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Streamlining Care for Children with Autism Spectrum Disorder

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Abstract

Background: Autism spectrum disorder (ASD) is a chronic and developmental disorder that affects about one out of every 65 children in California, and one in 59 children in the United States. Children with ASD have difficulty communicating and interacting with others, and experience oversensitivity to new stimuli and environments.

Problem: In healthcare settings, children with ASD experience numerous challenges related to lack of adequate knowledge and education of staff regarding ASD, and lack of appropriate environmental and sensory resources which reduce quality of care provided to this population.

Methods: The project took place in a Psychiatric Emergency Services (PES) Unit of a Hospital in Northern California that provides psychiatric and mental health services to approximately 15 children with ASD. This setting had no toolkit and/or sensory room to help staff better care for these children.

Interventions: An educational toolkit to educate and guide staff, and a sensory room available for staff to offer children with ASD to reduce stimuli were implemented within PES.

Results: 21 staff completed pre- and post- Likert-scale surveys, with 100% of the staff stated utilization of the interventions and agreeing with their effectiveness. Moreover, “Sensory Room Log” was used to evaluate the utility of the sensory room, with 100% of the staff using the sensory room for all 15 children with ASD that presented to PES (100% of children with ASD were offered and used the sensory room to decrease stimulation and promote relaxation).

Conclusions: All participating staff believed the educational toolkit and the sensory room were effective interventions to help streamline and improve the quality of care provided to children with ASD in PES and recommended them to be utilized within other healthcare settings.

Keywords: *Children with Autism Spectrum Disorder, Healthcare staff education, Educational toolkit, Autism sensory room*

Streamlining Care for Children with Autism Spectrum Disorder

Background

Autism spectrum disorder (ASD) is a developmental disorder that affects both communication and behavior (National Institute of Mental Health [NIMH], 2018). It is referred to as a “spectrum” disorder since there is a wide variation in the type and severity of symptoms, and defined as a “developmental disorder” because many of its symptoms tend to appear during the early developmental stages (NIMH, 2018). In the United States, one in 59 children live with ASD compared to one in 68 in 2012, an increase of 15% in incidence nationally (CDC, 2018). In California, approximately one in 65 children live with ASD compared to about one in 85 in 2009, an increase of 30% in incidence statewide (Nevison & Parker, 2020). Despite high prevalence and incidence of ASD among children and their frequent visits to healthcare settings, there is minimal support to streamline their care, resulting in lower quality of care and increased healthcare costs (Autism Speaks, 2018; Berglund et al., 2017). In the absence of effective interventions and support, total cost of caring for children with ASD can rise to \$461 billion by 2025, about four to six times greater than for children without ASD (Autism Speaks, 2018). This cost is mainly due to interruption of care and workflow related to special needs and behaviors of these children, including acting out their needs instead of verbalizing them which could be mistaken for aggression or violence (Autism Speaks, 2018).

People with ASD can experience some common signs and symptoms related to ASD, such as difficulty communicating and interacting with others, failure to listen to and respond to others, being overly focused and getting upset by changes in a routine (NIMH, 2018). Healthcare settings could also involve long periods of waiting and a great deal of touch and sound which may be difficult for these children to tolerate (Benich et al., 2018; Berglund et al., 2017).

Additionally, a general lack of staff knowledge and training regarding how to care for children with ASD can further delay their care and lower their quality of care (Benich et al., 2018; Berglund et al., 2017; Muskat et al., 2015). Thereby, children with ASD may experience difficulty and challenges when interacting and socializing with others within healthcare settings (Berglund et al., 2017).

Problem Description

Currently, within many healthcare settings, there are minimal guidelines or toolkits available for staff to follow when caring for children with ASD, resulting in limited knowledge and difficulty to properly care for these patients. Furthermore, there are limited resources for children with ASD within healthcare settings to help them reduce their stimuli and to relax, including while waiting to be seen for their appointments. In the absence of streamlining the care for children with ASD, staff's knowledge regarding providing care for these children could be less than sufficient, quality of care can be reduced, and cost of healthcare could be four to six times higher than what it should be. To help streamline their care, shortcomings regarding limited knowledge of staff and availability of educational toolkit to guide staff when caring for children with ASD, along with the need for a sensory room to address the oversensitivity to healthcare stimuli must be addressed. Thus, this project focused on developing and implementing an educational toolkit within a healthcare setting to guide and educate staff as well as implementing a sensory room to help mitigate the sensory problems these children could face.

Setting

A healthcare setting that faces shortcoming in streamlining care for children with ASD is a Psychiatric Emergency Services (PES) Unit of a Hospital in Northern California. PES provides psychiatric and mental health services to approximately 305 adult patients monthly, nearly 50

children a month, about 15 of these children with ASD. The mission of this unit, as posted on the unit, is to provide the best psychiatric care in a safe and healing environment to people in crisis because of mental illness. The vision of the organization is to provide excellent care with compassion and respect to every patient to help them live the healthiest life possible, and to partner with physicians, nurses and staff to continuously improve the quality of care, safety and patient experience. The organization also strives and prides itself on implementing innovations and adapting to an ever-changing environment.

Prior to implementation of this project, PES did not have a sensory room or an educational toolkit to help guide staff to care for children with ASD while they are at PES. Moreover, prior to this project, there had not been any attempts or efforts made at PES to change the practice for children with ASD. This had resulted in limited knowledge of staff on how to care for this population of patients and lack of availability of a place to reduce the stimuli for these children when they arrive to PES, usually leading to more aggressive interventions and outcomes, including restraints or emergency intramuscular (IM) medications for these patients. This in turn resulted in delays in care for this population, including the time they could have been evaluated properly by a psychiatrist for disposition, causing them to stay longer in PES than other children. This in turn reduced the quality of care and satisfaction which are central to mission and vision of this unit and organization. Therefore, interventions such as educational toolkit and sensory room need to be implemented within PES to address the issues related to lack of streamlining of care for children with ASD who visit PES.

Specific Aim

To guide the project, the following aim statement has been developed to outline the goals of the project: Within three months of initiation of the project, PES will have an appropriate

educational toolkit to educate 100% of the staff and increase their knowledge on how to properly care for children with ASD by 80%; Moreover, a sensory room with adjustable lighting and minimal noise level will be made available to 100% of the children with ASD, with 80% of the staff indicating beliefs that the sensory room was useful to help reduce the stimuli for these children.

Available Knowledge

PICOT Question

Prior to conducting a literature search and review to examine the available evidence on ASD, the following PICOT question was designed to guide the search: In children (individuals under the age of 18) with Autism Spectrum Disorder who visit healthcare settings (P), how does utilizing an educational toolkit and a sensory room (I), as compared to no educational toolkit and sensory room, (C), affect staff knowledge and delays in care (O) within a period of three months (T)?

Search Methodology

Two search strategies were undertaken from August 2020 to November 2020 utilizing key terms related to PICOT to explore current evidence regarding ASD. The primary key terms used include: “Children with autism spectrum disorder,” “Child* Auti*,” in combination with “Clinic* Guid*,” “Sens* or Room*,” “Item* or Toy*,” and “Toolk*.” First, a search of these primary key terms was conducted in Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, Cochrane Database of Systematic Reviews, and PsycINFO. During this initial database search, only peer-reviewed and/or systematic reviewed and/or meta-analysis and/or quality improvement journals published in English between 2012 to 2020 were considered. This resulted in total of 4157 search results across the mentioned databases. Second,

a complete search was performed on these selected journals: SAGE Journal of Autism, Autism and Developmental Disorders, Developmental and Behavioral Pediatrics, American Journal on Intellectual and Developmental Disabilities, Focus on Autism and Other Developmental Disabilities. This resulted in 2097 search results across these journals using the same key terms as databases. To help narrow the search results further, these inclusion criteria were established: (1) population had to be individuals under the age of 18 with ASD, and (2) involved intervention(s) and/or suggestion(s) for intervention(s) and/or quality improvement(s). After applying these criteria and removing duplicates within the databases and the journals, five articles were selected (Appendix A).

Integrated Review of the Literature and Analysis

All five selected studies underwent critical appraisal and analysis using Johns Hopkins (JH) Nursing Evidence-Based Practice Appraisal Tools (Dang & Dearholt, 2017). Level of evidence ranged from Level I-B (for randomized control trial [RCT]) to Level IV-B (for clinical guidelines developed utilizing experts' opinions), where B stands for good quality for that level of evidence. Berglund et al. (2017) developed clinical guidelines for practice improvements utilizing surveys and questionnaires to obtain experts' opinions, analyzed using JH Non-Research Evidence Appraisal Tool resulting in level IV- B rating. The remaining four studies were analyzed using JH Research Evidence Appraisal Tool. Padmanabha et al. (2018) and Parsons et al. (2018) both performed RCTs resulting in Level I-B ratings. Schoen et al. (2018) conducted a systematic review of research studies, including RCT and nonrandomized studies, resulting in level II-B rating. McIntosh et al. (2015) conducted a nonrandomized study resulting in Level II-C rating.

Among the five selected studies, Berglund et al. (2017) was the only study that worked directly on developing clinical guidelines to address the needs of the children with ASD within healthcare settings. The guidelines developed were aimed to address some of the difficulties that children with ASD can experience in healthcare settings, including ineffective communication with staff, overreacting to sounds/noise, and difficulty adapting to healthcare environment (Berglund et al., 2017). The suggested guidelines developed to address some of these shortcomings were: (1) involving parents and guardians in the planning and caring for their children, (2) improving communication between the staff, the children and their parents by using plain and concrete language instead of symbolic and abstract language, (3) making an individualized comprehensive plan that includes both the child's preparation and the entire program for the child's visit, and (4) using pictures to communicate with the children and showing them what they would experience during their visits (Berglund et al., 2017). In terms of educating staff, McIntosh et al. (2015) developed simulation-based training to educate staff on behavioral needs and symptoms of ASD in children. This study found that educating staff through simulation-based training can indeed help staff to recognize unique behavioral needs of children with ASD and to address them effectively to improve their quality of care. Padmanabha et al. (2018), Parsons et al. (2018) and Schoen et al. (2018) worked on addressing the behavioral and social aspects along with sensory and environmental concerns of children with ASD through different interventions. Padmanabha et al. (2018) developed home-based sensory interventions (HBSI) which includes utilizing items such as therapy balls, sensory toothbrush, pictured flashcards, lighting toys and coloring books. HBSI showed 32.3% improvement on Parent-rated 10-item likert scale questionnaire (PRILS-10), 18.1% on Children's Global Assessment Scale (CGAS), and 15.8% on Pediatric Quality of Life Inventory 4.0 (PedsQLTM). Parsons et al.

