants also need to learn how to respond to the environment with appropriate emotion. Caregivers in this level can provide befitting stimulations through daily activities. In the interaction processes, caregivers have to support infants to practice regulating at first; after, the caregivers can decrease supports once infants can regulate themselves. The interventions that caregivers can use for this age of infants are repe-

tition and giving motor sensory stimulations, as these are skills that children in this age are learning. Infants also explore sensory organization through stimulations in the environment. For example, the infants respond more to higher pitch of sound with visual or sound responses.

When infants turn 2 months, they enter the engagement and relating stage. Infants focus more on human face and voice. Through incept visual and hearing stimulations, infants process their sensory experience and engage in the environment. It can be seen as the first step of exploring their social behavior and being part of the community. The attachment patterns and behavior between caregivers and infants might be impacted by early engagement in this stage. In this stage, infants can adapt all the emotions from their prime caregivers by all the sense. Through accepting the voice and eye contact, infants can feel the emotions from the caregivers, and usually respond with coincidental mouth, arm, and leg movements (Greenspan, 2006, pp. 19-21).

After 3 months, infants use lamb movements, voice, and facial expression to engage in the environment and interact with caregivers, which is called Two-Way intentional affective signaling and communication stage. In this stage, infants have the ability to apply emerging logic purposefully in the reactive game with caregivers and expect to play a role in the game. The way of exploring the environment of infants is intended to produce cause-and-effect relationships rather than facultative. Some infants may disconnect with emotions in this stage since they experience unfulfilled sensory experience. Infants usually can experience cause-and-effect relationships of dependency. Defiance of presents with biting or butting head might happen in this stage if the environment cannot achieve their expectation.

When infants enter 4 months, they usually have the ability to feel fear, joy, pleasure, and other emotions. Infants in this age also learn to label feelings. Infants label their feelings depending on their emotional experience in this stage. According to different experience, each infant

might react differently to the same stimulation. The symptoms of incomplete development in this stage include "irregular body functions, unusually intense reactions, a tendency to withdraw from new situations, a generally negative mood, and a tendency to adapt slowly to change" (Greenspan, 2006, p. 18). By 4 months, infants can present negative emotion to the environment, but they also can adjust the emotional range to fit the environment. Building a flexible and comprehensive environment helps infants to develop attachment style; in reverse, infants might have attachment difficulties. The deeper emotion level that infants experience in this level, the more connections between relationships infants can develop. In this stage, infants develop *Proximal modes* and *distal modes. Proximal modes* are connecting their feelings and physical reactions; *distal modes* are connections among communications: visual, auditory, and emotional signaling (Greenspan, pp. 2006, 19-22).

During the first year, infants develop nonverbal skills to communicate with others. They usually respond when the stimulation happens in the environment, and still cannot define "me" and "others" in the relationships. Emotional world, sense of purpose, and sensations responses could be seen as the path to build up infants' self-identity in this developmental stage (Greenspan, 2006, pp. 21-23).

Between 16 and 24 months, toddlers can transfer the thoughts and actions to idiographic image in mind, which is the capacity for "object permanence". In this developmental stage, toddlers are able to recall and search for an object. This ability might not be stable during this period; after this period, toddlers' behaviors are impacted by this mode. In this stage, toddlers also learn to use their mouth muscle to pronounce words, moreover, having the ability to construct words makes toddlers give meaning to the emotions and vocabularies. Toddlers can use symbols to organize thoughts in mind (Greenspan, 2006, pp. 29-30).

During the second year, infants usually develop complex communications and connections with the environment. They have the ability to apply social cues to complete the reactions with others in this developmental stage. They start to realized there are "me" and "others" who exist at the same time in the relationships, and it's not only a passive two-way response. Moreover, they start to figure out the new solutions and learn to identify their own culture. While infants are increasing their problem-solving ability, their sensory experience has been strengthened. They imitate others' actions to greet other people in the environment. Through learning to socialize their modes, they develop full-aspect social ability (Greenspan, 2006, pp. 24-29).

Between two and five years old, toddlers have the ability to develop deeper emotions and realize the relationships better. They are able to connect their feelings and show loss, anger, sadness, empathy and sympathy with their experience. Also, in this stage, toddlers are able to accept separations (Greenspan, 2006, p. 33).

