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Improving lives of children through occupational therapy vision evaluation and intervention

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BOSTON UNIVERSITY
SARGENT COLLEGE OF HEALTH AND REHABILITATION SCIENCES

Doctoral Project

**IMPROVING LIVES OF CHILDREN THROUGH
OCCUPATIONAL THERAPY VISION EVALUATION AND INTERVENTION**

by

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B.A., Harvard University, 2015

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ABSTRACT

Introduction: Children in inpatient settings are in an unfamiliar environment that does not facilitate engagement in typical occupations. Children report multiple concerns with the hospital environment and experience including physical pain, loss of independence, loss of meaningful activities, lack of routine, and loss of control. Occupational therapists play a distinct role in improving the hospitalization experience for children by addressing these concerns. By improving the evaluation and treatment of visual deficits for children in inpatients settings, occupational therapists can increase children's function and independence in meaningful activities and maximize psychological well-being.

Theoretical Perspective and Evidence: Self-determination theory posits that humans have three innate psychological needs – competence, autonomy, and relatedness. These needs are not being met for children in inpatient settings as shown by multiple qualitative studies, however occupational therapy can aid in meeting these needs through proper intervention.

Description of Project: Resources were developed to improve the evaluation and treatment of visual deficits in children in inpatient settings including a vision screening tool, treatment protocol, referral protocol, and functional implications of visual deficits

chart.

Methods: The vision screening tool and protocols were used on a small sample of patients (n=6) to identify and treat visual deficits. A survey was provided to occupational therapists to determine feasibility, usefulness, and effectiveness of the resources.

Conclusion: The resources are useful and feasible for evaluating and treating visual deficits in children in the inpatient setting.

Keywords: inpatient pediatrics, visual impairments, vision screening tool, children, occupational therapy

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CHAPTER ONE: INTRODUCTION

The Problem

In 2012, 1 out of 6 discharges from hospitals in the United States were children. A total of 5.9 million children were hospitalized in the U.S. in 2012. While 3.9 million of those hospitalizations were neonatal stays, there were still nearly 2 million children (excluding infants) hospitalized in 2012 (Witt, Weiss, & Elixhauser, 2014). According to the CDC National Health Interview Survey (2016), about 7.5% of the U.S. population between ages 0-17 were hospitalized overnight, which illustrates the significant portion of the population that is affected by inpatient pediatric care. Children in inpatient settings, who are typically experiencing a physiological or physical illness, injury, or condition, are in an unfamiliar environment that does not facilitate engagement in typical occupations, roles, and routines. Thus, children report multiple concerns with the hospital environment and experience including physical pain, loss of independence, loss of meaningful activities, lack of routine, and loss of control (Coyne, 2006; Linder & Seitz, 2017). As a result of these negative consequences of hospitalization, children experience decreased psychological well-being as evidenced by increased stress, anxiety, and depressive symptoms (Potasz et al., 2013; Li, Chung, & Ho, 2011). Children in inpatient pediatric settings report multiple concerns and fears during their hospitalization, which lead to feelings of isolation, loneliness, and loss of self-determination (Linder & Seitz, 2017; Coyne, 2006). Children in inpatient settings are typically under a lot of physical and emotional stress related to the causes of their hospitalizations, such as a disease, trauma, disability, or illness. It is important to decrease their fears and concerns as much

as possible in order to ensure that they are in the best physical and mental health at the time of discharge (Linder & Seitz, 2017; Coyne, 2006). Addressing fears and concerns would also help children to be more engaged in therapy, which could improve outcomes. By improving their hospitalization experience through increasing function and independence, children will have increased quality of life after discharge.

Occupational therapists can play a distinct role in improving the hospitalization experience for children because they are skilled at targeting each child's areas of concern, including lack of routine, lack of meaningful activities, and decreased independence. Occupational therapists are trained to increase function by addressing physical or psychological impairments, adapting the environment, providing compensatory strategies, and adapting activities, thus increasing independence and participation in meaningful activities. In the inpatient pediatric setting, many different occupations are negatively impacted for children including, play, leisure, social participation, ADLs, and sleep (AOTA, 2014). Chen et al. (2004) provides evidence for the importance and value of occupational therapy in inpatient pediatrics. This study showed that occupational therapists can, not only increase function in self-care, mobility, and cognition, but can also intervene psychosocially by providing adaptations to environment and activities to improve a child's hospital experience. Additionally, this study shows the functional importance of providing occupational therapy and encourages doctors to make appropriate referrals, allowing occupational therapists the opportunity to increase children's function and independence, thus increasing their psychological well-being.

The distinct role and importance of occupational therapy in inpatient adult

settings is well supported in the literature. With the exception of Chen et al. (2004), there is a lack of evidence to support the importance of occupational therapy in inpatient pediatric settings. This lack of understanding about the role of occupational therapy in inpatient pediatrics is reflected in the AOTA fact sheet on “Children and Youth” (More, 2015). Inpatient pediatrics is not mentioned on the fact sheet specifically, but rehabilitation of injury or illness is mentioned. There are separate fact sheets for many specific practice areas within pediatric occupational therapy, such as early intervention, school-based OT, mental health, Autism Spectrum Disorder, and developmental disabilities, but there is no current fact sheet for inpatient pediatric rehabilitation or acute care (AOTA, 2018). This is a gap in information that can be filled by completing and publishing more research and/or information on the role of occupational therapy in the inpatient pediatric setting.

Theoretical Framework

Children in inpatient pediatric settings experience decreased psychological well-being while in the hospital environment due to multiple factors including lack of social supports, hospital environment and policies, staff behavior, lack of information, lack of independence, and lack of routine. In order to understand this problem further, this author examined the causal factors contributing to this problem and their relationships through the lens of self-determination theory as described by Ryan and Deci (2000). Self-determination theory posits that humans have three innate psychological needs – competence, autonomy, and relatedness – that are important to social development and psychological well-being. The satisfaction of these needs can influence mental health

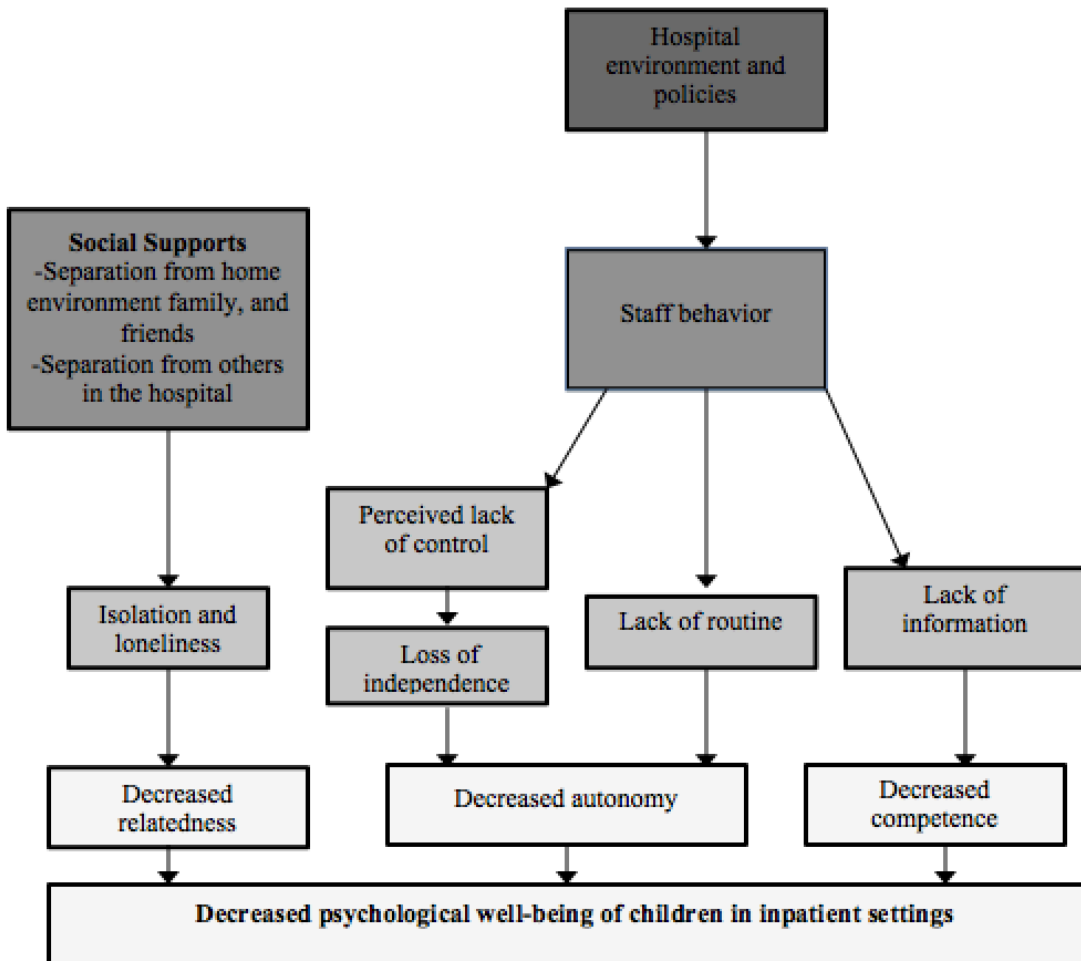
outcomes, which can then influence physical health outcomes (Ng et al., 2012). Contextual factors (e.g. environment, social interactions, communication, etc.) and personal factors (e.g. personality differences in autonomy, age, diagnosis, medical history, etc.) influence the satisfaction of these innate psychological needs, which then leads to changes in psychological well-being. Excessive control, non-optimal challenges, and lack of connectedness lead to lack of initiative and responsibility, which leads to distress and anxiety (Ryan & Deci, 2000; Ryan, Deci, & Williams, 2008; Ng et al., 2012).