(2018) studied the effectiveness of the Therapeutic Outcome By You (TOBY) Application, a tablet-based information technology application that is available for download and use on iPad. Use of TOBY Application showed to be effective in helping to address children with ASD's needs using behavioral, educational and developmental tactics with a focus on four major skill areas, including language and social. By utilizing Council for Exceptional Children (CEC) quality indicators and standards for an evidence-based practice guideline, Schoen et al. (2018) found that studies surrounding Ayres Sensory Integration (ASI) intervention support ASI being an evidence-based practice that can help improve children with ASD to better respond to sensory stimulation.

Summary/Synthesis of the Evidence

The five identified studies provided to be valuable in terms of different aspects of streamlining the care for children with ASD within healthcare settings. All five studies pointed out some type of behavioral and social concerns related to children with ASD, and their impacts on working with others and quality of care received. Findings of these five studies are significant in helping to streamline the care provided to children with ASD within healthcare settings. Studies that focused on staff knowledge and education agreed that there is a need for educating staff about the special needs of children with ASD, and that the level of healthcare staff knowledge and education is limited in providing high quality of care to these children. Studies differed in their approaches for educating staff, from simulation-based training and case studies to utilizing experts' opinions in developing clinical guidelines to help guide the staff when caring for children with ASD. Studies that focused on sensory and environmental needs found that having a quiet and relaxing area would be helpful for these children. One study identified using

specially made sensory equipment, including toys and brushes, to be helpful. Two studies found technological interventions, including TOBY Application and ASI to be helpful.

Most of the study findings were expected, including the limited knowledge of staff regarding behaviors and social interactions of children with ASD and the effectiveness of education and guideline on improving knowledge and care of these children, and the need for addressing these children's environmental and sensory concerns, including quiet environment with minimal sound and ability for light adjustment and sensory toys to provide adequate care. Therefore, the findings of the studies helped to answer the PICOT question by guiding the development of the educational toolkit to improve staff knowledge that can enhance the quality of care provided, and a sensory room to minimize noises and to allow children to control their environment (i.e., adjustable light and sensory toys) to address the behavioral and social concerns, including overreacting to sounds/noise that could lead to delays in receiving proper care. Although there are limitations associated with some of the studies, including lack of adequate size and homogeneity of samples studied, the overall strength of the studies, including methods of study, data analysis and measured outcomes, provide sufficient reasons to recommend the findings for the proposed changes in practice (i.e., implementing educational toolkit and sensory room and items).

While some of the included studies were done in other countries, characteristics of children with ASD are similar worldwide and therefore, the findings of the studies can still relate to children in the United States and can be generalizable to other healthcare settings as well. Moreover, while most studies related to children with ASD, findings of the studies regarding staff knowledge and education, and sensory and environmental needs and interventions can still apply to adults with ASD as well. For instance, having a quiet and relaxing environment for

reducing stimuli, and using simulation and case studies to educate staff can be useful for any age group diagnosed with ASD. It is important to note that future studies are needed to assess the implementation of some of these interventions, including HBSI in clinical settings to see how it could really impact children with ASD within healthcare settings instead of home.

Rationale

The project “Streamlining Care for Children with Autism Spectrum Disorder” involved implementing practice improvement interventions, including an educational toolkit and a sensory room. The PRECEDE-PROCEED Model was utilized as a conceptual framework for assessing, identifying, and addressing the social, behavioral, educational, and environmental factors associated with the care provided to children with ASD (Appendix B). The PRECEDE (Predisposing, Reinforcing, and Enabling Constructs in Educational/Environmental Diagnosis and Evaluation) was developed by Lawrence W. Green in 1970s while the PROCEED (Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development) was developed by Lawrence W. Green and Marshall W. Kreuter in 1991 (Green, 1974; Green & Kreuter, 1991). This framework has been utilized to develop and promote numerous health promotions, including positive behavioral changes (Allgood, 2014). This framework provided a structure for identifying the needs of children with ASD within a selected pediatric setting in Northern California, and assisted in planning, implementing, and evaluating the delivery of suggested evidence-based interventions to address the identified shortcomings and needs (Allgood, 2014; Phillips et al., 2012).

During the PRECEDE, the social, behavioral, environmental, and educational needs of staff and children with ASD within the selected pediatric setting was assessed and identified. Then, plans that comply with the policy and regulation of the setting were designed and executed

to tackle those needs and shortcomings. The PROCEED framework then helped to implement and evaluate the identified plans and interventions. For instance, an easy-to-understand educational toolkit outlining the important steps on how to approach and care for these patients were implemented to address the knowledge gap among the staff on how to properly care for this population. The implemented interventions were then evaluated by measuring outcomes, including the increase in staff knowledge (i.e., through surveys and interviews) to compare the actual outcomes to expected outcomes.

Methods

Context

This project was implemented within a PES Unit of a Hospital in Northern California. This unit provides psychiatric and mental health care to patients of different population and ages, from geriatric to pediatric, and for patients who arrive voluntarily and those who arrive on psychiatric holds (i.e., 5150). On average, PES serves 50 children a month, about 15 of these are children with ASD who are primarily on a psychiatric legal hold (i.e., 5150). The focus of the project was on implementing evidence-based interventions, including educational toolkit for staff to utilize and sensory room for staff to allow children with ASD to utilize while they are in PES. This project occurred over a period of three months and was broken down into multiple steps/tasks.

Interventions

The first step of intervention was to educate and involve the stakeholders of the current problems associated with providing care to children with ASD in PES, and to educate them on the suggested solutions (educational toolkit and sensory room) and the benefits these implementations can bring. Stakeholders remained an important part of the project and were kept

informed of the progress and the results throughout the project. Therefore, an effective stakeholder analysis was done by using an appropriate tool, such as the one provided by Mind Tools (n.d.), to successfully identify and prioritize the important stakeholders of this project to better facilitate implementation of interventions (Appendix C). The main stakeholders of this project were children with ASD and their parents, healthcare staff, including nurses and physicians, manager/supervisor and executives of the unit and organization. All these stakeholders were considered important and played a significant role. Involving the stakeholders and keeping an open communication was critical to success of this project.

An educational toolkit was then designed and implemented within PES consisting of five bullet points outlining the common necessary steps that staff needed to take to better care for these children (Appendix D). To maximize the support and effectiveness of the educational toolkit, the toolkit was made as-easy-to use and as-easy-to understand as possible while still being informative and evidence-based with current guidelines. The posters were placed inside the nursing station, on the bulletin board, and outside the sensory room (Appendix E). In addition to including posters, this toolkit also included a badge-friendly version of the poster that allowed staff to always carry with their badge to be able to use the toolkit whenever needed.

Moreover, a sensory room with adjustable lighting and minimal noise level to help lower the stimuli and promote relaxation for these children was made available by the nursing station but away from other patients (Appendix F). This was done by converting one of the nine available rooms on the unit into a sensory room. This sensory room had soft paddings on the wall, controlled lighting (intensity of the light in this room could be adjusted), and had reduced/minimal noise coming into the room. This sensory room was made available for these children when they first arrived to PES and throughout their stay as needed.

Gap Analysis

Comparing the current evidence-based guidelines and practices to the current conditions and practices when caring for children with ASD within healthcare settings shows gaps and shortcomings, including lack of appropriate knowledge and training of staff on how to care for these children properly as well as lack of appropriate resources to help reduce stimuli and promote relaxation for these children (Benich et al., 2018; Berglund et al., 2017; McIntosh et al., 2015; Muskat et al., 2015) (Appendix G). Behavioral training for all healthcare professionals is critical to help adequately plan and prepare care that is catered specifically to the needs of these children (Berglund et al. 2017). A survey questioning staff on their awareness of ASD and how to properly care for this population indicated a low level of knowledge and confidence prior to this project. Additionally, a sensory room with adjustable settings for children with ASD can help to promote relaxation and to reduce anxiety among these children (Padmanabha et al., 2018; Parsons et al., 2018; Schoen et al., 2018). Therefore, an educational toolkit to help guide and educate staff, and a sensory room to help lower the stimulus and promote relaxation for these children were implemented within the setting, with 100% of staff educated and used them when provided care to these children.

Gantt Chart

Before initiation of project, available knowledge on the topic was gathered by performing database searches and review of literature, conducted between August 2020 to December 2020 (Appendix H). After that, starting January 2021, project goals and objectives were developed until April 2021. Starting April 2021, meeting with stakeholders, including nurse manager of PES was initiated and letter of support/approval to implement project within PES was obtained (Appendix I). From April 2021 to May 2021, the objectives and goals of project as well as the

chosen setting to implement the project were reviewed with Chairperson Committee and approval was obtained. Starting June 2021, the work on designing and preparing the Educational Toolkit is initiated and this toolkit was implemented in August 2021 along with the sensory room. From August 2021 through September 2021, staff at PES were educated on how to effectively utilize the educational toolkit and sensory room for children with ASD who come to PES. In October 2021, the project was completed after evaluating the effectiveness of the implementations of the toolkit and sensory room (i.e., through surveying staff and comparing actual outcomes to expected outcomes).

Work Breakdown Structure

Utilizing WBS, streamlining patient care for children with ASD project was broken down into two parts: 1) Educating staff and 2) Sensory room (Appendix J). To help improve the knowledge of staff, an educational toolkit was implemented, and staff was trained on how to utilize this toolkit and care for children with ASD who visited PES. This toolkit was referred to as “Educational Toolkit to Care for Children with Autism Spectrum Disorder” which shared simple, step-by-step techniques to help provide high quality of care to these children. The toolkit included posters and badge friendly reminders attached to the back of staffs’ badges. Staff were then educated on the toolkit and how to properly utilize the toolkit. Implementing a sensory room within the setting is another part of implementation. This included finding a location within the setting that allowed a place for these children to relax when they first arrived and while waiting to be seen.