About halfway through their second year, toddlers develop the capacity for logical thinking. They start to connect their own thoughts, feelings, and actions with others'. In this stage, toddlers have the capacity to realize not only "me" and "others" but also realize themselves as an individual who can take different roles in different situations. Toddlers can differentiate between different versions of different "I". They also have the ability to recognize those versions of "I" with others in relationships. Toddlers in this stage are trying to organize complex sensory information. They can use complex language skills to understand and express the situations that happen in the environments; they start to play games with logic and causality. Caregivers help toddlers to name those complex feelings and thoughts, which can improve toddlers' emotional experience (Greenspan, 2006, pp. 32-34).

Symptoms and delays. As Greenspan mentions in the age development part, sensory stimulations from caregivers can help infants to improve sensory organization between 0-3 months. After 2 months, the infants with disorder might avoid eye contact or react antipathetically to smell, sounds and touch if they cannot connect to the environment appropriately. Infants with disorganized sensory experience in this stage might avoid sensory connection from others, for example, touch and sounds. Moreover, infants' early attach pattern can be impacted by a disruptive environment. When infants are learning cause and affect emotional process, some of them might not share intimate relationships with others. If they have less experience of shared warmth, closeness or compassion in relationships, they might experience disorder of nonverbal expression (Greenspan, 2006, pp. 20-21).

After three months, caregivers' attention and response could cause different reactions from babies: a less or primitive response could make babies develop a flat affect and negative emotions. Caregivers should take a role to offer back and forth relationships rather than one-way relationships in this stage in order to prevent babies from developing flat affect of emotion experience and response (Greenspan, 2006, p. 23).

If infants are unable to modulate their sensory experience between 3 and 10 months, they might be unable to organize nonverbal stimulations and communications from caregivers. When infants turn 5 months, continuing disruption in the environment might cause infants to have early attachment difficulties: infants might encounter difficulty having sympathy and empathy emotion once the learning environment is not continuing to stimulate the infants (Greenspan, 2006, pp. 21-23).

Also, experiencing a neurological disorder might cause toddlers to be unable to connect emotions and vocabularies from 16 to 24 months. The toddlers who have language delay might

also be unable to pretend play. The ability of organizing symbol and thoughts can be limited in this developmental stage (Greenspan, 2006, pp. 29-30).

After 2.5 years old, when logical thoughts become typical developmental milestone, some toddlers might have difficulty to understand thoughts and words if they have a disorder of recognizing sounds. Transferring sounds to image in mind becomes more difficult for toddlers with disorders which cause a weak short-term memory of both sounds and image. Due to lacking solid logical thoughts, a learning disability might appear and cause confused emotional interactions (Greenspan, 2006, p. 33).

Intervention. Usually, early intervention includes goals and objectives. Before giving the intervention, therapists assess the needs of the individuals. For example, if the individual needs help with functioning and behaviors, therapists will need to analyze individuals' behaviors with a functional analysis. Through observing process, therapists can settle the events that precede the problem behaviors (antecedent); the event that immediately follows the problem behaviors (consequence); and the duration of the problem behaviors (Donald & Pinson, 2012, p. 65). Also, solving the core emotional conflicts is one of the typical goals. Therapists also can help individuals to express their deeper thoughts and feelings through play and talk. Through play, the selected toy and conversation during the game, therapists may infer the underlying problems. Moreover, the intervention processes could include parents. According to parent's parenting style, therapists can help them to break and rebuild the relationship between parents and children in order to offer beneficial help. In addition, behavioral interventions can be used to decrease the less desirable behaviors and increase appropriate behaviors (Greenspan, 2006, p. 66).

Greenspan (2006) mentioned that the process of intervention could help the children to manage challenges and aggressions. Moreover, children can build their self-esteem through this

process. There are six steps of the intervention process: establishing floortime—which is "the cornerstone of the DIR (developmental, individual-differences, relationship-based) approach to intervention" (p. 69)—problem-solving time, identifying and empathizing with the child's point of view, breaking the challenge into small pieces, setting limits, and balancing limits and floor-time (p. 82, 91). Through the DIR process, developing social skills, relationships, and communication skills can be strengthened and improved through interaction with others (Pajareya & Nopmaneejumruslers, 2012, p. 2).