Model of the Problem

The satisfaction of a child's three innate psychological needs – competence, autonomy, and relatedness – is hindered when children are in an inpatient hospital setting because of the negative influence of contextual and personal factors. The nature of the hospital environment and policies are structured to improve children's physical health, which sometimes does not align with maintaining their psychological well-being (Coyne, 2006; Linder & Seitz, 2017). Policies and the hospital environment determine the behavior of staff (e.g. nurses, therapists, doctors, etc.), which affects the psychological well-being of children in various ways that align with the innate psychological needs described by self-determination theory (Coyne, 2006; Linder & Seitz, 2017). For example, a staff member's unclear communication with a child about procedures, treatments, medicine, daily routine, etc. can negatively affect the child's competence and autonomy because they may not be provided with sufficient information regarding their health, which can lead to feelings of anxiety and fear of the unknown (Lambert, Glacken, & McCarron, 2012). Staff behavior also directly influences a child's routine and their

perceived control, which affects independence. Both lack of routine and perceived lack of control result from the need of autonomy not being satisfied (Coyne, 2006; Linder & Setiz, 2017). The need of relatedness is met through social supports, which are often diminished when children are in the hospital environment, which leads to feelings of isolation and loneliness (Coyne, 2006; Linder & Setiz, 2017). As demonstrated in Figure 1, each component of the problem corresponds with one of the innate psychological needs not being met in the hospital environment due to the nature of the hospital environment, policies, staff behavior, and social supports.

Figure 1: Model of the Problem



This model of the problem was developed by synthesizing various research studies on the pediatric hospital experience as well as integrating self-determination theory as described by Ryan and Deci (2000). Overall, the studies used to inform the model of the problem were qualitative studies using semi-structured interviews or observation as outcome measures, which yielded a breadth of information regarding the hospital experience for children, but did not provide any quantitative data. For example, Linder and Seitz (2017), Coyne (2006), Bsiri-Moghaddam, Basiri-Moghaddam, Sadeghmoghaddam, and Ahmadi (2011), Salmela, Salanterä, and Aronen (2010), and Jensen, Jackson, Kolbaek, and Glasdam (2012) all used semi-structured interviews with open-ended questions to ask children what their hospital experience was like and how it could be improved. Alternatively, Livesley and Long (2013) and Lambert, Glacken, and McCarron (2012) used observation and field notes to collect data on children's knowledge of the hospital experience and their information needs, respectively. Due to the lack of research on this topic and the complexity of the problem, most of the studies explored what factors influence children's hospital experience to build a foundation of research in order for causal studies to be conducted in the future. Further, many of the studies were conducted internationally – England (Coyne, 2006; Livesley & Long, 2013), Iran (Bsiri-Moghaddam et al., 2011), Denmark (Jensen et al., 2012), Ireland (Lambert et al., 2012), Finland (Salmela et al., 2010) — which limits external validity due to potential cultural differences, national regulations, and hospital policies. The study by Linder and Seitz (2017) was conducted in the U.S. and had similar findings compared to the international studies, which allows for the assumption that the international study

findings can be generalized to U.S. pediatric hospitals. Most of the studies examined children ranging in age from 7–18 years old, which allowed the researchers to obtain more reliable self-report data from the children since they were old enough to clearly articulate their fears and concerns regarding the hospital experience. Overall, the studies all reported similar findings and results, thus strengthening the evidence that factors in the model contribute to children’s decreased psychological well-being in hospital settings. Findings on the pediatric hospital experience were supplemented with self-determination theory to create a more complete model of the problem where the studies were less thorough in their research. Each factor plays a role in contributing to the problem as demonstrated by multiple studies.

As described in self-determination theory, human beings seek to fulfill their need of relatedness, which involves engaging in social interaction (Ryan & Deci, 2000). Children in hospital settings reported decreased social supports as well as feelings of loneliness and isolation, which demonstrates the lack of fulfillment of the need of relatedness (Linder & Seitz, 2017; Coyne, 2006). In Linder & Seitz (2017) and Coyne (2006), children reported feeling lonely because they were separated from their family and friends and separated from others within the hospital. For example, children reported the following sources of bother: “being stuck in a room for so long,” “no interaction,” “not being home and playing,” and “not being with my family (Linder & Seitz, 2017).” Lack of social supports has a direct relationship with increased feelings of isolation and loneliness. Further, feelings of isolation and loneliness have a direct relationship with decreased psychological well-being, and are mediating variables between lack of social

supports and decreased psychological well-being (Linder & Seitz, 2017; Ryan, Patrick Deci, & Williams, 2008; Ryan & Deci, 2000). In order for lack of social supports to decrease psychological well-being, the child must experience feelings of isolation and loneliness. Ryan et al. (2008) highlights the direct relationship between the satisfaction of the need of relatedness and mental health in a model that shows that increased relatedness leads to less anxiety, less depression, and higher quality of life. This further supports the model of lack of social supports leading to feelings of isolation and loneliness, which leads to decreased psychological well-being.

Looking at the problem of children's hospital experience more broadly, by considering the environment in addition to the children themselves, shows how administrative and environmental factors play a role in children's hospital experience and well-being. The hospital environment and policies have a direct relationship with staff behavior. This relationship precedes multiple other relationships in the model because staff behavior impacts children's psychological well-being directly through multiple mediators. In Linder & Seitz (2017), children identified specific hospital policies and aspects of the hospital environment that negatively impacted their experience, but also played a role in staff behavior. For example, children reported care routines administered by nurses and other staff as bothersome due to multiple reasons such as getting woken up in the middle of the night for vitals, having to get up to go to the bathroom at night due to IV fluid schedules, and being hooked up to an IV pole (Linder & Seitz, 2017). These factors are controlled by certain treatment protocols as designated by hospital policies as well as the nature of a hospital environment, which involves medical treatment. Other

policies, such as staff scheduling, influence when and how often nurses and other medical professionals are able to treat and interact with patients, which can have an effect on staff behavior and interactions with patients. For example, if a hospital is understaffed, health professionals may be more stressed and rushed when performing certain procedures or treatments. As shown in the model, staff behavior mediates the relationship between the hospital environment/policies and perceived lack of control, lack of routine, and lack of information, but also has a direct relationship with perceived lack of control, lack of routine, and lack of information.

As demonstrated by Linder & Seitz (2017) and Coyne (2006), there is a direct relationship between staff behavior and perceived lack of control. Coyne (2006) and Livesley and Long (2013) found that children experienced a lack of control over personal needs because either the staff determined when they ate, slept, and used facilities on the unit or the children had to ask for staff permission to do most daily activities. Children felt an even greater lack of control when they were left waiting for food, medicines, or pain relief because they felt like they were unable to meet their own basic needs, which leads to an unsatisfied need of autonomy according to the self-determination theory (Coyne, 2006; Ryan & Deci, 2000). Perceived lack of control has a direct relationship with loss of independence (Coyne, 2006; Ryan & Deci, 2000). Children reported feeling like they could not be independent in many activities due to their lack of control over the activity. For example, even though a child could independently get dressed or go to the bathroom, they may not be permitted to perform the task truly independently because a nurse has to assist them per hospital policy or doctors orders. When a child cannot control

their basic daily activities, they feel a loss of independence because the needs of autonomy and competency are not being satisfied (Ryan & Deci, 2000). Loss of independence has a direct relationship with decreased psychological well-being and mediates the relationship between perceived lack of control and decreased psychological well-being. Children lose independence in hospital settings, which leads to unfulfillment of the needs of autonomy and competence, which leads to increased anxiety and depression and lower quality of life (Ryan et al., 2008). Children experience decreased psychological well-being as a result of loss of independence, which is caused by perceived lack of control due to certain staff behavior.

Additionally, there is a direct relationship between staff behavior and lack of routine, and lack of routine has a direct relationship with decreased psychological well-being. Lack of routine is a mediating variable between staff behavior and decreased psychological well-being. Staff behavior determines a child's daily schedule in the hospital, which fluctuates daily based on shift changes, staff numbers, medical treatments, etc. (Linder & Seitz, 2017; Coyne, 2006; Livesley & Long, 2013) Hospitalization disrupts a child's normal routine because they are in an unfamiliar environment without access to many of their typical occupations such as school, sports, and extracurricular activities (Coyne, 2006; Bsiri-Moghaddam et al., 2011). The transition from a consistent routine to an unpredictable routine within an unfamiliar environment leads to loss of autonomy for children because not only do they not have the ability to determine their daily activities, but they also do not know what each day's schedule will be (Linder & Seitz, 2017). Lack of routine leads to decreased psychological

well-being because the need of autonomy is not met, which leads to diminished mental health outcomes such as increased anxiety, increased depression, and decreased quality of life (Ryan et al., 2008).

Last, there is a direct relationship between staff behavior and lack of information, and lack of information has a direct relationship with decreased psychological well-being. Lack of information is a mediating variable between staff behavior and decreased psychological well-being. Jensen et al. (2012) examined children's experiences in an acute care setting through semi-structured interviews and found that children's lack of understanding of their disease, treatment, and procedure was one of the main themes across interviews. Children reported not knowing what many medical terms meant, which led to their lack of knowledge of procedures. In this example, staff behavior directly influenced children's lack of information because they did not simplify language when communicating with the children in order for them to understand (Jensen et al., 2012). Lambert et al. (2012) studied information exchange between children and health professionals and found that children prefer various communication strategies, so it is important to develop the best method for each individual child to ensure that they are included in the conversations regarding their medical treatment. Based on observation and interviews, researchers found that superficial generic information provided to children by staff led to unpreparedness and worry for children regarding medical procedures (Lambert et al., 2012). Children also reported the importance of individualized information and comprehensible terminology in order to increase their understanding and reduce their uncertainty (Lambert et al., 2012). Staff behavior,

specifically poor communication with children, leads directly to the lack of information that children report. This lack of information leads children to experience worry, uncertainty, confusion, and fear of the unknown, which is congruent with the unfulfillment of the need of competence (Jensen et al., 2012; Lambert et al., 2012; Linder & Seitz, 2017; Ryan et al., 2008). As demonstrated by the evidence, certain staff behavior leads to lack of information, which leads to decreased psychological well-being.