Responsibility/Communication Plan

There were three types of primary communicative meetings that took place for the project, including the initial stakeholders meeting, the toolkit and sensory room utilization

training, and the toolkit and sensory room evaluation/update meeting (Appendix K). The initial stakeholders meeting involved presenting the toolkit and sensory room ideas to the stakeholders and using feedback gained to help design and gain approval. After designing and implementing the toolkit and sensory room within the setting, education was provided to staff on how to utilize the toolkit and sensory room. Regarding sensory room, once staff became knowledgeable and educated on its purpose and how to best utilize the room, they utilized them for these children to maximize the effective use of sensory room while they first arrived and waiting to be seen to minimize the stimulation and stress that they can be experiencing. Additionally, evaluation/update meetings also occurred periodically to obtain feedback from staff regarding the toolkit and sensory room utilization. This information/feedback was then used to continuously improve the toolkit and utilization of sensory room to maximize their effectiveness.

Strengths, Weaknesses, Opportunities and Threats Analysis

There are several strengths, weaknesses, opportunities and threats (SWOTs) associated with this project (Appendix L). A strength of this project was that it helped to address the knowledge gap which was present among the staff caring for children with ASD in PES. Moreover, the sensory room implementation helped to provide a relaxing, healing place with decreased stimuli for children with ASD as they could be commonly exposed to overstimulation within PES. Another strength associated with this project was its relatively easy to follow and understand toolkit and sensory room within the three-month time frame. Additionally, this project was cost-efficient and required a relatively low budget to implement while providing extensive benefits and savings to PES. Opportunities presented by successful implementation of the project included: Improved knowledge of staff regarding proper care of children with ASD, decreased delays in care and discharge, increased personalization of care that is tailored to the

needs of children with ASD. Weaknesses of the project included: Its need for extra resources (i.e., dedicating a room in PES to be the sensory room), being highly dependent on staff compliance and utility of implementations (i.e., utilizing the toolkit and sensory room), and not being applicable to all ages of the lifespan (i.e., not for adults with ASD). Threats to the project included: Some staff resistance to learn and utilize the toolkit, and not having adequate resources to complete the implementation of the toolkit and sensory room (i.e., using sensory toys), therefore not allowing the project to be implemented and evaluated as intended to.

Budget and Financial Analysis

The implementation of the toolkit and sensory room was cost-efficient and fairly low budget since PES already had most of the needed resources (i.e., the sensory room and materials to make the educational toolkit). Implementing the toolkit and “Sensory Room Log” required computer, papers, and printer which were all available and thereby its cost were negligible. Therefore, the initial cost was primarily related to in-service training of the staff on educational toolkit and sensory room (Appendix M1). There were total of 10 physicians and 20 registered nurses (RNs), including one nurse manager and one nurse educator. Since the educational toolkit and sensory room were easy-to use and understand, total of two-hours (one-hour for each) were needed for in-service training to orient staff to the toolkit and sensory room. Supplemental educational PowerPoints regarding the toolkit and sensory room were also shared with staff for their reference to refresh their memories as needed. Therefore, using the average hourly rate for RNs (\$60/hour) and physicians (\$150/hour), the estimated initial cost, which would also be same as the cost for the first-year, was estimated to be \$5,400 (Appendix M2). It is noteworthy that this cost is for the first year, and after the first year, the cost could be lowered to half (\$2,700) since a refresher course can be one-hour total.

It is also noteworthy that the savings generated over time could potentially outweigh this cost. Savings would be generated by potentially reducing delays in care, including delayed evaluations by physicians and discharges of these children in PES. On average children with ASD stay in PES between three to five days compared to children with other diagnoses that stay one to two days. With some exceptions, PES does not get reimbursed for keeping patients longer than 24-hours, contributing to the loss of revenue. Therefore, for each hour that these children stay at PES past 24-hours, PES could operate at loss of \$83 (assuming the daily average cost of \$2,000 to stay at this PES). Considering an estimated 180 children with ASD (15 per month) come to PES, even if this project can help them to be seen and have disposition (whether discharged or transferred to another facility) one hour early, then the annual savings generated by this project would be \$14,940. In this case, return on investment (ROI) for the first year would be 177% and second year would be 453%. Therefore, for every dollar spent, PES could save approximately \$177 during the first year and \$453 during the second year. Moreover, it is also expected that with higher quality and standards of care that this project brings, it could possibly help with better reimbursements for providing value-based care although the exact amount is not known.

Study of the Interventions

To help provide education and guide staff on evidence-based practice and approach to caring for children with ASD, an educational toolkit utilizing information from evidence-based research articles was made and available to provide easy-to-follow steps/guidelines for staff when caring for children with ASD in PES. The information utilized in this educational toolkit was kept relevant/informative but short (easy-to-follow) in order to encourage/empower staff to follow and utilize every time that they care for these children, with hope that they would also

remember and become more knowledgeable over time. To assess the impact of the educational toolkit and to make sure the observed outcomes were due to this implementation, pre- and post-toolkit surveys were developed with statements relevant and helpful to best evaluate its effectiveness, and these surveys were then distributed to staff one month after its implementation (which included educating the staff on how to best utilize and follow this toolkit).

To support staff to have a place to offer children with ASD to help decrease stimuli and promote relaxation (as PES can be such a loud and sensory overloaded place), a sensory room in a quieter place on the unit with adjustable lighting and soft padding was selected near the nursing station. The adjustable lighting was meant to allow these children to be able to set the light according to their own preference and mood (i.e., from full brightness to dark) and the minimum noise level to help these children to better relax and not feel overloaded with stimuli. The soft padding was intended to help provide safety measure for these children in case they attempt to hurt themselves by banging/hitting their bodies and head into walls as it has happened before (soft padding instead of hard wall could also help keep some children interested and relaxed when they touch the soft object). Allowing the room to be close to nursing station was meant to help staff to better be able to monitor these children for safety and to attend to their need in a prompt manner. To assess the impacts of the sensory room and to make sure the observed outcomes were due to sensory room, pre- and post- Sensory Room Surveys were developed with statements relevant and helpful to best evaluate its effectiveness, and these surveys were then distributed to staff one month after its implementation (which included educating the staff on how to best utilize and offer this sensory room). Moreover, a Sensory Room Log was also made available to further evaluate the effectiveness of this sensory room by allowing the staff to share

whether they offered the sensory room to the child with ASD, whether that child utilized the sensory room, and if so whether the staff believed the sensory room provided to be effective.

Outcome Measures and Analysis

Throughout this project, Plan-Do-Study-Act (PDSA) was used to help plan, implement, evaluate, and adjust/recommend measurements and analysis to improve the quality and success of this project (Appendix N). To measure the effectiveness of the implementations of the project, quantitative measures were performed through Likert-scale survey and “Sensory Room Log”. The survey results are subjective measurements which are important since one of the goals is increasing staff knowledge and competency to care for this population by implementing the toolkit. By performing the Likert-scale survey (i.e., asking five to seven statement questions where staff would rate their level of agreements), it helped to find whether staff utilized the toolkit and sensory room, and to what extent they believed they have helped. First, there were pre-implementation surveys called “Pre-Toolkit Survey” and “Pre-Sensory Room Survey” to establish a baseline data, and then there were post-implementation surveys called “Post-Toolkit Survey” and “Post-Sensory Room Survey” done to compare to the baseline data to see how the interventions have contributed and helped (Appendix O). Comparing the data from pre- and post-surveys showed the number of participating staff that utilized the toolkit and the sensory room when caring for children with ASD, and how many were satisfied with the implementations and thought they were useful/effective and should be recommended for other settings. Qualtrics was used to design the surveys and to share with staff at PES to take. Data from Qualtrics was then extracted into Excel Program as numerical table/values (1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly agree) that was used to graph the charts to visualize and analyze the results from the surveys (Appendix P).

Moreover, objective measurements were also collected, including how many children with ASD used the sensory room. This was done by keeping a “Sensory Room Log” on the unit in the nursing station close to the sensory room where staff marked whether they used the sensory room or not for their patients under the age of 18 with ASD (Appendix Q). This Log had three columns that staff needed to check: One asks whether the sensory room was offered to child with ASD, and the second column asks whether the child used the sensory room. This showed how many times the sensory room was offered to and utilized by these children. For those that checked the first two columns, then a third column asked staff opinion on whether they think the sensory room helped the child or not by answering “Yes” or “No.” The data on this Log was then converted to a numerical table (with Yes=1 and No=2) and was graphed on Excel Program to visualize and analyze the data gathered (Appendix R). This helped to show how many of the children with ASD who come to PES are offered and use the sensory room to decrease stimulation and promote relaxation, as well as how many of the staff believed whether the sensory room was helpful or not.

Ethical Considerations

On May 2021, the USF DNP Department determined that this project met the guidelines for an evidence-based change in practice project as outlined in the DNP project checklist (Statement of Determination) and was approved as non-research (Appendix S). There are no identifiable issues or conflicts of interests noted for this project. The project does not require Institutional Review Board approval, as it is not considered to be research on human subjects, and no data will be collected from patients or their parents. All data were collected anonymously from staff, primarily nurses and doctors. Throughout this project, patients’ best interests were kept in mind and ANA code of ethics, including patient’s privacy, autonomy, nonmaleficence,

and beneficence were followed closely by respecting patient's privacy and staying HIPPA compliant, providing information and education to enable informed decision making and respecting choices, and keeping best interests of individuals in mind (i.e., improving their quality of care) (American Nurses Associate, 2018). Moreover, the Jesuit value and principle of Cura Personalis or "Caring for the individual person," respecting each person, and having social responsibility in creating, communicating, and applying knowledge to a world shared by all people and held in trust for future generations were upheld and followed by this project since the project contributed to providing better care for children with ASD and sharing the knowledge with others to promote advancement in care.