The first step of floortime is to build a baseline. Floortime engages therapists, parents, and children. A solid baseline can strengthen the clinical relationships and give clear direction of following treatment. Adults can build a routine for the communication and interaction with children. The second step of floortime is to help children develop problem-solving skills. Showing empathy and sympathy is important in the communication. After encouraging children to practice self-confidence and express their thoughts, adults can guide children to handle specific situations. For children with language delays, the caregiver can help the children practice choosing between options instead of answering yes-no questions. The third step of floortime is developed based on steps 1 and 2. Adults show their empathy with children's behaviors and thoughts. Through giving understanding, adults can help children to be aware of their goals and find out a solution to deal with their negative feelings. The fourth step of floortime is to pay attention to the details of steps 1, 2 and 3. Adults analyze triggers and goal plans of children's behaviors and separate the goal plans into small pieces. Through reaching each target, the children will eventually achieve the goal plans. The fifth step of floortime is to build limits on children's misbehaviors and avoidance. Through negotiation and debate during problem-solving time, adults can bring the limits and consequences and guide children to practice and apply on their behaviors.

The sixth step of floortime is to focus on balancing increase limits and floortime at the same time; the more limits that are added, the more floortime parents should spend with children. Increasing limits may cause negative emotions and feelings, and increasing floortime can diminish the negative feeling and strengthen the trust in relationships (Greenspan, 2006, pp. 83-89).

Music Therapy and Early Intervention

As discussed about children during their early childhood, caregivers and therapists can use repetition to encourage infants to become more and more interested in the sounds, touch, and other stimulations. Each infant has a different style of responding to the stimulation. Caregivers are the best resource to offer unique stimulation experience and figure out the unique way of each infant.

The music therapy approaches with children can be divided into three: Nordoff-Robbins music therapy, Orff Music Therapy, and Bonny Method of Guided Imagery in Music (GIM) (Davis, Gfeller, & Thaut, 2008).

Nordoff-Robbins music therapy is a music-centered treatment in which music is seen as a remediation of lacking skills rather than a power of engagement (Aigen, 2014). Nordoff-Robbins focuses on learning and gaining benefits from experience. Individuals and therapists are creating music and leaning skills through it ("Nordoff-Robbins," n.d.).

According to Voigt (2003), "Orff Music Therapy has been applied with children with developmental problems and disabilities" (para. 4). Orff music therapy is a responsive interaction treatment. It offers early childhood treatment and focuses on connecting children with disabilities with the social world. The clinical application of Orff music therapy is present on "playing with sound," improvisation, instrumentarium, and multisensory aspects of music. "Playing with music" uses role play and various rhythm and melody to engage children; improvisation is the core

theory of Orff music therapy— improvisation is one way to play with children through music, and it gathers sounds and objects together; multisensory aspects of music offer children to play with instruments or different materials during the treatment in order to encourage children to express themselves in interactive activities; multisensory aspects of music provide therapists information to help children to achieve their clinical needs through a combination of different modalities (Voigt, 2003).

Assessment. Before the interventions start, the formal assessment processes help therapists to gather information of the children. Through this process music therapists will determine if music therapy is a beneficial treatment for the children. The therapist's understanding of children includes their background, limitations, and needs before setting goals for them. An ideal appropriate goal can be figured out through the interactions among therapists, children, and family members during the treatment processes. The treatment processes usually include: interview with the family members and clients, observation, reviewing record of the clients, standardized assessment test (Crowe, 2007).

Music therapy intervention. There are two types of music therapy interventions that usually apply with children: Supportive active therapy and Insight music therapy. Supportive active therapy is the intervention that uses musical activities to engage clients, for example, moving body parts with rhythm. Supportive active therapy focuses on emotional expression and awareness through music. Insight music therapy is the intervention that includes song-writing, music listening, and auditory discrimination activities. It is a process-oriented treatment, strengthening and developing sensory skill through music activities. The most common instrumental materials

that music therapists will use in the treatment are guitar and piano which help the music therapists to develop various music styles to match clients' preferences. All elements are designed to achieve clients' needs (Crowe, 2007).

Benefits of music therapy intervention with children. Music therapy can be applied with prenatal period, premature infants, rehabilitative period, and children with emotional/physical disorders. During the prenatal period, fetuses are able to hear mothers' sound and feel the vibration from the interment. In *The effects of music therapy on vital signs, feeding, and sleep in premature infants,* the authors pointed out that fetuses can hear mothers' heartbeat starting at 16 weeks. The damaged quality of environment in the intrauterine may lead to a deprived development. Appropriate music can provide a helpful environment to the fetuses (Loewy, Stewart, Dassler, Telsey, & Homel, 2013). During the prenatal period, the interventions which can be used in this situation are prenatal stress relief, maternal-fetal bonding, and prenatal language development. Mothers' negative emotional levels can increase Norepinephrine and Cortisol hormones which can decrease blood pressure and weaken the immune system. This might later cause having anxiety, autism, and depression symptoms. Music therapists can guide mothers to listen to internal rhythms, and also the movements and interactions from fetuses. Moreover, appropriate music can be used during the birthing process as well (Weir, 2012).