Pediatric hospitalization causes decreased psychological well-being as a result of many factors interacting together. Each child's experience is unique, but all children in the hospital are likely to be affected by each factor in some way. Overall, there is moderately strong evidence to support the relationships mapped out in this model because there are initial studies that have laid a foundation, but there has not been extensive research conducted on this population and problem. Since there is a gap in literature, it is an important topic to continue to research due to its complexity and applicability to all children in hospitals.

The Effect of Vision on Function

Vision is the main way of receiving external input and the dominant sense for most people. More than 50% of the brain is devoted to processing visual input and information (Hagen, 2012). The visual pathway in the brain processes 80% of external input, thus vision plays a significant role in the ability for people to function and perform basic daily activities (Jerath, Crawford, & Barnes, 2015). Visual deficits or impairments greatly impact children's function and independence in their daily activities, such as play, school-based activities, and self-care activities. Additionally, visual deficits affect all

areas of development, including social, motor, cognitive, and language development, due to decreased exploration of the environment and limited interest and participation in social interactions (Willings, 2017). Pediatric visual impairments have a negative effect on health-related quality of life (HRQoL) overall as shown by the negative effects on multiple domains, including psychosocial interactions, school, mobility, and activities of daily living (DeCarlo, McGwin, Bixler, Wallander, & Owsley, 2012). Furthermore, according to a systematic review by Augestad (2017), children with visual impairments have more emotional problems (e.g. anxiety and depression) than children without visual impairments. Visual deficits have a negative impact on HRQoL and psychological well-being, thus compounding the negative experiences children undergo during hospitalization, which compromises the functional gains made during rehabilitation and decreases well-being at discharge. Assessing, identifying, treating and referring for visual deficits is important for children in inpatient settings in order to improve safety, increase function and independence in meaningful activities, and maximize psychological well-being.

Summary of the Problem

Children in inpatient settings report multiple concerns with the hospital environment and experience including loss of independence, loss of meaningful activities, lack of routine, and loss of control (Coyne, 2006; Linder & Seitz, 2017). Occupational therapists can directly address these concerns by identifying impairments through evaluation and providing client-centered, evidence-based, occupation-based treatment. Occupational therapy plays a distinct role in the inpatient pediatric setting by

improving children's function and increasing independence, thus increasing psychological well-being. Despite the significant role of occupational therapy in the inpatient pediatric setting, there is a gap in literature and research on this topic. Therefore more information is needed to support the role of occupational therapy in inpatient pediatrics.

By completing a doctoral capstone focused on advanced clinical practice at Phoenix Children's Hospital, this author practiced occupational therapy in the inpatient pediatric setting and gained knowledge about the distinct role of occupational therapy in this setting. Gaining advanced clinical skills in this setting provided this author with the tools and knowledge to create materials and resources for other practitioners and students to provide occupational therapy services that increase the function and independence of children in the hospital setting. By improving the evaluation and treatment of visual deficits for children in inpatient settings, occupational therapists can increase children's function and independence in meaningful activities and maximize psychological well-being. Occupational therapists are skilled clinicians in a unique position to address vision, given the appropriate set of resources and tools, however there are not resources specifically tailored for inpatient pediatric settings. In order to improve the evaluation and treatment of visual deficits in inpatient pediatric settings, this author developed a vision screening tool and treatment/referral protocols.

CHAPTER TWO: EVIDENCE

Gap in Literature

Occupational therapy can play a distinct role in improving the hospitalization experience for children because they are skilled at targeting each child's areas of concerns including pain, routine, activities, and independence by adapting the environment and activities. However, there is limited research examining the effectiveness of occupational therapy interventions to increase children's function, independence, and/or quality of life in inpatient pediatrics. Overall, there is limited literature specific to increasing function, independence, and/or health related quality of life (HRQoL) in hospitalized children and very few articles involve occupational therapists (Potasz et al., 2013; Chen et al., 2004). There is insufficient literature focused on inpatient pediatric occupational therapy, which demonstrates a need for more research on the use of occupational therapy in the inpatient setting to increase quality of life for children.

Previous Attempts to Address the Problem

Despite the limited literature on the role of occupational therapy in inpatient pediatrics, there are articles detailing interventions implemented by other professions to increase the quality of life of hospitalized children through various occupations or activities that fall within the scope of occupational therapy practice. A review of the literature revealed three main interventions for increasing health-related quality of life (HRQoL) among hospitalized children including therapeutic play, adapted physical activity and animal assisted therapy.

Therapeutic play

Therapeutic play has been shown to decrease stress and depressive symptoms in children in hospital settings. This intervention has moderate evidence to support its effectiveness as shown by the support of one randomized clinical trial and one control group pretest-post-test, between subject design (Potasz et al., 2013; Li, Chung, & Ho, 2011). These studies had some limitations with regards to external validity, so this intervention was not classified as strong evidence. For example, both of these studies took place internationally (in Brazil and Hong Kong, respectively) and both of them studied children hospitalized for specific conditions (respiratory disease and cancer, respectively) (Potasz et al., 2013; Li, Chung, & Ho, 2011). In the Potasz et al. (2013) study, occupational therapists were the personnel who provided the intervention due to their skills in promoting increased function in all occupations, including play. Li, Chung, and Ho (2011) found that therapeutic play using virtual reality computer games decreased children's depressive symptoms. Additionally, Potasz et al. (2013) found that engagement in play activities tailored to each child's interests led to a decrease in stress (as measured by cortisol levels) for children ages 7-12. Providing toys and opportunities to play allows children to engage in activities that are familiar to them and obtain sensory stimulation that they may not receive otherwise. Therapeutic play is highly feasible in inpatient pediatric hospitals because most hospitals have a child-life room equipped with many toys and games that can be taken to a child's room if necessary. Providing play opportunities requires little administrative process because most inpatient units already have the supplies that are needed to implement the intervention, and therapeutic play is

likely to be supported by administration and staff due to its feasibility, low cost, and high impact. Pediatric occupational therapy inherently involves play because play is one of the main occupations for children. By utilizing play in occupational therapy sessions, children may experience an increase their psychological well-being by decreasing stress levels and depressive symptoms as shown by the evidence. This intervention is already used by occupational therapists, but there is limited research to support its effectiveness despite its prevalence among practitioners and the fact that it is inherent to the profession.

Adapted physical activity

Adapted physical activity (APA) has been shown to increase HRQoL, specifically self-esteem and mental health dimensions, for children in hospital settings. This intervention has moderate evidence to support its effectiveness as demonstrated by the support of a randomized controlled trial conducted in France on children hospitalized for pediatric cancer treatment (Speyer, Herbinet, Vuillemin, Briancon, & Chastagner, 2010). Despite the limitations of this study with regards to its external validity, it provides strong evidence that adapted physical activity leads to improved HRQoL, specifically self-esteem and mental health dimensions (Speyer et al., 2010). In this study, each child engaged in APA sessions 3x/week for 30 minutes, and the sessions were personalized according to their health status, medical indications, age, and interests. If children were unable to go to the APA room, the APA teacher brought adapted equipment for APA to their room (i.e. plastic balls that could be disinfected for a sterile room). There are a wide variety of APA activities for children to choose from including ball games (e.g. handball, soccer, volleyball, etc.), circus arts, throwing games, shooting games, racket sports, self-

expression through movement, fighting activities, video games, and bodybuilding (Speyer et al., 2010). As demonstrated by the various activities available for APA, this intervention is highly feasible at inpatient pediatric hospitals due to the many games that they already have in the child-life rooms. An occupational therapist could administer a modified version of this program since they are trained in activity adaptation to meet the needs of the child. This intervention involves children who are medically compromised engaging in physical activity, which may seem counterintuitive to some administrators, parents, and even some children. Children may think that APA is not feasible for them while they are in the hospital because they don't realize that the sports and activities can be adapted to meet their needs. Overall, APA is a feasible, evidence-based intervention that could be implemented in inpatient pediatric hospitals if administrators, parents, and children are accepting and supportive. As demonstrated by this study, APA could increase the children's HRQoL by infusing play into the children's hospital experience and increasing occupational performance.

Animal-assisted therapy

Animal-assisted therapy (AAT) has been shown to decrease stress and pain and increase coping abilities in children in hospital settings. This intervention has mixed evidence as shown by a literature review and a quasi-experimental, repeated measures study that had some significant results, but needs further research in order to strengthen the findings (Urbanski & Lazenby, 2012; Tsai, Friedmann, & Thomas, 2010). Tsai, Friedmann, and Thomas (2010) studied the effects of animal-assisted therapy, specifically interaction with a dog, on children (ages 7–17 years) at U.S. children's

hospitals, and found that AAT decreased physiological arousal (decreased systolic blood pressure), but did not decrease anxiety or medical fear levels. These are mixed findings that indicate the potential effectiveness of AAT on children's psychological well-being, but there is a need for further research to determine how AAT can be used to affect anxiety and fear rather than just physiological arousal. Urbanski & Lazenby (2012) examined the benefits of animal-facilitated therapy (AFT) in decreasing distress among inpatient pediatric oncology patients. Urbanski & Lazenby (2012) included 6 research articles and 11 supporting evidence articles focused on children ages 0-18 hospitalized on the oncology unit. The literature review revealed that AFT decreased pain (Braun et al., 2009; Sobo et al., 2006), increased coping abilities in relation to chronic illness, decreased loneliness, increased comfort and relaxation, and increased socialization and self-esteem (Caprilli & Messeri, 2006). This is strong evidence that animal-facilitated therapy provides benefits for children that can lead to an increase in quality of life by decreasing negative psychological and physiological symptoms.