Results

Total of 21 staff at PES participated in taking the 4 surveys. In regards to pre-Sensory Room Survey, 18 staff stated they do not feel confident in their knowledge regarding caring for children with ASD, all 21 participants stated they would find themselves having difficulty caring and managing children with ASD, 18 stated they have not previously been educated on how to provide proper care for these children, 21 believed educational toolkit would be helpful to increase their knowledge, and also believed lack of resources, including absence of educational toolkit is issue when caring for these children in PES.

In regard to post-Toolkit Survey, 21 individuals believed educational toolkit helped to increase their knowledge and skills to provide proper care. Moreover, all 21 participating individuals used the educational toolkit every time when they cared for children with ASD and found the educational toolkit to be a good resource with plan to keep using the educational toolkit when caring for these children. In addition, all agreed the content of the educational

toolkit was relevant and current as well as easy to understand and follow, and would recommend implementation of it into other healthcare settings.

For pre-Sensory Room Survey, all 21 participating individuals believed lack of a quiet place in the setting to be an issue and agreed that the setting needs to have an appropriate location/room available to offer children with ASD since they frequently have difficulty offering a soothing location to children with ASD. Moreover, everyone agreed that it is important to have an appropriate room, such as sensory room available to offer these children to reduce stimuli and promote relaxation for them.

For post-Sensory Room Survey, all 21 participating individuals agreed that they offered the sensory room every time they cared for these children and found the sensory room to be helpful to reduce the stimuli and promote relaxation. Additionally, the participating staff all agreed that the location of the sensory room and the level of noise in the sensory room was appropriate, and all agreed the adjustable lighting of sensory room was also helpful. Moreover, everyone agreed that they plan to keep offering the sensory room, and would recommend implementation of this sensory room into other healthcare settings.

Discussion

Summary

Pre-Toolkit Survey showed that majority of staff do not seem to have adequate confident and knowledge caring for children with ASD and had not been previously educated on such. Therefore, all the participating staff thought that an educational toolkit would be valuable to increase their knowledge and to help guide them when caring for these children. Post-Toolkit Survey then showed that all participating staff believed educational toolkit helped to increase their knowledge and skills and that it was a good resource that they all used when caring for

these children and they would recommend implementation of it into other healthcare settings. Moreover, staff also stated that the educational toolkit content was current and relevant and easy to understand which are necessary for a toolkit to be successful. Therefore, the implementation of the sensory room was shown to be effective and valuable by all the staff who agreed that this educational toolkit could provide to be valuable in other healthcare settings as well.

Pre-Sensory Room Survey showed that staff believed PES needed to have an appropriate room that is quiet to offer these children to help reduce stimuli and promote relaxation. Post-Sensory Room Survey showed that the implemented sensory room was helpful and was offered by staff every time they cared for these children and all staff agreed they would recommend its implementation into other settings. Moreover, all staff believed the location of the sensory room and its features (adjustable lighting and the minimal noise level) were appropriate (which were necessary for the sensory room to succeed). Therefore, the implementation of the sensory room was also shown to be effective and valuable by all staff who agreed that this implementation could also provide to be valuable in other healthcare settings.

Interpretation

By implementing the educational toolkit and educating staff on the toolkit, and implementing the sensory room and educating the staff on utilizing it for their patients with ASD who are under the age of 18, the project helped to provide higher quality of care to children with ASD and to help streamline their care within PES. The findings of this project indicated an educational toolkit could help to improve staff knowledge and competency in providing high quality of care to children with ASD within healthcare settings. Moreover, it also showed that a sensory room could also be helpful to promote relaxation and reduce stimulation for children with ASD within healthcare setting. Through staff feedback and evaluation, this project also

showed that implementing these interventions into other healthcare settings could also prove to be beneficial for staff and these children.

Limitations

It is noteworthy to mention that this project has its own limitations and barriers. Staff played an important role in successful implementations and outcomes of the project, and while most staff participated in taking the surveys, there was some resistance or unwillingness to participate which caused the low numbers of participants/data that could pose as limitation. Moreover, this project did not implement sensory items that could have possibly helped these children, including therapy balls, sensory toothbrush, pictured flashcards, lighting toys and coloring books. Furthermore, the length of this project was another limitation as it did not monitor the effectiveness of the toolkit and sensory room past three months. With time, staff may go back to status quo and not use the toolkit and sensory room as they would within the first three months of being evaluated. Additionally, this project was solely intended for children with ASD and did not address the needs of adults with ASD within PES which could be a limitation as well. There was also no funding or grants available to purchase and implement appropriate sensory toys in the sensory room which was a barrier as this could have further helped the project and the effectiveness of the sensory room.

Conclusion

The number of children diagnosed with ASD in California and United States have increased. These children have special behavioral, social, and sensory needs that can make them experience many challenges within healthcare settings. The special needs of these children along with the lack of proper education and knowledge of staff cause a decline in quality of care and increase in preventable healthcare cost. Therefore, there is a need for a quality improvement

project to streamline the care provided to children with ASD by implementing evidence-based educational toolkit and sensory room that could help to address the unique needs and behavior of these children. The success of these implementations in PES could help streamline the care provided to children with ASD throughout other healthcare settings.

Funding

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Appendix A

Evidence Table

Purpose of article or review	Design / method / Conceptual framework	Sample / Setting	Major variables studied (and their definitions)	Measurement of major variables	Data analysis	Study findings	Level of evidence (critical appraisal score) / Worth to practice / Strengths and weaknesses / Feasibility / Conclusion(s) / Recommendation(s)
<p>APA Reference: Berglund, I. G., Björkman, B., Enskär, K., Faresjö, M., & Huus, K. (2017). Management of children with autism spectrum disorder in the anesthesia and radiographic context. <i>Journal of Developmental & Behavioral Pediatrics, 38</i>(3), 187-196. https://doi.org/10.1097/DBP.0000000000000432</p>							
To develop guidelines to improve the care and preparation of children with ASD during anesthesia and radiology procedures.	Modified Delphi method, including distribution of questionnaire and utilizing expertise of participants recruited nation-wide. No conceptual framework noted.	N= 30 initially n= 21 completely participated and included in expert panel. These participants worked with children with ASD and were considered to be experts.	IV: Questionnaire DV: Guidelines	Experts' answers to questionnaires analyzed using Delphi method.	A list of items was created from a previous survey and the literature. In the first round, the items with less than 60% agreement were discarded. Items were merged, and a new	Final guidelines consisted of 14 items and a checklist of 16 factors. 8 of the items received a full 100% consensus for inclusion. 5 areas covered by items and checklist are: planning involving parents/guardians, features in the environment, use of time,	Level IV – B Worth to practice: The guidelines developed in this study are relatively general, feasible and could be useful in providing high quality, patient-centered care. Strengths and weaknesses: Utilized perspectives of experts across varying professions throughout several hospitals. Participants are considered to possess adequate knowledge and expertise of children with ASD. Moreover, the guideline could be utilized in other healthcare settings as the guidelines are general. Weaknesses are related to diversity of participants as most participants were female nurses (did not match

		Setting: Anesthesia and radiology departments in Sweden			list was created. Rounds 2, 3 and 4 were performed similarly and responses less than 80% agreement were removed from the guidelines. The guidelines include final results of the list that received more than 80% consensus.	communication, and health care professionals. Involving parents/guardians and refraining from using abstract/symbolic language were identified to be very important.	national gender breakdown of profession) and no parents' expertise were utilized to develop the guidelines. Feasibility and conclusion: Relatively feasible and easy to implement guidelines that could potentially help to better prepare and care for children with ASD. Although setting of this study is anesthesia and radiology, guidelines developed could be applied to other healthcare settings (also pointed out by authors). Recommendation: The implementation of all of these guidelines and their effectiveness needs to be evaluated in real practice (it has not been done yet). Although parts of these implementations have been deemed effective already. Include in the project
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Definition of abbreviations: ASD: Autism Spectrum Disorder

Purpose of article or	Design / method /	Sample / Setting	Major variables studied (and their	Measurement of major	Data analysis	Study findings	Level of evidence (critical appraisal score) /
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review	Conceptual framework		definitions)	variables			Worth to practice / Strengths and weaknesses / Feasibility / Conclusion(s) / Recommendation(s)
<p>APA Reference: McIntosh, C. E., Thomas, C. M., Allen, R. A., & Edwards, J. A. (2015). Using a combination of teaching and learning strategies and standardized patient for a successful autism simulation. <i>Clinical Simulation in Nursing, 11</i>(3), 143–152. https://doi.org/10.1016/j.ecns.2014.11.008</p>							
<p>To describe the development and evaluation of a simulation-learning module and/or learning strategies to introduce nursing students to individuals with ASD by preparing them on how to care for a patient with ASD in crisis in a controlled environment.</p>	<p>Three faculty in a nursing program with experience in simulation development, implementation, and evaluation, with one faculty also being expert in ASD diagnostics and behavior, developed a simulation training for nursing students in a nursing program.</p> <p>Before participating in simulation, students were provided case study and lecture to</p>	<p>N= 27 students in their last semester of the senior BSN program participating in the simulation in groups of three to four.</p> <p>All N= 27 students participated in the debriefing sessions, in the same groups of three to four students.</p> <p>Setting: Ball State University,</p>	<p>IV: simulation-learning module</p> <p>DV: Assessment, communication, prioritization of tasks, and use of critical thinking (problem solving and decision making)</p>	<p>Nine-item survey done by students after completion of simulation to see if outcomes were achieved, and to identify shortcomings and changes needed to improve the simulation in the future.</p>	<p>No statistical tools (i.e., mean, median, mode, t- test, ANOVA) or software were identified to have been used in this study.</p> <p>Analysis of students' involvement was based on their levels of conversation with either the patient with ASD or his mother, maintenance of a safe environment and removal of the</p>	<p>The simulation and survey thereafter showed that communication with patient with ASD could be challenging, and while students agreed communication with his mother could have been effective and helpful, only few students communicated with his mother and utilized her as a resource as part of his care.</p>	<p>Level II, C</p> <p>Worth to practice: This study identified the effectiveness of a simulation learning module on knowledge of students when caring for individuals with ASD. Therefore, it could provide benefits on teaching healthcare staff effectively on how to provide quality of care to patients with ASD.</p> <p>Strengths and weaknesses: This is the first stimulation dedicated to teach nursing students about caring for individuals with ASD. Moreover, staff did not provide grades or pass or fail to participating students to allow for a nonthreatening learning activity to the students. Additionally, to treat every student the equal, same faculty</p>