The connection between parents and fetuses can strengthen the fetuses' nervous system. Maternal-Fetal Bonding uses singing and vocals with music in order to develop the fetuses' nervous system completely and decrease parents' stress and anxiety. One way to apply music with fetuses can be lullaby: "Music therapy can improve neonatal function and reduce anxiety" (Taheri, Jahromi, Abbasi, & Hojat, 2017, p. 129). Regarding music therapy for anxiety, stress and maternal-fetal attachment in pregnant women during transvaginal ultrasound, Shin and Kim

(2011) pointed out the relationship between the brain and music: "The aesthetic pleasure received by the right brain can release endorphins from the pituitary gland, thereby decreasing physiologic response and relaxation" (p. 2). The interaction of the thalamus and the reticular activating system, blood pressure, heart rate and respiration rate may be impacted by music. A strengthened Maternal-Fetal Bonding could be processed through listening to soothing music during the pregnancy.

In *Brain development,* Kim et al., (2006) describes how creative music therapy can improve fetuses' brain and development as evidenced by 3D volumetric magnet resonance imaging (MRI). The result of MRI shows that in one-year, functional development, including cognitive ability, behaviors, and motor development, are improved. In five years, language abilities, adaptive skills, and executive function are improved. Specifically, the realms for music and language are interconnected in the brain. Early intervention of creative music therapy offers stimulations of experience and environment for the preterm baby's brain and benefits their language skills in short/long term functions (Haslbeck, Bucher, Bassler, & Hagmann, 2017).

The most common situation that premature infants might experience is difficulty with breathing, feeding, and abnormal body fat and muscle tissue (Loewy, Stewart, Dassler, Telsey, & Homel, 2013). Premature infants who are born earlier than thirty-eight weeks can gain benefits through music therapy through live/recorded music, promotion of healthy sucking reflex, multimodal stimulation and music, infant stimulation, and parent-infant bonding. Live/recorded music has been successfully applied in the hospital setting with premature infants. In the process, the respiratory regularity and oxygen saturation levels show improvement. Moreover, music can decrease not only infants' distress but also parents' anxiety. Premature infants prefer a female singing voice, so the mothers' voice can be used as a tool to build up the parent-children relationship

(Schlez et al., 2011). For feeding and breathing issues, Gato Box is one of the devices that can help premature infants learn sucking and match their breathing with knocking patterns of rhythm by music therapists (van der Heijden et al., 2016). In addition, Gato Box and Remo Ocean Disk are devices that can imitate the sound of the womb. These two devices can offer multimodal stimulation to premature infants who have not received enough sensory stimulation in the womb. A combination of lullaby and multimodal stimulation helps premature infants sleep well and gain more weight through decreasing and stabilizing their heartbeat, and it also leads to lower respiratory rates (Standley, 1998). Another type of sound intervention would be instrumental intervention, which can offer a sense of security to parents and infants with a hospitalized setting (Krueger, Horesh, & Crossland, 2012). With either way of musical intervention, music therapists will need help from parents to process. Parents' voice and interaction with premature infants can make connections between infants and parents. Also, a stable environment will be created through listening to the mother or father's singing voice. Compared to speaking voice, singing voice shows better efficiency and can benefit infants' oxygen levels for a long period (Standley & Moore, 1995).

Benefits to children with rehabilitation in the music therapy area have not shown solid evidence so far. However, the relationship between children with rehabilitation and adult rehabilitation shows that treatment at an early age plays an important role in children's ongoing development. The treatment at early ages can prevent secondary damage. The study mentioned in *The role of music therapy in paediatric rehabilitation* mentioned that head injury might be caused by medical, physical, functional, communicative, behavioural, cognitive and social factors. The interventions applied in music therapy may differ in how helpful they are depending on the needs of the children (Kennelly & Brien-Elliott, 2001).