Many inpatient pediatric hospitals already have AAT available to patients, but some children may not be able to interact with the dogs due to medical restrictions. This requires a moderate level of administrative involvement by the staff in order to determine which patients can participate in AAT, which will likely not be 100% of the children. AAT involves a recreational therapist, child life specialist, or other health care provider like an occupational therapist entering the child's room with the therapy dog and its handler (typically a volunteer) and facilitating an interaction between the dog and the child (Tsai, Friedmann, & Thomas, 2010). Typically, the dog will sit on the child's bed or

near their bedside and the child will pet, touch, and brush the dog (Tsai, Friedmann, & Thomas, 2010). This intervention could be easily implemented at an inpatient pediatric hospital where AAT is already present because there are not any other resources necessary except for the therapists' presence. AAT could be supplemented by having an occupational therapist present in order to facilitate more therapeutic interactions between the child and dog to decrease stress and anxiety and, potentially, increase function and independence in children. For example, a child could brush the dog to work on self-care skills that can then be translated to brushing their own hair. Another example would be to use petting the dog or throwing a ball for the dog as a means to increase upper-extremity strength or range of motion (ROM). Occupational therapists could structure a treatment session using a therapy dog as a means to meet various functional goals, which would then increase the child's quality of life. Overall, AAT could potentially lead to increased psychological wellbeing and increased quality of life for children in inpatient settings, but there is not strong, conclusive evidence to support it at this time.

Occupational therapy

The literature search revealed only one article specifically looking at the effectiveness of occupational therapy in inpatient rehabilitation to increase function (Chen et al., 2004). Chen et al. (2004) examined various rehabilitation services (i.e. OT, PT, speech therapy, etc.) and their effect on functional gains as measured by the Functional Independence Measure for Children (WeeFIM), which is a standardized outcome measure with various domains (i.e. locomotion, self-care, communication, social cognition) that measures children's overall function. This study used data retrieved from

the WeeFIM database, which includes all hospitals in the U.S. who utilize the WeeFIM, and 12 of 32 facilities participated in the study, yielding a sample size of 910 children, which strengthens the evidence. Children who received more occupational therapy services improved more in the self-care domain on the WeeFIM (Chen et al., 2004). Along with amount of therapy services, age and impairment were significantly related to the amount of functional gain (Chen et al., 2004). Specifically, children 7 years or older and children who had a TBI or major multiple trauma made larger gains in function as compared to children younger than 7 years old or those with CP, non-TBIs or other impairments (Chen et al., 2004). This study showed the effectiveness of occupational therapy in increasing function for hospitalized children on a broad scale across multiple hospitals and diagnoses. Although this study has strong evidence supporting occupational therapy in inpatient pediatrics, there is a need for more research detailing the effectiveness of occupational therapy in increasing quality of life for hospitalized children by targeting any of the causes of their physical pain or negative psychological symptoms (i.e. stress or anxiety).

Implications

Pediatric hospitalization causes decreased quality of life as a result of many factors interacting together including hospital environment, staff behavior, physical pain or limitations, lack of information social supports, etc. These factors lead to perceived lack of control, loss of independence, lack of routine, isolation and loneliness, which lead to decreased psychological well-being such as stress, anxiety and depressed mood. Each child's experience is unique, but all children in the hospital are affected by these factors

in some way. As demonstrated by current evidence from various disciplines, occupational therapists are uniquely equipped with the skills to provide interventions that have been shown to increase quality of life in children in hospital settings. These interventions include therapeutic play, adapted physical activity, animal-assisted therapy, and occupational therapy in general due to its focus on increasing functional gains. Although there is some evidence currently available, there remains a large gap in the literature supporting occupational therapy, specifically, in inpatient pediatrics. Since there is a gap in literature, it is an important topic to continue to research due to its generalizability to all children in hospitals.

This doctoral capstone project is meant to add to the literature supporting the distinct role of occupational therapy in inpatient pediatrics as an important service with distinct value in increasing independence and function in meaningful activities, but also, in improving psychological well-being. In addition to previous efforts to improve function and well-being (animal-assisted therapy, adapted physical activity, therapeutic play), vision screening, treatment, and referral by occupational therapists can contribute to satisfying the three innate human needs (autonomy, relatedness, and competence) as detailed in self-determination theory (Ryan & Deci, 2000). Visual deficits compounded by the negative experience of hospitalization leads to dissatisfaction of the innate human needs, which decreases psychological well-being, therefore occupational therapists need to evaluate and treat visual deficits in children in inpatient settings.

CHAPTER THREE: DESCRIPTION OF PROJECT

This doctoral capstone focused on advanced clinical practice in inpatient pediatrics at Phoenix Children's Hospital, specifically in acute care. Due to the gap in literature and prevalence of information on occupational therapy in this setting, this author gained knowledge in this specialty clinical area in order to contribute a piece of literature and start to bridge the gap. The doctoral capstone project was shaped by the clinical experience therefore the specific focus of the project was determined approximately three weeks after the start of the clinical experience.

Occupational therapists can play a distinct role in improving the hospitalization experience for children because they are skilled at targeting each child's areas of concern (e.g. loss of meaningful activities, loss of independence, etc.) and because they can provide interventions that effectively increase each child's independence and function through adaptation of activities and the environment. Occupational therapists evaluate children in the inpatient setting to determine current impairments and devise goals to address in therapy. After providing occupational therapy services and interacting with other professionals at Phoenix Children's Hospital for three weeks, this author identified the need for additional resources to improve occupational therapists' evaluation of vision and treatment of visual deficits and impairments in the pediatric acute care setting. Vision is one of the many areas assessed by occupational therapists, however vision is often not formally assessed in acute care due to the severity of other impairments that often take precedence over visual deficits. Vision is one of the main ways that people receive information from and interact with their environment. Occupational therapists are skilled

in general evaluation of visual skills and deficits and can provide interventions to address these deficits or refer children to another professional (e.g. ophthalmology, orthoptics, etc.) if necessary. By evaluating and treating visual deficits in children in acute care, occupational therapists can increase children's independence with functional and meaningful activities and increase a sense of control over their environment, thus increasing psychological well-being. By gaining advanced clinical practice in inpatient pediatrics, this author developed a capstone project that contributes to the literature supporting the value of occupational therapy in this setting and provides resources for current and future practitioners.

Development of Resources

This project consisted of the development of a vision screening tool and treatment and referral protocols, specifically for pediatric acute care. The purpose of the vision screening tool (Figure 2) is to: identify visual deficits, assist in assessment of visual perception skills, identify appropriate interventions, and determine the need for a referral to another profession (e.g. optometry, orthoptics, neuro-ophthalmology). Age-appropriate norms (Figure 2) for certain visual skills are provided at the end of the vision screening tool to assist occupational therapists in interpreting the results. A treatment protocol (Figure 3) and referral protocol (Figure 4) were developed for occupational therapists to utilize after performing the vision screen to assist with determining appropriate interventions (e.g. eye patching, visual motor exercises, etc.) and/or requesting a consultation from appropriate professionals. The treatment protocol provides information about specific interventions given certain visual deficits. Additionally, to supplement the

treatment protocol, there is a chart (Figure 5) that identifies more specific recommendations (e.g. patching schedules, visual motor exercises, etc.) for each visual deficit along with corresponding functional implications.

Figure 2: Vision screening tool

Vision Screening Tool

Visual History

Glasses? YES / NO

History of visual deficits? YES / NO

If yes, list here: _____

Binocular Vision

Diplopia present with only 1 eye open? YES / NO
**If yes, then monocular diplopia present*

Diplopia disappears with 1 eye closed? YES / NO
**If yes, then binocular diplopia present*

**To test: Hold up fingers and ask patient how many they see*

Near Point of Convergence (NPC)? _____cm

**To test: Place ruler between the two brows and slide small object (i.e. business card, pen, sticker) along ruler toward child's nose at 1-2cm/sec. Ask child to tell you when the object becomes blurry or they see double. Measure that point from child's nose. This is the NPC (near point of convergence). NPC ~5-7cm is typical finding for elementary school children. NPC >7cm is an indicator of convergence insufficiency (see attached for more information)*

Saccades? Intact / Impaired
**To test: hold two objects about 2ft apart in front of patient and ask patient to look from one object to the other back and forth quickly*

Visual Acuity

Near Vision: Intact / Impaired

Distant Vision: Intact / Impaired

Comments: _____

Oculomotor Skills

Visual fixing

- Fixing on faces? YES / NO

- Fixing on objects? YES / NO

Nystagmus present? YES / NO

**To test: move object through all planes and hold at end range of visual field for ~2-3 seconds*

Resting position of eyes

Upper eyelid droop (ptosis)? YES / NO

	Left Eye	Right Eye
Esotropia (inward)		
Exotropia (outward)		
Hypertropia (upward)		
Hypotropia (downward)		

Visual Tracking

Plane	Intact or Impaired?	Smooth Pursuits Present?	Dissociation of head and eye movements?	Nystagmus present at end of visual field?
Horizontal				
Vertical				
Diagonal				
Circular				

Figure 2: Vision screening tool (continued)