	<p>educate basic information about ASD and to allow students to apply principles of communication, assessment, prioritization, critical thinking decision making and problem solving to this population.</p> <p>No conceptual framework noted</p>	School of Nursing			<p>dangerous items from patient's reach, assessment and addressing patient's chief complaint (in this case the head wound), discussing the health history and discharge plans with the patient and his mother, and active decision making and/or working to resolve problems with other students in the same group.</p> <p>Faculty observations and assessment of</p>	<p>Moreover, most students had hard time understanding the meaning of patient's behaviors and way of interaction resulting in inadequate assessment and prioritization, delays in care and discharge of this patient.</p> <p>Regardless, all students agreed that preparation via case study and lecture materials before simulation along with this simulation allowed them to better understand and appreciate people with ASD, and to be more aware</p>	<p>member conducted the debriefing session for each group of students, same patients was used, and students were given as much time as needed.</p> <p>Weakness could relate to lack of giving adequate time for students during simulation (only 10-minute allocated). Moreover, this simulation was performed in groups of three to four (potentially not allowing all students to interact and learn) and not utilized actual patient with ASD (individual portraying patient was staff working with individuals with ASD but did not have ASD).</p> <p>Feasibility and conclusion: ASD Simulation could be a helpful way of educating staff on how to care for patients with ASD and can help with identifying staff's strengths and weaknesses when caring for these individuals. Performing simulation to educate staff could be feasible depending on the setting and finding individual(s) to portray as patients and finding time for staff to participate.</p>
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					<p>students' performance was another important analysis tool as it was one of the ways to effectively evaluate the students' performance and the effectiveness of teaching materials along with identifying areas to make changes to the simulation for ongoing program evaluation in the future.</p>	<p>on how to communicate and care for this population.</p> <p>Moreover, students stated that this simulation provided them with additional opportunity to use their critical thinking, communication, and prioritizing strategies more effectively.</p>	<p>Recommendation:</p> <p>Prior to simulation, provide information via case studies, lecture and written information about ASD and quiz staff to assess their knowledge so during the simulation they could be prepared and apply what they have learned to the simulation. Moreover, increase the length of simulation to more than 10 minutes to allow adequate time for students to demonstrate success with outcomes. Additionally, recording the simulation sessions and reviewing them with participants could better help them understand their strengths and mistakes to improve, and to reinforce teaching and learning strategies on ASD.</p> <p>Include in the project</p>
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Purpose of article or review	Design / method / Conceptual	Sample / Setting	Major variables studied (and	Measurement of major variables	Data analysis	Study findings	Level of evidence (critical appraisal score) / Worth to practice /
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	framework		their definitions)				Strengths and weaknesses / Feasibility / Conclusion(s) / Recommendation(s)
<p>APA Reference: Padmanabha, H., Singhi, P., Sahu, J. K., & Malhi, P. (2018). Home-based sensory interventions in children with autism spectrum disorder: A randomized controlled trial. <i>The Indian Journal of Pediatrics</i>, 86(1), 18-25. https://doi.org/10.1007/s12098-018-2747-4</p>							
<p>To determine the viability and short-term effectiveness (12 weeks) of HBSI in children with ASD with sensory processing abnormalities .</p>	<p>12-wk, parallel group, pilot, randomized controlled trial (RCT). Randomly assigned children with ASD to SI group who receive HBSI by the parents/caregivers, and ST group who would not. No conceptual framework noted.</p>	<p>N=185 children with ASD between 3–12 y of age, with sensory processing abnormalities were screened for eligibility. N=40 children met criteria. n=21 randomly assigned to SI group and n=19 to ST group. The study was conducted in the Neurodevelopmental</p>	<p>IV: HBSI (pre-designed structured activities to be performed using home-based items and a sensory kit, including blankets, sofa, bed, soft toys, sensory brushes, flash cards and lighting) DV: Physical health, emotional functioning, and social functioning, including sensory outcomes, such as</p>	<p>PRILS-10: Help measure reduction in common sensory abnormalities CGAS and PedsQLI: Help measure changes in overall wellbeing and health-related quality of life (i.e., behavioral and emotional health and functioning as well as physical)</p>	<p>Data was analyzed using IBM-SPSS 21.0 version. T-test was used for parametric variables; MannWhitney U test was used for nonparametric variables, and Chi-square/Fischer exact test for dichotomous variables.</p>	<p>Overall, there was improvement on PRILS-10, CGAS and PedsQLT M respectively in SI group. Findings suggest HBSI activities are feasible and suggested to have a beneficial part in reducing the severity of sensory abnormalities in</p>	<p>Level I - B Worth to Practice: HBSI is relatively feasible and effective to be implemented to help improve the overall wellbeing and health-related quality of life in children with ASD. Strengths and Weaknesses Major strengths include, being the first pilot-RCT on sensory interventions in children with ASD tried in real world settings from a developing country (India), exclusively included ASD children who had sensory abnormalities, and rigorous compliance checks to ascertain the effectiveness of interventions. The limitations are, PRILS-10 was a self-designed questionnaire, a standardized objective measure could have improved measurement of outcome, duration was short-term (12 wk) trial, long-term effects of the interventions are uncertain,</p>

		Clinic, at Department of Pediatrics, Postgraduate Institute of Medical Education and Research, Chandigarh and Prayaas, Rehabilitation center for handicapped children	improvement in eye contact (Avoiding), respond when called by name (Sensitivity), decline in sensitivity to loud noises (Avoiding), decline in tendency to stand in proximity to others (Seeking), and decline in hyperactivity (Seeking)			children with ASD and are associated with improvement in overall wellbeing and health-related quality of life in these children.	majority of the study population was children 3–9 years old, and observational bias could have played a role (parents in SI spent more time with children than ST and knew about the interventions). Feasibility and Conclusion: Feasible and effective to use HBSI in settings, including short-term (12 week) implementation. Recommendation: A double blinded RCT study with longer-term follow-up to better assess the changes in severity of sensory abnormalities needs to be developed. Include in the project
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Definition of abbreviations: HBSI: Home-Based Sensory Interventions; ASD: Autism Spectrum Disorder; IV: Independent Variable; DV: Dependent Variable; SI: Sensory Intervention; ST: Standard Therapy; PRILS-10: Parent Rated 10-Item Likert Scale; CGAS: Children's Global Assessment Scale; PedsQLI: Pediatric Quality of Life Inventory

Purpose of article or review	Design / method / Conceptual framework	Sample / Setting	Major variables studied (and their definitions)	Measurement of major variables	Data analysis	Study findings	Level of evidence (critical appraisal score) / Worth to practice / Strengths and weaknesses / Feasibility / Conclusion(s) / Recommendation(s)
<p>APA Reference: Parsons, D., Cordier, R., Lee, H., Falkmer, T., & Vaz, S. (2018). A randomised controlled trial of an information communication technology delivered intervention for children with autism spectrum disorder living in regional Australia. <i>Journal of Autism and Developmental Disorders</i>, 49(2), 569-581. https://doi.org/10.1007/s10803-018-3734-3</p>							
To explore the effectiveness of tablet-based ICT intervention (TOBY app), to supplement the existing therapies, on improving visual motor, imitation, language and social skills in children with ASD, aged between 2 and 6 years living in regional	Parallel RCT design. Participants (children 2-6-year-old with ASD and their families) were randomly assigned to either intervention group (Ipad with TOBY) or control group (Ipad without TOBY) to do 20 min of therapy per	N=59 participants (children 2-6 year old with ASD and their families) recruited and completed the study. N=29 randomized to intervention group (using TOBY) and N=30 control group (not using TOBY) Study took place in Australia,	IV: TOBY application on tablet DV: Visual motor (i.e., perception and discrimination of sensory cues, such as color and shape), imitation (includes copying an action, design, or pre-speech sounds), language (recognition and production of	Primary measures: MSEL was used to assess and measure visual motor, and expressive and receptive language skills CSBS used to assess and measure imitation and social skills Secondary measures: ToP (internal control, creative use	Data were organized and analyzed using SPSS 24. Descriptive statistics were used to describe the sample. Independent t-tests for continuous data and Pearson's χ^2 tests for categorical data were used to compare demographic and outcome measure	For hypothesis one, the expressive language subscale of the MSEL was the only statistically significant difference between the intervention and waitlisted groups between baseline and post intervention. For hypothesis two and three, when all the participants' scores were	Level I - B Worth to Practice: TOBY app could be relatively feasible and provide benefits in language and social skills to children with ASD. Strength and Weakness: This study resembled replicating real world as it provided minimal level of support and reminders to enforce use of TOBY (allowed individuals to do it by themselves as they would in real life). Moreover, this study utilized effective recruitment method, including snowballing technique and randomization of participants. Weakness includes participants dropout and not using TOBY app as recommended for the recommended time (they used less than half of time recommended, 11 minutes instead of 20 minutes)

Australia.	day with the TOBY app. No conceptual framework noted.	involving only those living outside of major cities (regional areas) as defined by the Australian Standard Geographical Classification System	object names), and social skills (interpersonal skills, such as joint attention) of children with ASD.	of objects, intrinsic motivation, and ability to give and read social cues) POM (for pragmatic language) SPT (non-verbal play Activities)	differences between groups at baseline. Shapiro–Wilks tests were conducted to test for normality. Independent t-test and Mann–Whitney U for group comparison using the randomization allocation as grouping variable	pooled and measured over time, statistically significant improvements were shown in receptive and pragmatic language and social skills and these gains were maintained, thus suggesting skill acquisition when utilizing TOBY app.	<p>Feasibility and Conclusion: This study provided good overview and outlook on effectiveness of TOBY app. TOBY could be relatively feasible to implement provided the setting could afford the technology.</p> <p>Recommendations: To improve its utility, children need to comply with directions and usage time (might need to come up with better engagement methods to keep the children engaged and involved in using the application).</p> <p>Include in the project</p>
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Definition of abbreviations: ICT: Information Communication Technology; TOBY: The Therapeutic Outcome By You; MSEL: Mullen Scales of Early Learning; CSBS: Communication and Symbolic Behavior Scales; POM: Pragmatic Observation Measure; ToP: Test of Playfulness; SPT: Symbolic Play Test