Rehabilitation areas that can be applied to music therapy are: role and models of intervention, pre-rehabilitation context, motor skill, speech, cognitive skills, psychosocial support, and contraindications. Encouraging the activation of preserved neural pathways can be applied to music and language area; songwriting techniques can be applied to emotional needs; familiar songs and musical activities can be applied with speech and conversation needs; acoustic rhythm can be applied with clients with stroke (Kennelly & Brien-Elliott, 2001). For music therapy early intervention, the children's preference is the most important factor that therapists need to include in the treatment. The intervention can be designed according to the family and children's musical position. The four basic musical elements that music therapists can apply in the music intervention are: pitch, rhythm, volume, and timbre (Oldfield, 2006).

The goal of rehabilitation is to engage children within the environment. Music preferences and music ability are used to design the goals for each individual. Most children with rehabilitation need experience illness or injury, and becoming mentally upset and distressed is common when they are required to engage the environment after medical treatment. Music therapy should also consider children's mental needs in a rehabilitation music therapy program. Music therapy is a tool that is used to increase children's self-esteem, increase motivation, and reduce negative feelings about the future through techniques such as songwriting and music procedure. For motor skills, music therapy offers children musical equipment to exercise. Instrumental activities—for example, drums—can strength upper limbs and shoulder parts through encouraging children to do both-arm movements. For behavioral skills and cognitive skills, children with long term mid-severe brain damage can cause cognitive disorder, which can lead to problem-solving difficulty, sequencing difficulty, inability to stay on-task, and memory issues. Music therapy can inspire the brain area of cognition with rhythm and melody. It works on organizing, ordering and

remembering information. Moreover, singing can help children to pronounce words and use their voice with various pitches, speeds, volume and rhythms. Through warm-up activities, intonation and speech rate can be improved; rhythmic and speech drills actives can improve intelligibility of speech (Kennelly & Brien-Elliott, 2001).

Family's Engagement in Music Therapy Early Intervention

Kern et al. (2012) mentioned that engagement of families with children with disabilities is necessary in the music therapy process. Positive engagement assists the family's ability to help their children throughout developmental stages. According to Kern, et al (2012) The Division of Early Childhood provides five principles of family-centered music therapy practice: "a family-centered and strength-based approach, natural and inclusive environments, developmentally sound interventions, functional goals that are oriented toward active child engagement, and services that are provided in a coordinated and systematic manner" (p. 234). Interactive intervention from parents can offer children a natural space to learn skills. Through *Using typical infant development to inform music therapy with children with disabilities* (Wheeler & Stultz, 2008), parents' involvement has been proved as a beneficial intervention in early intervention program with Greenspan's (2006) developmental stages and floortime theory. The interaction between parents and children during six stages, which include sensory stimulations, choice offering, giving understanding, and set the limit for the inappropriate behaviors, can help children to develop social skills, relationships, and communication skills (Wheeler & Stultz, 2008).

Moreover, Hibben (1992) noted that music therapy offers both "involved" and "direct" play. Music playing tends to be a nonverbal interaction between family members. Sharing experience is an important process during the children's first year. Musical tools offer involvement

and safe distance for both parents and children. Playing with music can inspire parents and children to express their negative feelings, and work through them with musical activities. Seven improvisational techniques that could be applied in family music therapy sessions include techniques of intimacy, redirection, elicitation, and emotional exploration, referential and procedural techniques, and techniques of empathy. Through sharing instruments, modeling, telling stories, and showing care, parent-child relationships could be strengthened. Through a case study, Hibben (1992) found that parents' and children's behaviors can be observed during song activities and music making procedures. The therapists can make new combinations in parent-children relationships according to the observation made during the music therapy intervention. Hibben (1992) concluded that "music therapists, knowing the value of play, are well equipped to include families in their work with children and children in their work with families" (p. 43).

Discussion

This paper focused on how parent-child relationships play a role in the music therapy in early intervention program. The studies in this thesis indicated the significance of family background, which includes instructor of family, parents' education, parents' mental health condition and parents' engagement. Music as a treatment offers benefits of various interventions between caregivers and children. It offers a platform for caregivers to explore specific ways to involve themselves and other members in the therapy process and help children to achieve their developmental goals.

In the process, supporting family to find their true feelings and discover a comfortable way to communicate with the environment are important goals for the music therapists during the session. Music therapists should use their professional knowledge to develop the specific

treatment plan for each individual. An individual's background, musical preference and physical/mental needs are the resources that music therapists can include in the treatment plan.