<p style="text-align: center;">Visual Fields</p> <p>Difficulty finding items during tasks? YES / NO</p> <p>- If yes, which side? Left / Right / Middle</p> <p>Difficulty navigating environment? YES / NO</p> <p>Interacting with objects in periphery? YES / NO</p>	<p style="text-align: center;">Visual Perception/Visual Motor</p> <p>Depth perception? Intact / Impaired <i>*Observe child's ability to reach for objects</i></p> <p>Postural Dysfunction? YES / NO If yes, describe _____</p> <p>Finger-to-nose? Intact / Impaired <i>*Ask child to touch their nose and then your finger ~1ft from face 3x sequentially</i></p>														
<p>Functional Assessment of Vision</p>															
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%; padding: 5px;">ADL</th> <th style="padding: 5px;">Impairments Noted</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Grooming</td> <td style="height: 20px;"></td> </tr> <tr> <td style="padding: 5px;">Dressing</td> <td style="height: 20px;"></td> </tr> <tr> <td style="padding: 5px;">Toileting</td> <td style="height: 20px;"></td> </tr> <tr> <td style="padding: 5px;">Eating</td> <td style="height: 20px;"></td> </tr> <tr> <td style="padding: 5px;">Bathing</td> <td style="height: 20px;"></td> </tr> <tr> <td style="padding: 5px;">Mobility (transfers, ambulation)</td> <td style="height: 20px;"></td> </tr> </tbody> </table>		ADL	Impairments Noted	Grooming		Dressing		Toileting		Eating		Bathing		Mobility (transfers, ambulation)	
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<p>Additional comments:</p> <div style="border: 1px solid black; height: 80px; margin-top: 5px;"></div>															

(Alvarez et al., 2010; American Academy of Ophthalmology, 2019; Blanchard et al., 2016; Brown, 2006; Digre & Moran, 2005; Duane, 1922; Harbert, Yeh-Nayre, O'Halloran, Levy, & Crawford, 2012; Irving, Steinbach, Lillakas, Babu, & Hutchings, 2006; Jhaji, 2017; Kelly et al., 2016; Kid Sense Child Development, 2019; Lane, Smith, & Schnek, 2008; Maples & Hoenes, 2007; Menjivar, Kulp, Mitchell, Toole, & Reuter, 2018; Newman, 2018; Patel et al., 2018; PEDIG, 2010; Penix, Swanson, & DeCarlo, 2015; Scheiman, 2003; Scheiman, 2005; Totsuka, Handa, Ishikawa, & Shoji, 2018; Triantafilou, Welder, & Longmuir, 2014)

Age Appropriate Visual Skills

Near point of convergence (NPC)		Saccades (Norms)	
<ul style="list-style-type: none"> For elementary school-aged children (Maples & Hoenes, 2007): <ul style="list-style-type: none"> >5cm is an indicator of convergence insufficiency For school-aged children (ages 9-14) (Menjivar, Kulp, Mitchell, Toole, & Reuter, 2018): <ul style="list-style-type: none"> >7cm is an indicator of convergence insufficiency Mean = 6.9cm Median = 5cm 		Age (yrs)	Latency (seconds) time delay between eye movements
		<5	0.40
		5	0.33
		6	0.29
		7	0.27
		8	0.24
		9	0.22
		10	0.21
		11	0.23
		12	0.19
		13	0.20
		14	0.17
		15-19	0.20

(Irving, Steinbach, Lillakas, Babu, & Hutchings, 2006)

Visual Fixing and Tracking

Age (months)	Visual fixing and tracking skills
0-1	fixes on faces or light; follows faces while in supine
1-2	fixes on faces and objects; follows to midline
2-3	follows objects with eyes past midline, downward/upward, horizontally 180 degrees;
3-4	follows moving object in supported sitting
4-5	Follows with eyes without head movement; look with head in midline
5-6	Fixes on distant objects

(VORT Corporation, 1995)

Vision Milestones

Age	Age appropriate visual skills
Birth	Fixes on faces or light; follows faces while in supine
1	Fixes on faces and objects; follows objects to midline
2-3	Looks at hands; followed objects and faces
4-5	Bats at objects above while in supine; examines own hands;
5-7	Fixes on distant objects; color vision fully developed; reaches for image of self in mirror; turns head to fix on an object
7-11	Stares at small objects; depth perception emerging; engages in peek-a-boo
11-12	Tracks objects moving quickly
12-14	Places shapes in shape sorter; recognizes self in mirror; points for objects; recognizes familiar pictures/objects
18-24 (~1.5-2 yrs)	Focuses on near and far objects; scribbles; imitates lines and circles while scribbling
36-38 (~3 yrs)	Vision is approaching 20/20; copies shapes; names colors
48-72 (4-6 yrs)	Recognizes and recites alphabet; beginning to read; complete depth perception

(Children's Hospital of Philadelphia, 2018)

Figure 3: Functional Implications of Visual Deficits

Functional Implications of Visual Deficits		
Visual Deficit	Functional Implication	Interventions
Farsightedness (impaired near vision)	<ul style="list-style-type: none"> • Difficulty reading during school-based tasks leading to headaches, nausea, etc. • Difficulty identifying shapes and objects in environment during play tasks • Avoidance of close work/tabletop work 	Sensory supports <ul style="list-style-type: none"> • Contact lenses and/or glasses
Nearsightedness (impaired distant vision)	<ul style="list-style-type: none"> • Impaired ability to read clock across the room • Inability to read instructions on the board • Decreased ability to read signs while driving • Decreased ability to read signs while navigating environment during community mobility at school or other activities 	Sensory supports <ul style="list-style-type: none"> • Contact lenses and/or glasses
Diplopia (Webber, 2018)	<ul style="list-style-type: none"> • Decreased depth perception • Decreased visual perception for driving (for children ages 16+) • Decreased reading proficiency and speed • Difficulty navigating unfamiliar environments and avoiding obstacles • Decreased accuracy reaching and grasping for items for ADL, play, and school-based tasks • Decreased dexterity for tasks requiring fine motor coordination (i.e. buttoning shirts, opening containers, drawing etc.) • Difficulty pouring water accurately or engaging in cooking tasks • Difficulty copying from the board to one's paper or from one paper to another 	Patching <ul style="list-style-type: none"> • Patch one (affected) eye when navigating unfamiliar environment to maintain safety • Alternate patching vs not-patching (i.e. every 2-6 hrs) due to risk of developing amblyopia (American Academy of Ophthalmology, 2019) Visual motor exercises <ul style="list-style-type: none"> • Alternating proximal and distal targets of the same and various sizes: Place picture of child's interests (i.e. paw patrol) on wall ~6 feet away and place a picture of paw patrol ~2feet from child at eye level. Ask child to look from close picture to far picture

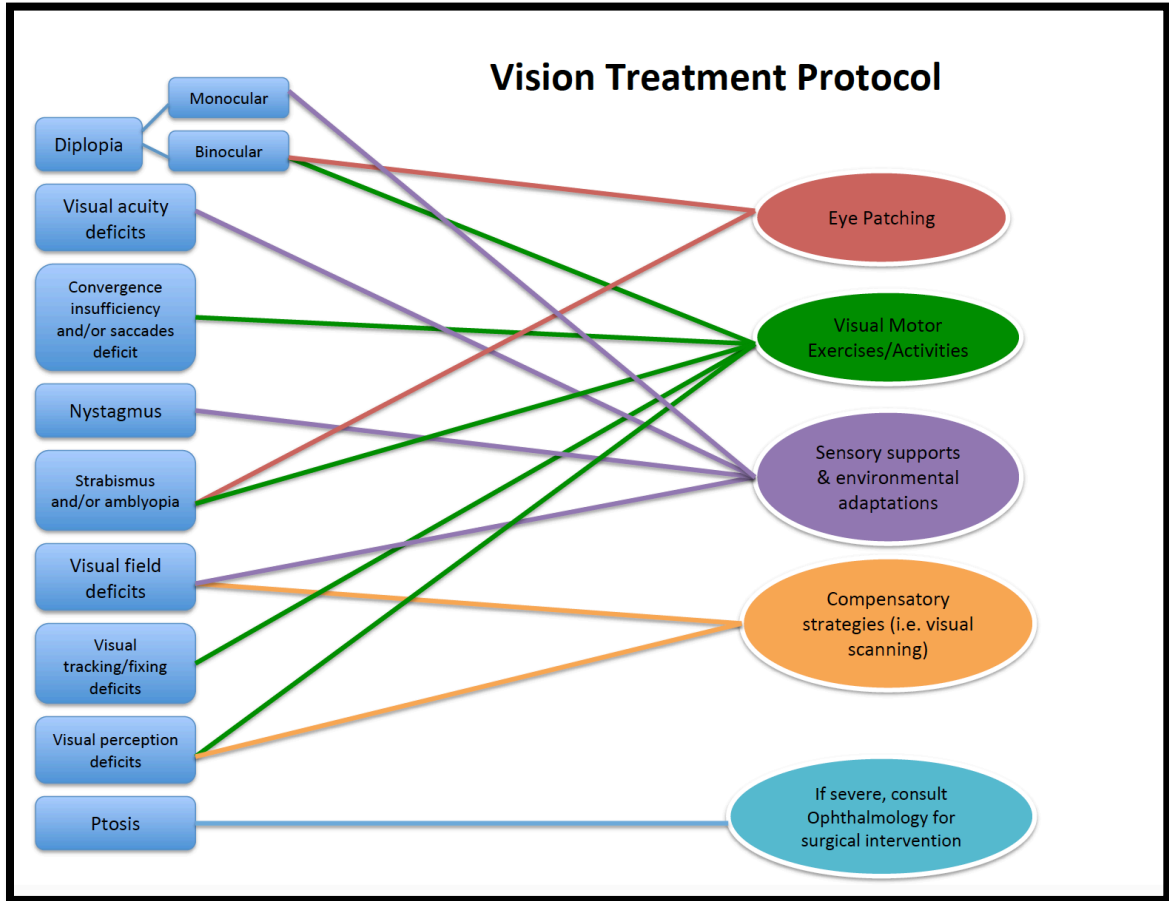
		<ul style="list-style-type: none"> Convergence activity: Present a small object ~20inches from the child's face and slowly move object toward child until one or both eyes are not fixed on the object anymore. Continue this activity until the child is no longer interested in the object
Convergence insufficiency (Alvarez et al., 2010)	<ul style="list-style-type: none"> Loss of concentration, headaches, diplopia, and/or eye strain during visual motor tasks (i.e. writing, reading, coloring) Avoidance of close work/tabletop work Loss of place while reading leading to increased time for reading tasks Difficulty remembering what was read and reading slowly Difficulty performing crafts or other precise activities working at near distances 	<p>Visual motor exercises</p> <ul style="list-style-type: none"> Alternating proximal and distal targets of the same and various sizes: Place picture of child's interests (i.e. paw patrol) on wall ~6 feet away and place a picture of paw patrol ~2feet from child at eye level. Ask child to look from close picture to far picture Convergence activity: Present a small object ~20inches from the child's face and slowly move object toward child until one or both eyes are not fixed on the object anymore. Continue this activity until the child is no longer interested in the object
Impaired saccades (OT Toolbox, 2019)	<ul style="list-style-type: none"> Loss of place while reading Poor spacing and orientation when writing Difficulty copying from the board to one's paper or from one paper to another 	<p>Visual motor exercises</p> <ul style="list-style-type: none"> Gaze Stabilization Exercises: Place object ~2ft from child's face and have child turn head to both sides while maintaining eye contact with object. Use an object that the child likes such as a stuffed animal or action figure Complete mazes by tracking with eyes only without moving head Place 4-5 pictures on wall ~ 4 ft from child and ask child to look at different pictures (i.e. look at the dog, cat, etc.)
Nystagmus (Penix, Swanson, DeCarlo, 2015)	<ul style="list-style-type: none"> Decreased visual acuity leading to difficulty with school-based tasks (i.e. seeing the board) 	<p>Environmental adaptations</p> <ul style="list-style-type: none"> Large print for reading Using tablets to magnify print