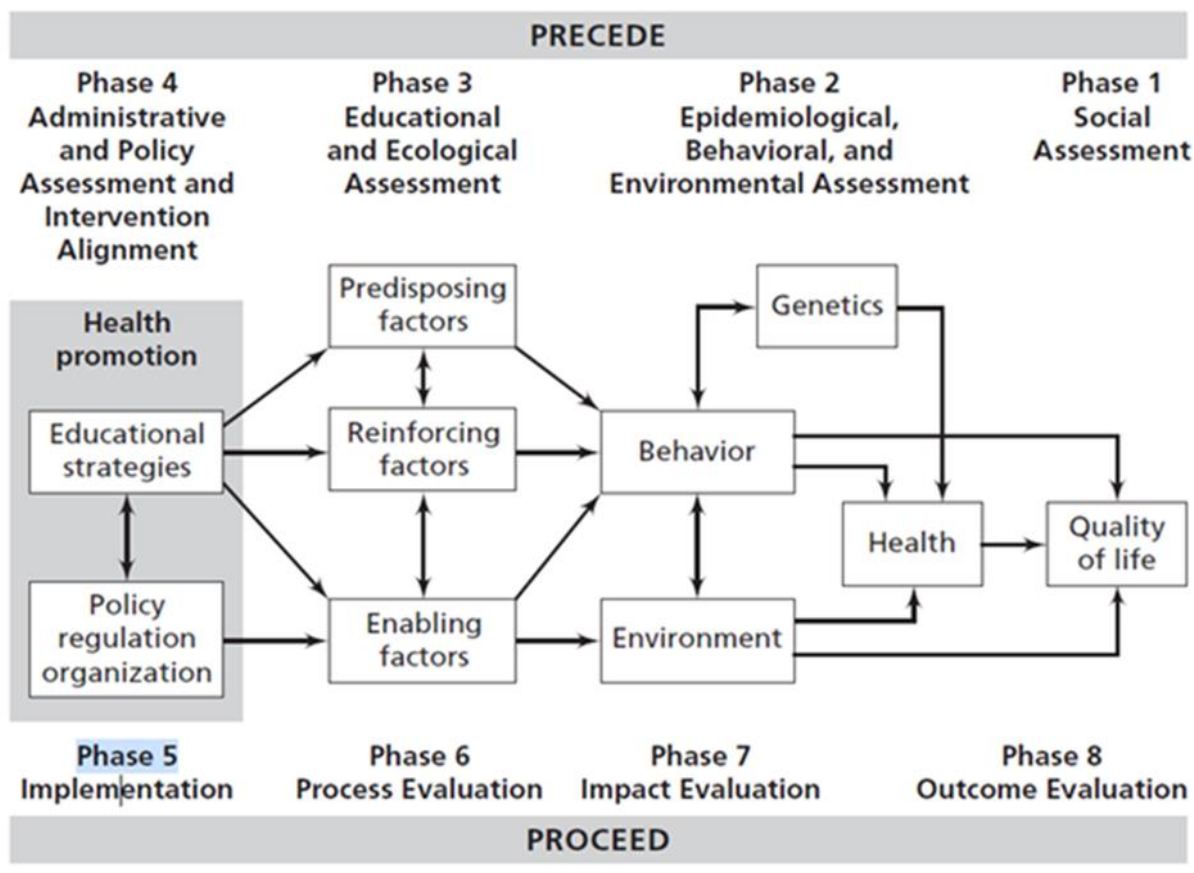
Purpose of article or review	Design / method / Conceptual framework	Sample / Setting	Major variables studied (and their definitions)	Measurement of major variables	Data analysis	Study findings	Level of evidence (critical appraisal score) / Worth to practice / Strengths and weaknesses / Feasibility / Conclusion(s) / Recommendation(s)
<p>APA Reference: Schoen, S. A., Lane, S. J., Mailloux, Z., May-Benson, T., Parham, L. D., Roley, S. S., & Schaaf, R. C. (2018). A systematic review of Ayres Sensory Integration intervention for children with autism. <i>Autism Research, 12</i>, 6-19. https://doi.org/10.1002/aur.2046</p>							
To utilize CEC Standards for Evidence-based Practices in Special Education to evaluate and determine whether ASI intervention meets the criteria for an evidence-based practice for children with ASD	A systematic review of research studies that examine effectiveness of ASI intervention for children with ASD. No conceptual framework noted.	Articles on ASI for children with autism from 2006 to 2017 worldwide (No specific setting mentioned) Initial search (removing duplicates and applying “Sensory”): N= 478 After stage 1: N= 19 studies After Stage 2: N=6 studies; After Stage 3: n= 3 studies (2 RCT and 1 nonrandomized)	IV: CEC criteria for evidence-based practices in Special Education DV: Characteristics of ASI studies	CEC Standards for Evidence-Based Practices in Special Education (a set of evidence-based practice standards used to evaluate intervention studies)	3 stages: Stage 1: extensive database search for relevant studies using search terms related to sensory integration and autism interventions conducted in CINAHL, Cochrane Reviews, Cochrane Trials, Embase, ERIC, Medline, and PsychINFO databases. Stage 2: Selection of studies using specific inclusion	One RCT study met 100%, the other RCT met over 85%, and nonrandomized study met over 50% of CEC QI for evidence-based practice and all had positive outcomes regarding effectiveness of ASI on children with ASD. ASI intervention meets criteria for evidence-based practice for 4–12 year-old children with ASD, according to	Level II – B Worth to Practice: ASI could be valuable to children with ASD to reduce stimulation and sensory overload as it meets the criteria for evidence-based practice. Strengths and Weakness: Compared to other reviews of sensory integration intervention, this study used a manualized approach to thoroughly identify studies that explain the key characteristics and use of ASI intervention exclusively (excluded those that did not meet the criteria for ASI). Moreover, studied identified had more narrowly defined population (children with ASD between the ages of 4 and 12 years), and research question is specific to the evidence-based criteria set forth

					<p>criteria related to methodology and description of the intervention (i.e., peer-reviewed scientific literature, written in English and is consistent with ASI theory) Stage 3: Evaluation of included studies using CEC standards to determine whether ASI intervention meets the criteria for an evidence-based practice for children with ASD.</p>	<p>the CEC Standards for evidence based practices in Special Education.</p>	<p>by CEC. Weakness includes that this study does not utilize other evidence-based practice guidelines although states it was considered (i.e., Frank Porter Graham, Child Development Institute).</p> <p>Feasibility and Conclusion: Implementing ASI as outlined in the studies could be beneficial and evidence-based practice but could be somewhat difficult to do, depending on the budget and setting approval and finding those certified to help.</p> <p>Recommendation: Adhere closely to ASI intervention addressed in this study to ensure the delivery of evidence-based practice.</p> <p>Include in the project</p>
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Definition of abbreviations: CEC: Council for Exceptional Children; ASI: Ayres Sensory Integration; QI= Quality Indicators

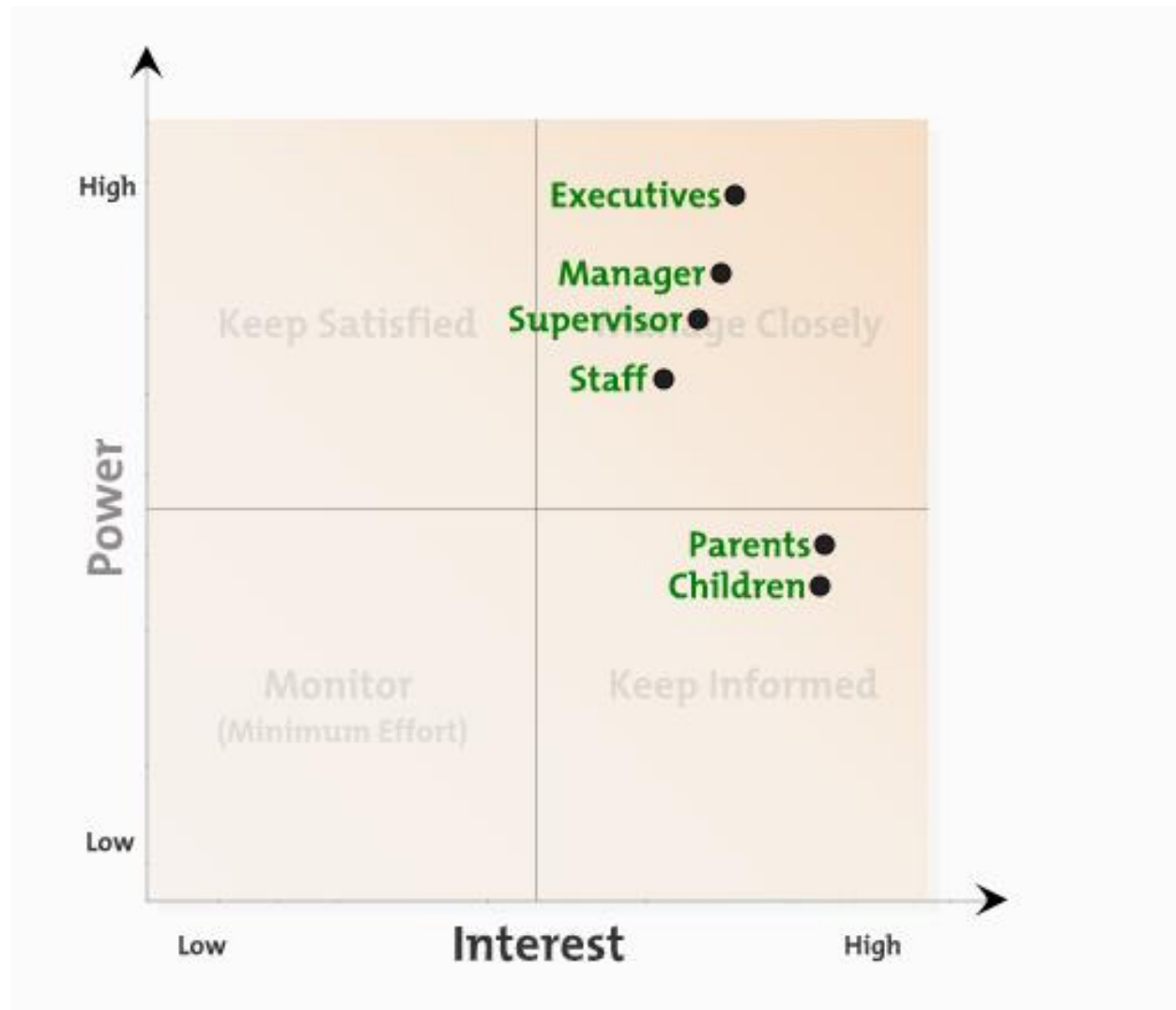
Appendix B

PRECEDE-PROCEED Model



Note. Diagram of the PRECEDE-PROCEED Model from (Alligood, 2014).