Through various rhythm, melody, and pitch combinations, caregivers' negative emotions could be decreased; various musical activities can engage infants/children to interact with the environment and parents; listening, singing, and touching can improve the parents-child relationship. Also, musical tools can offer children an opportunity to practice movement of their body parts that achieve their physical needs. Moreover, music therapy is easy to be applied in different treatment settings: in the ICU setting it can decrease the premature baby's and their parents' anxiety, and in an in-home setting it can increase the engagement through stimulation.

However, the research I used in this thesis does not discuss several key considerations. First, the research does not account for the differences in music therapy's effect on children with disabilities with the original family and children with disabilities with the foster/adoptive family. The studies in the thesis showed that fetuses' physical development could be affected by parents' voice through integration of the brain (Taheri, Jahromi, Abbasi, & Hojat, 2017). Also, the interaction between parents and children can offer a natural environment to children in order to complete their developmental stages (Greenspan, 2006). However, the studies do not show the difference between children with biological parents and children with a foster/adoptive family.

Those studies of the early intervention are developed about children with biological families. Further studies on parent-child relationships with music therapy in early intervention program can be focused on treatment with various family types. Longer lifespans, increasing number of single mothers, and the movement for women's equality are some of the common social issues in the post-World War II era (Burnette, 1997). The increasing demand of foster families

and "skipped generation" families are another common issue that the music therapists should see as a factor that might impact the effect of the treatment.

Fostering positive parent-child relationship might be challenged if the music therapists cannot engage foster families or grandparents in the session. Continued studies can show the dissimilarity between children with biological family and children with other type of families, which may impact intervention skills, session settings, and musical applications in the treatment process. Difference in generation might challenge communication between children and grandparents. Moreover, the culture and biological background of the child is unknown to foster families, so the therapists cannot track the children's developmental background before they run the session. The new family is a new environment to children. Children need time to get familiar with their adoptive parents and siblings, and becoming part of the new family is a challenge for children. Also, a challenge for the therapists will be to engage the adoptive family and children together during the session (Capello, 2006). For future research, there could be a focus on the differences between music therapy's effect on children with biological parents and children with foster and "skipped generation" families.

Secondly, another gap of the research is that it does not track the development of children after they leave the early intervention program, which serves children before three years old. The research shows different interventions that music therapists can use with different ages of children. However, the research does not indicate the evidence of regression or improvement of children after they stop the music therapy early intervention program. After three, children enter school life. The school program they enter is not clear to the therapist, so the level of support is unclear. The research does not demonstrate if the skills children learned in the early intervention program are able to support them in acquiring more skills at later stages in their development

without music therapy. More research should be conducted at later stages to determine whether children regress or improve in the skills they acquired during music therapy.

Third, in developmental stage studies, the therapists apply different treatment skills at different developmental stages. The gap in this theory that may be brought out is that the children might not have been able to be included in the early intervention program since they were born. Therefore, the treatment might not meet their developmental stages punctually. The developmental studies should perform the effect and remediation of later intervention to children. Greenspan (2006) mentioned that there are six stages of children's development in early childhood. In this theory, typical children and children with disorders react differently to stimulations in the environment. However, in some situations a child's delayed development may not be recognized right away, and they may show signs of disorders later than the typical developmental timeline. In this case, there may be a difference in the physical and developmental ages of a child. Therefore, the therapists can face the challenges of developing a treatment plan and applying techniques that are appropriate for the child. Future studies should explore more evidence of the gap in the relationship between developmental stages and therapeutic treatment.

Music therapy involves music and therapy in the process, which includes musical skills, musical technique and counseling skills. Therapists offer the compatible treatments to each individual, but challenges exist due to different reasons. In early intervention program, family is always one of the important factors that therapists need to include. This thesis has demonstrated that there can be delay symptoms at different stages, and it has also demonstrated that the stimulation from parents and parent's voice can offer a natural stimulation to children since the time

that they are fetuses. Music therapy offers different sound and singing in the process that can engage children and parents. Infants can be engaged with higher pitches, and lullabies are the most common way for parents to practice involving themselves in the music therapy session.

This thesis also outlined three key gaps in the literature. These gaps include the lack of research on the developmental differences between children from biological families and children from adoptive/foster families; the lack of research on children's development after they leave early intervention programs; and the lack of attention in developmental stage studies to children whose developmental age does not match their actual age. These are the three gaps that researchers need to focus on in future studies of music therapy as an early intervention.

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In the judgment of the following signatory this thesis meets the academic standards that have been established for the above degree.

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