	<ul style="list-style-type: none"> Negative psychosocial impact (i.e. social discrimination by peers) 	<p>Sensory supports</p> <ul style="list-style-type: none"> Prism glasses Contact lenses and/or glasses
Impaired fixation (Willings, 2017)	<ul style="list-style-type: none"> Decreased attention on school-based tasks Decreased ability to locate items in environment Impaired development of social skills (i.e. fixing on faces and making eye contact) 	<p>Visual motor exercises</p> <ul style="list-style-type: none"> Convergence activity: Present a small object ~20 inches from the child's face and slowly move object toward child until one or both eyes are not fixed on the object anymore. Continue this activity until the child is no longer interested in the object Walking while balancing a ball on top of a cup or cardboard tube With one eye at a time, hold a fruit loop/cheerio between fingers and insert pipe cleaner/string into the hole with the other hand. Repeat with the other eye. Once child can complete with each eye, repeat activity with both eyes open Other games: sewing cards, Operation, Lite Brite, stringing jewelry, pick-up sticks
Impaired tracking (Willings, 2017)	<ul style="list-style-type: none"> Decreased ability to engage in play activities (i.e. tracking soccer ball, tracking character in a video game) Loss of place while reading Difficulty reading or copying from the board Difficulty driving a car 	<p>Visual motor exercises</p> <ul style="list-style-type: none"> Gaze Stabilization Exercises: Place object ~2ft from child's face and have child turn head to both sides while maintaining eye contact with object. Use an object that the child likes such as a stuffed animal or action figure Shine a flashlight on objects in a dark room and ask child to follow the light and name the objects (may complete patching strong eye or with no patching) Place favorite object or food around the room and ask the child to scan to find it

		<ul style="list-style-type: none"> Place a marble in a pie pan and rotate it with circular motions on the outside rim. Ask child to follow marble with eyes only, not head Roll marbles toward child and ask them to trap each marble under a cup
Strabismus and/or amblyopia (signs include esotropia, exotropia, etc.) (Webber, 2018)	<ul style="list-style-type: none"> Decreased depth perception Decreased perception for driving (for children ages 16+) Decreased reading proficiency and speed Difficulty navigating unfamiliar environments and avoiding obstacles Decreased accuracy reaching and grasping for items for ADL, play, and school-based tasks Decreased dexterity for tasks requiring fine motor coordination (i.e. buttoning shirts, opening containers, drawing etc.) Difficulty pouring water accurately or engaging in cooking tasks Difficulty copying from the board to one's paper or from one paper to another Negative psychosocial impact (i.e. social discrimination by peers and teachers) (Alsheheri, 2016) 	<p>Visual motor exercises</p> <ul style="list-style-type: none"> Convergence activity: Present a small object ~20 inches from the child's face and slowly move object toward child until one or both eyes are not fixed on the object anymore. Continue this activity until the child is no longer interested in the object Shine a flashlight on objects in a dark room and ask child to follow the light and name the objects (may complete patching strong eye or with no patching) Place favorite object or food around the room and ask the child to scan to find it <p>Patching</p> <ul style="list-style-type: none"> Patch unaffected eye for minimum of 6 hours/day for amblyopia (Yazdani et al., 2017) Patch affected eye when navigating unfamiliar environment Utilizing an eye patch (full occlusion) vs Bangerter filters (part-occlusion) yields similar results (PEDIG, 2010) Use patch or filter on glasses depending on child's preference (PEDIG, 2010)
Visual field deficit (Lane, Smith, Schenk, 2008)	<ul style="list-style-type: none"> Difficulty navigating unfamiliar environments and avoiding obstacles Increased disorientation during 	<p>Sensory support</p> <ul style="list-style-type: none"> Prism glasses

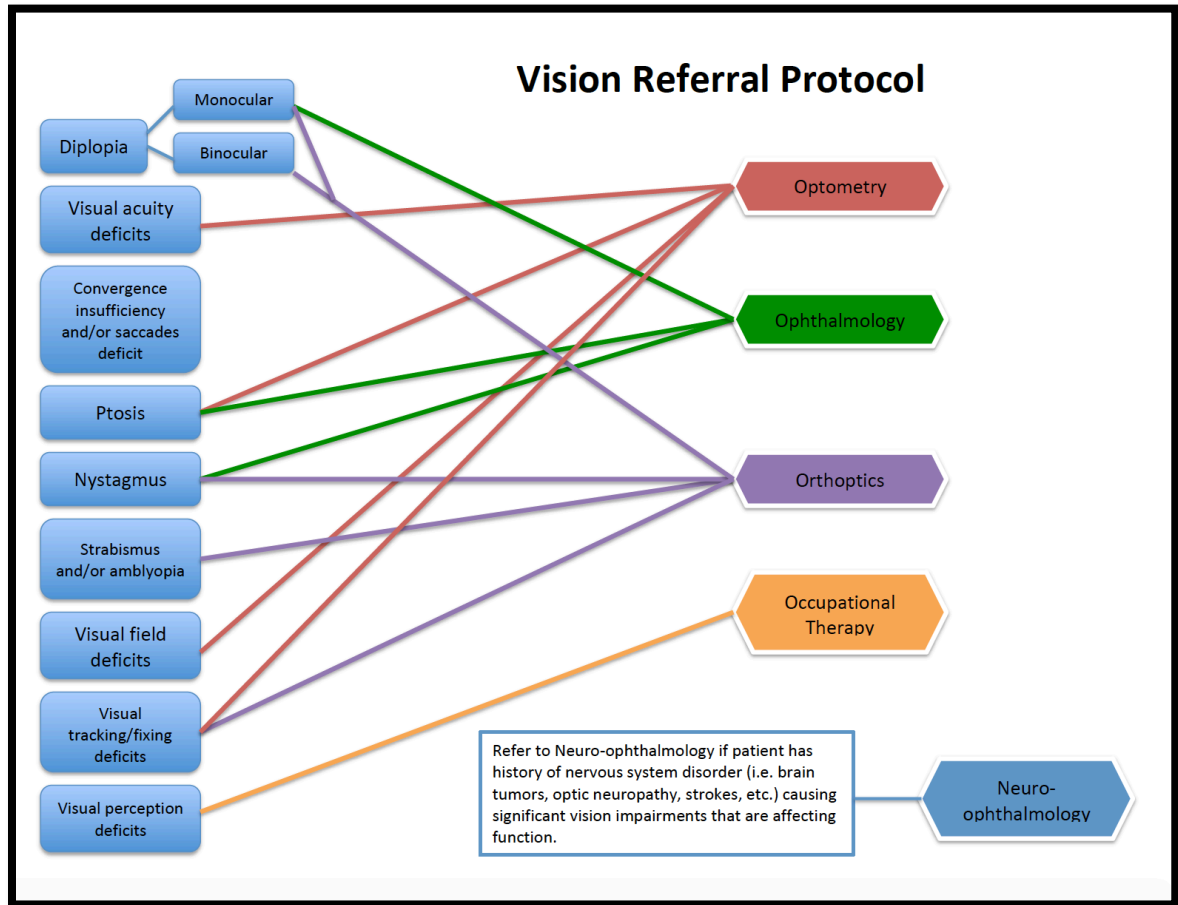
	<p>unfamiliar activities</p> <ul style="list-style-type: none"> • Difficulty finding objects during ADLs (i.e. tooth brushing, finding clothes in closet) • Increased time to complete ADLs • Inability to safely drive or cross street for community mobility • Increased risk of falls due to impaired ability to recognize obstacles and potentially impaired balance • Difficulty visually scanning classroom and assignments for school-based tasks • Negative psychosocial impact due to increased difficulty with meaningful occupations 	<p>Compensatory strategies</p> <ul style="list-style-type: none"> • Visual scanning training • Environmental set-up
Impaired visual perception	<ul style="list-style-type: none"> • Difficulty navigating unfamiliar environments and avoiding obstacles • Decreased ability to copy shapes, letters, etc. • Impaired ability to complete puzzles, dot to dots, etc. • Difficulty matching shoes and socks • Impaired ability to sort or organize belongings leading to disorganization • Decreased ability to reach for and grasp objects in a busy environment (i.e. retrieving food from the refrigerator) • Poor eye-hand coordination to engage in play tasks 	<p>Visual motor exercises (Kid Sense, 2019)</p> <ul style="list-style-type: none"> • Copying shapes, completing partially drawn pictures • Playing memory • Word searches, puzzles, dot-to-dot • Building with blocks • Identify objects by touch <p>Compensatory strategies (Kid Sense, 2019)</p> <ul style="list-style-type: none"> • Visual cues (i.e. stickers to mark start of reading) • Directional arrows to identify direction of writing or reading • Utilizing graph paper • Eliminate visual distractions (i.e. clear desk, position desk facing de-cluttered background) • Create steps for more difficult tasks (i.e. completing puzzles by quadrant)