Appendix C
Stakeholder Analysis



Note. Stakeholder analysis from Mind Tools (n.d.).

Appendix D

Educational Toolkit

Educational Toolkit to Care for Children with Autism Spectrum Disorder



Parents Keep the parents involved as much as possible; Encourage preferred home activities/routines to the child to resemble the familiar environment for them.

Communication Use calm, concrete language; Avoid Sarcasm and jokes; Use pictures and diagrams to explain whenever possible.

Behavior Approach the child gently and be patient; Reduce the number of commands and nursing interventions to the minimum necessary.

Environment Create a calm/quiet environment; Decrease stimulation; Encourage using the sensory room; Keep lights and noise level at minimum

Address stress Ignore undesired behaviors and reward desired behaviors; Let the child continue with the self-stimulatory activities (i.e., pacing, rocking back and forth)



Berghund, I. G., Björkman, B., Enskär, K., Faresjö, M., & Huns, K. (2017). Management of children with autism spectrum disorder in the anesthesia and radiographic context. *Journal of Developmental & Behavioral Pediatrics, 38*(3), 187-196. <https://doi.org/10.1097/DBP.0000000000000432>

Minskat, B., Burnham Riosa, P., Nicholas, D. B., Roberts, W., Stoddart, K. P., & Zwaigenbaum, L. (2015). Autism comes to the hospital: The experiences of patients with autism spectrum disorder, their parents and health-care providers at two Canadian paediatric hospitals. *Autism: The International Journal of Research and Practice, 19*(4), 482-490. <https://doi.org/10.1177/1362361314531341>

Schoen, S. A., Lane, S. J., Mailloux, Z., Benson, T., Parham, L. D., Roley, S. S., & Schaaf, R. C. (2018). A systematic review of Ayres Sensory Integration intervention for children with autism. *Autism Research, 12*, 6-19. <https://doi.org/10.1002/aur.2046>

Appendix E

Figure E1

Educational Toolkit Poster in Nursing Station

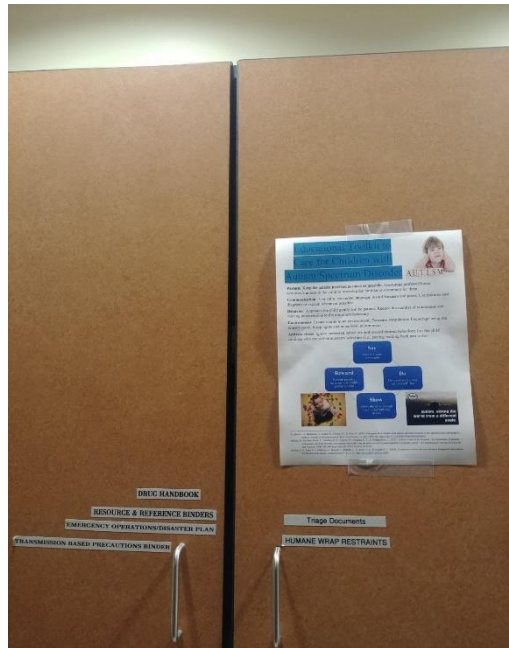
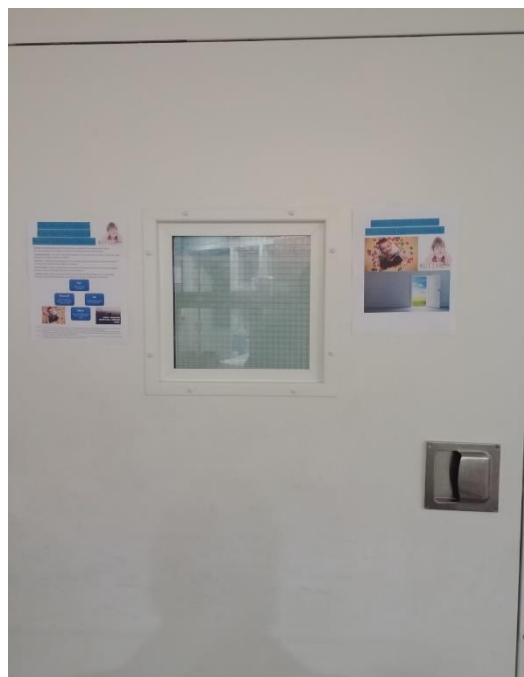


Figure E2

Educational Toolkit Poster Outside Sensory Room



Appendix F

Figure F1

Inside the Sensory Room



Figure F2

Adjustable Lighting Outside of Sensory Room



Appendix G

Gap Analysis

Current State	Future State	Gap	Actions to close gap
Lack of appropriate educational toolkit to guide staff when caring for children with ASD and lack of a sensory room to help these children to relax and reduce their stimuli.	Availability of an educational toolkit to help increased knowledge among staff and guide them when caring for these children, and availability of a sensory room to help reduce the stimuli for these children.	Lack of an educational toolkit and adequate knowledge of staff, and a sensory room for these children to reduce their stimuli.	Create and implement an educational toolkit and a sensory room in the setting.

Appendix I
Letter of Support

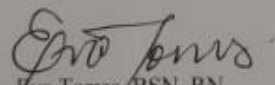


April 27, 2021

To Whom It May Concern,

This is a letter of support for Siavash Rostami Jafarabad to implement his DNP Comprehensive Project: "Streamlining Care for Children with Autism Spectrum Disorder" at San Mateo Medical Center (SMMC) Psychiatric Emergency Services (PES).

Sincerely,


Eva Torres, BSN, RN

Nurse Manager

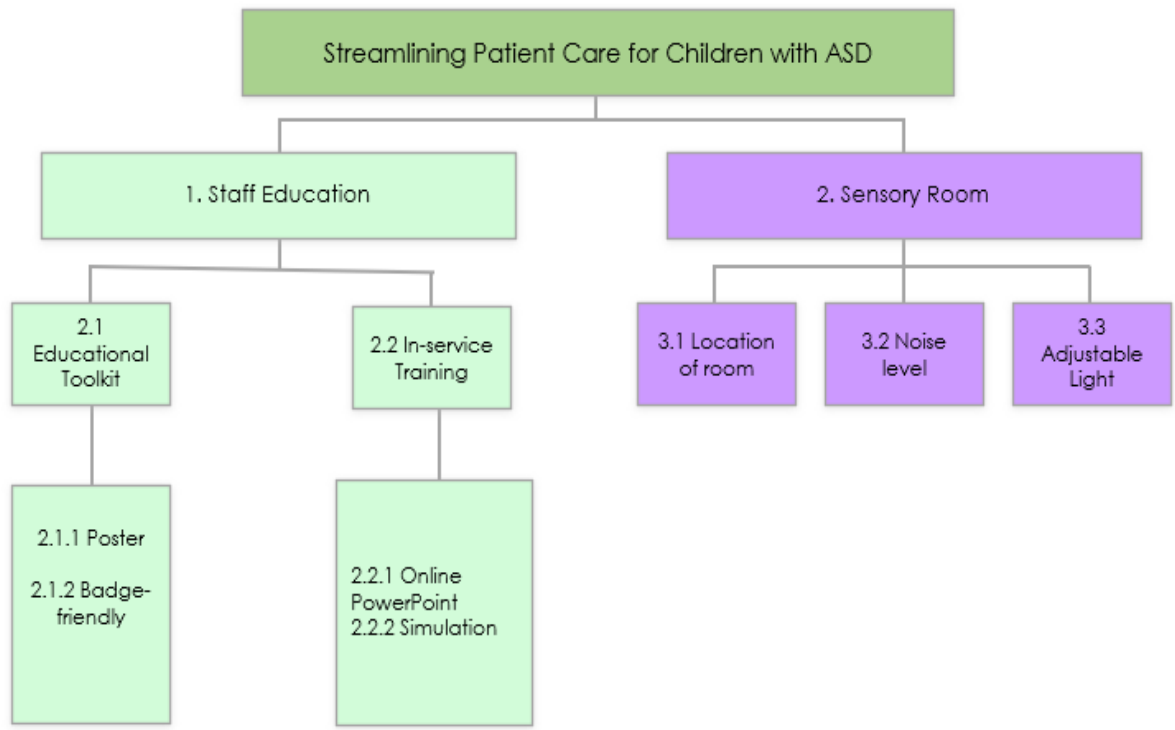
222 W 39th Ave

San Mateo, CA 94403

(650) 578-7174

Appendix J

Work Breakdown Structure



Appendix K

Communication plan

Communication	Purpose	Medium	Frequency	Audience
Stakeholder Meeting	Introduce toolkit and sensory room. Review the design and objectives/goals.	In person/Face to face or online via Zoom meeting	Three times	Stakeholders
Toolkit and sensory room training	Provide toolkit and sensory room training to staff	In person/Face to face or online via Zoom	Initial/Annual	Staff
Toolkit and sensory room assessments/update meetings	Gather feedback from staff and stakeholders regarding toolkit and sensory room implementations and identify ways to improve	In person/Face to face or online via Zoom	Monthly	Stakeholders and Staff