Figure 4: Vision Treatment Protocol



(Alvarez et al., 2010; American Academy of Ophthalmology, 2019; Blanchard et al., 2016; Brown, 2006; Coll, 2012; Eye can learn; Irving, Steinbach, Lillakas, Babu, & Hutchings, 2006; Kelly et al., 2016; Kid Sense Child Development, 2019; Lane, Smith, & Schnek, 2008; Menjivar, Kulp, Mitchell, Toole, & Reuter, 2018; Newman, 2018; OT Toolbox, 2019; Patel et al., 2018; PEDIG, 2010; Penix, Swanson, & DeCarlo, 2015; Scheiman, 2003; Scheiman, 2005; Totsuka, Handa, Ishikawa, & Shoji, 2018; Triantafilou, Welder, & Longmuir, 2014; Willings, 2017; Yazdani et al., 2016)

Figure 5: Vision Referral Protocol



(American Academy of Ophthalmology, 2019; Blanchard et al., 2016; Coll, 2012; Lane, Smith, & Schnek, 2008; Patel et al., 2018)

Barriers and solutions

One of the barriers of this project is the variable length of stays of children at Phoenix Children's Hospital (PCH) and the inconsistency of therapists due to variable schedules. Since children may have a short stay at PCH or be transferred to another floor that another occupational therapist covers, it is difficult to provide visual interventions and monitor progress closely. Despite this lack of continuity of care in therapies, the vision screening tool can be useful in determining the appropriate interventions or need

for a referral on initial evaluation, which can be passed along to all occupational therapists through the electronic medical record.

Another barrier to this project is the time needed to implement vision therapy interventions in acute care pediatrics. Many of the children have other impairments (e.g. mobility, cognition, etc.) that take precedence over vision; therefore those impairments are the focus of therapy sessions. The treatment protocol provides time-efficient intervention ideas that are easily incorporated into a typical occupational therapy treatment session; therefore, therapists can integrate vision therapy into their sessions without adding on too much time.

By utilizing the vision resources developed in this capstone project, occupational therapists can evaluate and provide interventions to address visual deficits in children within the restrictions of the inpatient acute care environment.

CHAPTER FOUR: EVALUATION PLAN AND OUTCOMES

Methods

Following development of the vision screening tool and treatment/referral protocols, the resources were provided to the acute care occupational therapists, who then provided feedback and suggestions. Their feedback was incorporated into the vision screening tool and treatment/referral protocols. Over the course of 14 weeks at Phoenix Children's Hospital, the vision screening tool was used on a small sample of patients (n=6), when indicated, to identify any visual deficits present. The treatment and referral protocols were then used to identify appropriate interventions and determine the need for referral to another profession (e.g. optometry, ophthalmology, etc.).

Sample Selection

The vision screening tool can be used on any population of children in the acute care settings. Due to time constraints inherent to the acute care setting, the vision screening tool was tested on a small sample of patients (n=6). Patients were selected to undergo the vision screening if they presented with any noticeable or unprompted report of visual deficits, were involved in a traumatic accident that may have led to a concussion or loss of consciousness (e.g. motor vehicle crash, suspected non-accidental trauma), or presented with a neurological condition associated with visual deficits. The vision screening tool was administered to match the cognitive abilities and of each patient, therefore it was not administered in a standardized protocol.

Data & Results

The vision screening tool was administered to the following patients yielding the following results:

Table 1: Data and results

	Diagnosis	Visual Screening Results	Intervention Recommendations	Referral
Patient 1	12 yo male with unidentified neurological condition of unknown etiology presenting with acute internuclear ophthalmoplegia. The medical team reported he likely had a diagnosis of multiple sclerosis, however at the time of the vision screen, he was undiagnosed. The patient underwent an ophthalmology assessment prior to his admission to acute care due to presentation of exotropia in left eye and was diagnosed with acute internuclear ophthalmoplegia, which is often associated with multiple sclerosis.	Exotropia in left eye and nystagmus in right eye during abduction; complaint of double vision and blurred vision; deficits in visual tracking, visual fixing, saccades, and convergence due to exotropia of left eye; increased difficulty with ADLs and difficulty navigating environment when walking as a result of the double vision	Visual motor exercises to address and improve convergence insufficiency, diplopia, impaired saccades, strabismus, and impaired visual tracking; Patching the affected eye when walking or navigating the environment to decrease diplopia and maintain safety; Patching the unaffected eye (right eye) for ~6 hours per day when not walking to strengthen the affected eye	Outpatient occupational therapy with an occupational therapist specializing in vision therapy; follow-up with ophthalmology
Patient 2	14 year old male involved in a motor vehicle crash with loss of consciousness at the scene status post surgical repair of pelvic fracture.	No apparent visual deficits and no complaint of double vision, blurred vision, headache, or nausea	--	--
Patient 3	5 year old male involved in a motor	No apparent visual deficits and no	--	--

	vehicle crash with no loss of consciousness status post surgical repair of tibia/fibula fracture	complaint of double vision, blurred vision, headache, or nausea.		
Patient 4	15 year old female status post posterior spinal fusion secondary to idiopathic scoliosis. Patient with no complaint of double vision, blurred vision, headache, or nausea prior to post-op day 3. On post-op day 3, patient with complaint of blurred vision after OT session while seated edge of bed.	Decreased visual acuity (distant and near) and diplopia; complaint of blurred vision, and headaches; no additional visual deficits; per patient report, patient had blurry vision and decreased visual acuity prior to admission to hospital	Sensory supports (i.e. glasses) recommended through an optometrist to improve visual acuity	Follow-up with optometrist after discharge to undergo a formal vision assessment and determine the most appropriate sensory support
Patient 5	4 year old male with acute myeloid leukemia (AML) undergoing 3 consecutive bone marrow transplants status post posterior fossa tumor resection	Esotropia in left eye; decreased coordination of both eyes likely leading to diplopia, however difficult to assess diplopia due to presence of ataxia due to tumor resection; can visually track in all planes, however does not demonstrate smooth pursuits or dissociation of head and eye movements; can converge on objects, however near point of convergence not formally tested due to inability for patient to communicate due to decreased verbalization; impaired saccades and ptosis in left eye	Visual motor exercises incorporated into OT treatment sessions to address all of the aforementioned visual deficits	Formal assessment by ophthalmology or neuro-ophthalmology after completion of bone marrow transplant and discharge from hospital

Patient 6	5-month-old female with a humerus fracture. Mother reported child received early intervention therapy services at baseline due to delayed developmental milestones.	Visually tracked faces and objects horizontally and vertically across midline, however unable to dissociate head and eye movements; fixed on objects and faces, however demonstrated delayed processing when interacting with objects; required initial hand over hand assist to activate her upper extremity to reach for a rattle despite visually fixing on it	Family and patient continue with early intervention services to address delays in sensory processing and other developmental milestones	Family and patient continue with early intervention services
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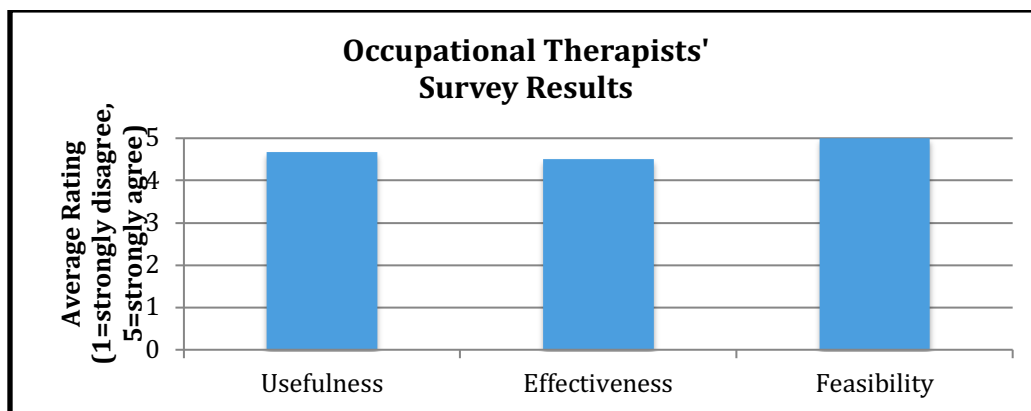
The vision screening tool was feasible to perform in the inpatient acute care setting, however it was implemented differently for each patient depending on their individual abilities, age, cognitive status, attention span, and other external factors (i.e. time, schedule). For example, some areas of vision were not assessed for infants (e.g. saccades, depth perception) since their visual skills have not fully developed. Visual fixing and tracking skills and resting position of the eyes are the areas that are focused on during infant visual assessment because these skills are developing during the first year of life. Additionally, the vision screening tool was provided in its entirety if time permitted, however typically some areas of vision were broadly assessed due to time constraints in acute care (e.g. not using a ruler for measuring near point of convergence). The vision screening tool was useful in identifying deficits and, subsequently, the treatment protocol was useful in determining appropriate interventions for specific visual deficits.

Additionally, the referral protocol was useful in determining if a child needed to be referred to another professional, and, if so, which specialty.

Outcomes

The primary intended outcome of this project was to provide occupational therapists with the tools and resources to evaluate vision and provide the appropriate interventions or referrals based on that evaluation in the pediatric acute care setting. To measure this outcome, the inpatient acute care occupational therapists at Phoenix Children's Hospital were provided a survey to assess the usefulness, feasibility, and effectiveness of the vision evaluation and intervention resources (i.e. screening tool, treatment/referral protocols). The survey used a Likert scale with the following rating system: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree. Two out of four of the acute care occupational therapists submitted a survey response with the results reflected in Figure 6. There was not 100% survey response from the occupational therapists due to the high work volume in the acute care setting.

Figure 6: Survey Results



The results of the survey reflected high ratings in all three categories demonstrating the usefulness, feasibility, and effectiveness of utilizing these resources in the inpatient setting.

The secondary outcome of this project was to increase the independence and function of children in inpatient settings, therefore increasing their quality of life and psychological well-being. This outcome was measured by utilizing the vision screening tool and treatment/referral protocols on a small sample of patients (n=6). It was not feasible to formally assess the quality of life and psychological well-being of children after vision evaluation and intervention due to the variable length of stays and time constraints in the acute care setting.

If provided more time and resources, it would be beneficial to conduct a study looking at the impact of the visual interventions provided as a result of the vision screening tool to determine if the visual interventions increase independence and function, thus increasing psychological well-being in children in inpatient hospital settings. Additionally, it would be beneficial to examine how the vision screening tool could be consistently modified to evaluate children of different ages and initial diagnoses. A future project to improve the evaluation and intervention of vision in inpatient pediatrics could involve modifying the vision screening tool and treatment/referral protocols for various populations, including infants, toddlers, school-age children, and young adults.

CHAPTER FIVE: DISSEMINATION PLAN

The purpose of this capstone project was twofold. The first purpose was to contribute to the literature that exists for occupational therapy in inpatient pediatrics. The second purpose was to provide clinicians and future practitioners with tools to evaluate and treat visual deficits in children in inpatient settings in order to increase the independence, psychological well-being and quality of life of the children. The dissemination of this capstone project to the appropriate audiences was crucial to the achievement of these two purposes.

To achieve these goals, this author formally presented this capstone project to fellow occupational therapy doctoral students and faculty members at Boston University on August 23rd, 2019. This was an oral presentation using a poster to provide the audience with visuals (Figure 7). This presentation provided future practitioners and occupational therapists in academia with more knowledge about the role of occupational therapy in inpatient pediatrics and aided in decreasing the gap in literature. Additionally, this author presented this capstone project at Phoenix Children's Hospital on August 21st, 2019 to other rehabilitation professionals, including occupational therapists, physical therapists, and speech language pathologists. This presentation focused on providing current occupational therapists and other rehabilitation professionals with the resources developed during this capstone experience to improve the evaluation and treatment of visual deficits for children at Phoenix Children's Hospital. Additionally, this author provided the rehabilitation department with paper copies and digital files of the vision screening tool (including age-appropriate norms), treatment and referral protocols, and

functional implications of visual deficits chart. The rehabilitation professionals will have access to these resources at all times while at work via a shared drive making the resources feasible to use for evaluation and treatment.

The dissemination of this capstone project was completed through oral presentations and provision of the vision resources to Phoenix Children's Hospital. This achieved the two purposes of contributing to the literature and providing occupational therapists additional resources for vision evaluation and treatment.

Figure 7: Poster

Boston University College of Health & Rehabilitation Sciences
Sargent College
Department of Occupational Therapy

I, LOVE: Improving Lives of Children through Occupational Therapy Vision Evaluation and Intervention

Katie Appelbe, OT/s
Simone Gill, PhD, OTR; Kayla Raymond, OTR/L, Phoenix Children's Hospital
Department of Occupational Therapy

BACKGROUND/LITERATURE REVIEW

DESCRIPTION OF THE PROJECT

OUTCOME EVALUATION/METHODS

The problem:

- ◆ Setting: inpatient acute care pediatrics
- ◆ Children report multiple concerns with the hospitalization experience: loss of independence, loss of meaningful activities, and loss of control
- ◆ Concerns lead to feelings of loss of self-determination, loneliness, and isolation
- ◆ Negative feelings result in decreased psychological well-being and quality of life

The solution: Occupational therapy

- ◆ Provide interventions to increase independence and participation in meaningful and functional activities
- ◆ Vision is assessed by occupational therapists, however is often not formally assessed in acute care
- ◆ Vision is one of the main ways people receive information

Description:

- ◆ Development of a vision screening tool to evaluate vision of children in pediatric inpatient acute care settings
- ◆ Development of treatment protocol to assist in selecting appropriate interventions given certain visual deficits found by the vision screening tool
- ◆ Development of a referral protocol to assist in referring children to other providers if needed

Purpose of screening tool and protocols

- ◆ Identify visual deficits
- ◆ Assist in assessment of visual motor and perception skills
- ◆ Identify appropriate interventions
- ◆ Determine the need for a referral to another profession

THEORETICAL BASIS

Self-determination theory
(Ryan & Deci, 2000)

By evaluating and treating visual deficits in children in acute care, occupational therapists can increase children's independence with functional and meaningful activities, provide a sense of control over their environment, thus increasing psychological well-being

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Outcome 1:

- ◆ to provide occupational therapists with the tools and resources to evaluate and treat visual deficits in the pediatric acute care setting
- ◆ Measured by: surveys provided to acute care occupational therapists

Occupational Therapists' Survey Results

Category	Average Rating (1-5)
Usability	4.5
Effectiveness	4.5
Feasibility	4.5

Outcome 2:

- ◆ to increase the independence of children improving their quality of life and psychological well-being
- ◆ Measured by: utilizing vision screening tool and treatment protocols on a small sample of patients (n=6)
- ◆ Unable to formally assess quality of life and psychological well-being after vision treatment due to the variable length of stays in the acute care setting

CONCLUSIONS

- ◆ Occupational therapy plays a distinct role in the pediatric acute care setting in increasing children's independence and function to increase psychological well-being and quality of life through evaluation and treatment of functional deficits including visual deficits
- ◆ Gap in the literature describing the role of occupational therapy in inpatient pediatrics
- ◆ More research needed to demonstrate the impact of occupational therapy on children's function and psychological well-being

CHAPTER SIX: CONCLUSION

While completing the 14-week advanced clinical practice experience at Phoenix Children's Hospital, this author gained advanced clinical skills in the specialty area of occupational therapy in inpatient pediatrics. Occupational therapists play a distinct role in the inpatient pediatric setting addressing children's concerns with the hospital environment by increasing their independence and participation in meaningful activities, thus increasing their psychological well-being. During this experience, this author developed a capstone project that contributes to the literature supporting the value of occupational therapy in the inpatient pediatric setting and provides resources for current and future practitioners. This capstone project focused on providing resources to occupational therapists to improve the evaluation and treatment of visual deficits in children in inpatient settings in order to increase their function and independence, thus improving their psychological well-being and quality of life. Children in inpatient hospital settings, specifically Phoenix Children's Hospital, will benefit from this vision screening tool and appropriate interventions that address their visual deficits, increase their interaction with their environment, and increase their independence in functional and meaningful activities.

APPENDIX*Executive Summary*

Title of Project: Improving Lives of Children through Occupational Therapy Vision Evaluation and Intervention

Name of Facility: Phoenix Children's Hospital

Student Name: Katherine Appelbe

Academic Mentor: Simone Gill, PhD, OT, OTR, Associate Professor, Boston University

Site Mentor: Kayla Raymond, OTR/L

Goal of project: This capstone project's first and broader purpose is to increase the independence of children in inpatient settings improving their quality of life and psychological well-being. The second purpose is to provide occupational therapists with the tools and resources to evaluate and treat visual deficits in the inpatient pediatric setting. By addressing visual deficits in children, occupational therapists can improve their function and independence, this increasing psychological well-being.

Background of problem: Children in inpatient settings are in an unfamiliar environment that does not facilitate engagement in typical occupations. Children report multiple concerns with the hospital environment and experience including physical pain, loss of independence, loss of meaningful activities, lack of routine, and loss of control.

Occupational therapists play a distinct role in improving the hospitalization experience for children by addressing these concerns including increasing independence and function thus improving psychological well-being. Self-determination theory posits that humans have three innate psychological needs – competence, autonomy, and relatedness. These needs are not being met for children in inpatient settings as shown by multiple qualitative studies, however occupational therapy can aid in meeting these needs through proper intervention. Vision is the main way of receiving external input and visual deficits affect

all areas of development, thus it is crucial to evaluate and treat visual deficits in children to increase function (Willings, 2017).

Overview of project: In order to assist occupational therapists in the evaluation and treatment of visual deficits, a vision screening tool and treatment/referral protocol were developed. The vision screening tool is used to identify visual deficits and assist in the assessment of visual motor and perception skills. The treatment protocol identifies appropriate interventions for specific visual deficits. Lastly, the referral protocol determines the need for a referral to another profession.

Outcomes: The primary outcome was measured by utilizing the vision screening tool and treatment/referral protocols on a small sample of patients (n=6). It was not feasible to formally assess the quality of life and psychological well-being of children after vision evaluation and intervention due to the variable length of stays and time constraints in the acute care setting. To measure the secondary outcome, the inpatient acute care occupational therapists at Phoenix Children's Hospital were provided a survey to assess the usefulness, feasibility, and effectiveness of the vision evaluation and intervention resources. The results of the survey reflected high ratings in all three categories.

Recommendations: There remains a gap in literature demonstrating the role of occupational therapy in inpatient pediatrics, however these resources contribute to the literature base. More research is needed to demonstrate the impact of occupational therapy on children's function and psychological well-being in inpatient pediatrics, specifically related to addressing vision.

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CURRICULUM VITAE