Appendix L

Strengths, Weaknesses, Opportunities, and Threats Analysis



Appendix M

Table M1

Budget Proposal

	Registered nurses (RNs)	Physicians
Number of Staff	20	10
Average Hourly Rate	\$60	\$150
In-Service Training Cost (1 Hour)	\$1,200	\$1,500
In-Service Training Cost (2 Hours)	\$2,400	\$3,000

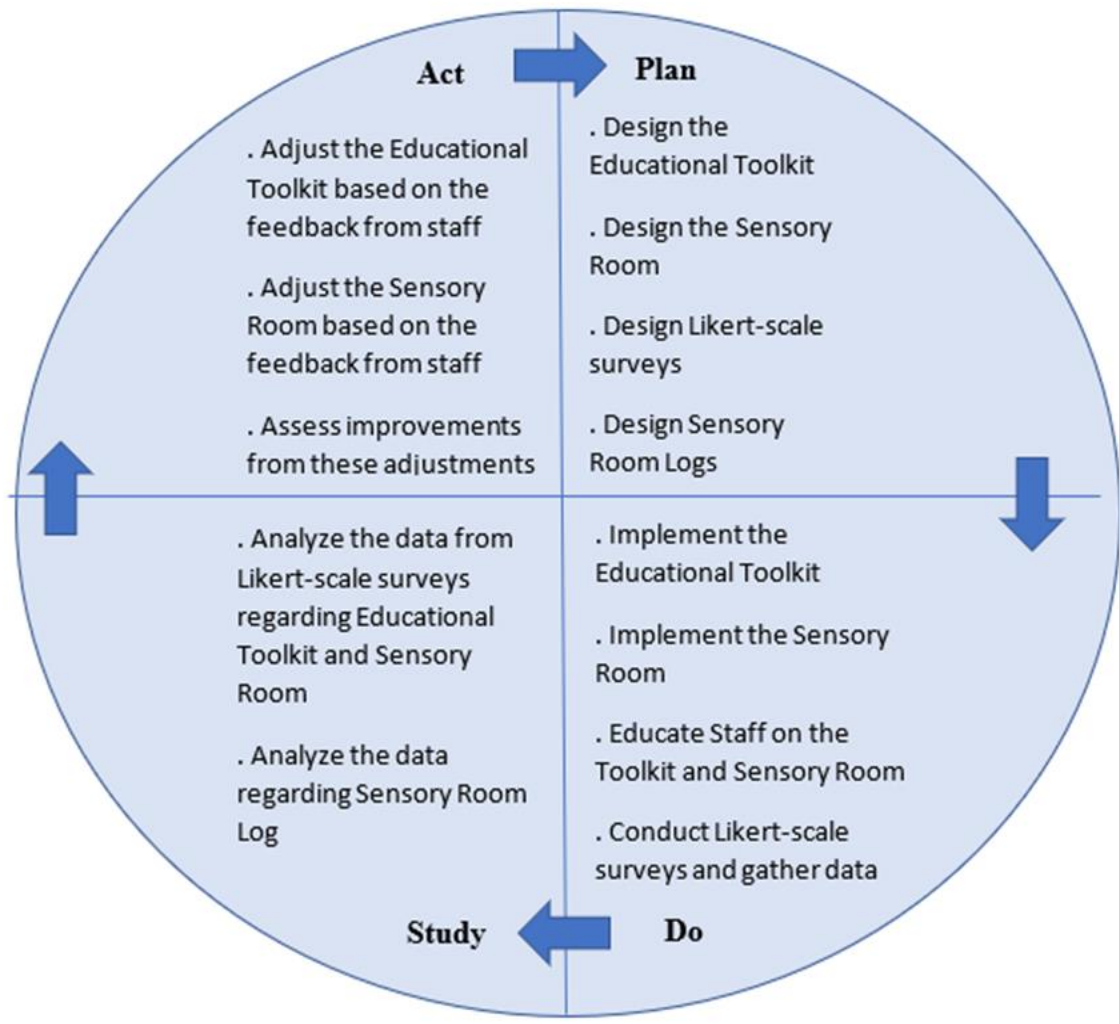
Table M2

Budget Analysis

	Total Cost (\$)	Savings (\$)	Net Cost (\$)	ROI (%)
First-Year	5,400	14,940	-9,540	177
Second-Year	2,700	14,940	-12,240	453

Appendix N

Plan-Do-Study-Act



Appendix O

Figure O1

Pre-Toolkit Survey



I feel confident in my knowledge and skills to provide proper care to children with Autism Spectrum Disorder (ASD)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I frequently find myself to have difficulty caring and managing children with ASD

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I have been previously educated on how to provide proper care for children with ASD to meet their needs

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I believe an educational toolkit would be helpful to increase my knowledge regarding caring for children with ASD

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I believe the lack of resources, including the absence of an educational toolkit is an issue for me when caring for children with ASD

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure O2

Pre-Sensory Room Survey



I believe my setting needs to have an appropriate location/room available to offer to children with Autism Spectrum Disorder (ASD)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I believe the lack of a quiet place in my setting is an issue for children with ASD

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I frequently find myself to have difficulty offering a soothing location to children with ASD

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I believe a sensory room to reduce stimuli and promote relaxation would be helpful for children with ASD

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

It is important for me to have an appropriate room (sensory room) available to offer children with ASD

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure O3

Post-Toolkit Survey



The educational toolkit helped me to increase my knowledge and skills to provide proper care to children with Autism Spectrum Disorder (ASD)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I used the educational toolkit every time that I cared for children with ASD

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I found the educational toolkit to be a good resource when caring for children with ASD

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I plan to keep using the educational toolkit whenever I care for children with ASD

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The educational toolkit was easy to understand and follow

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The contents of educational toolkit was relevant and current

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I would recommend implementation of the educational toolkit to other settings (i.e., inpatient psychiatric unit)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 04

Post-Sensory Room Survey



I found the sensory room to be helpful to reduce the stimuli and promote relaxation for children with Autism Spectrum Disorder (ASD)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I offered the sensory room every time that I cared for children with ASD

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I plan to keep offering the sensory room to children with ASD

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The location of the sensory room was appropriate

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The level of noise in the sensory room was minimal/appropriate

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The adjustable lighting of the sensory room was helpful

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I would recommend implementation of this sensory room to other settings

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please rate your level of agreement with the statement above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix P

Figure P1

Pre-Toolkit Survey Result

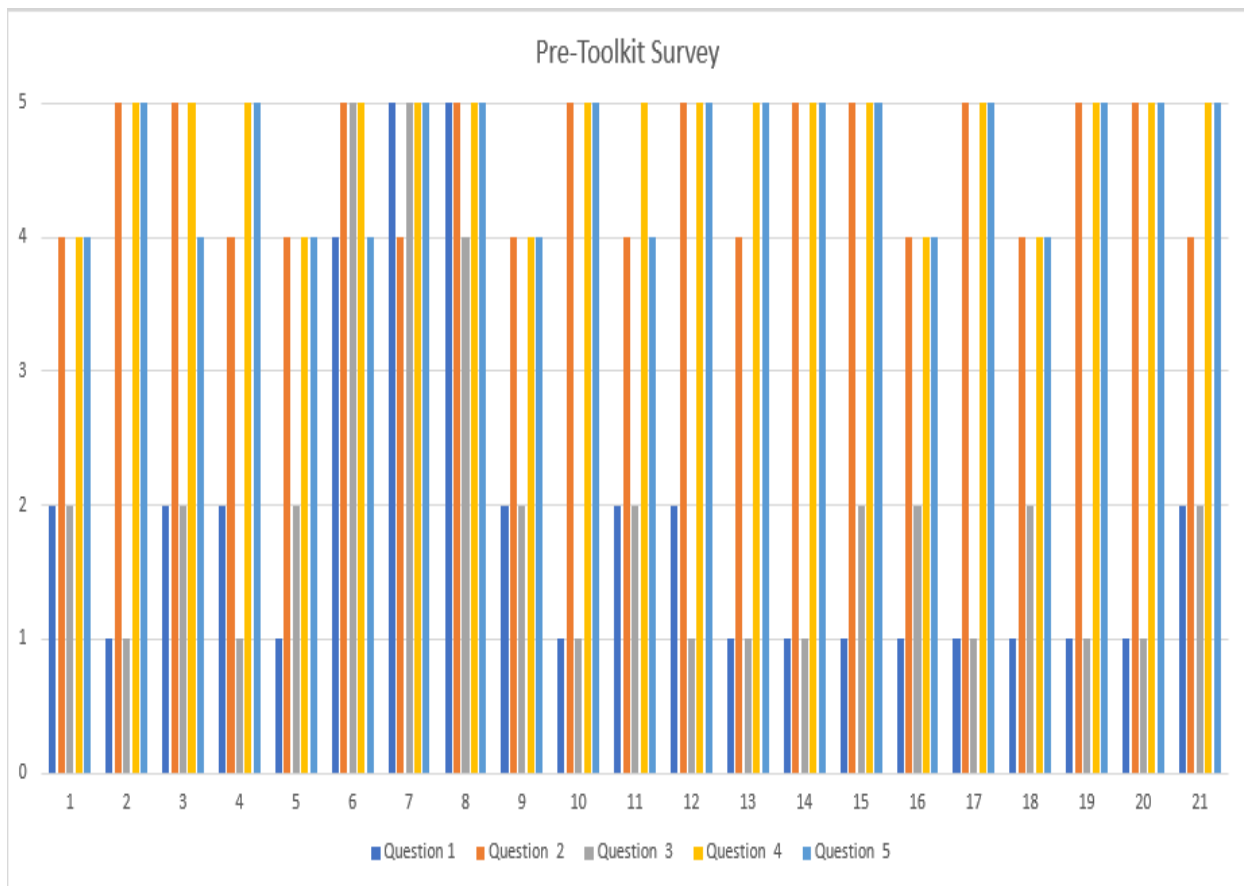


Figure P2

Post-Toolkit Survey Result

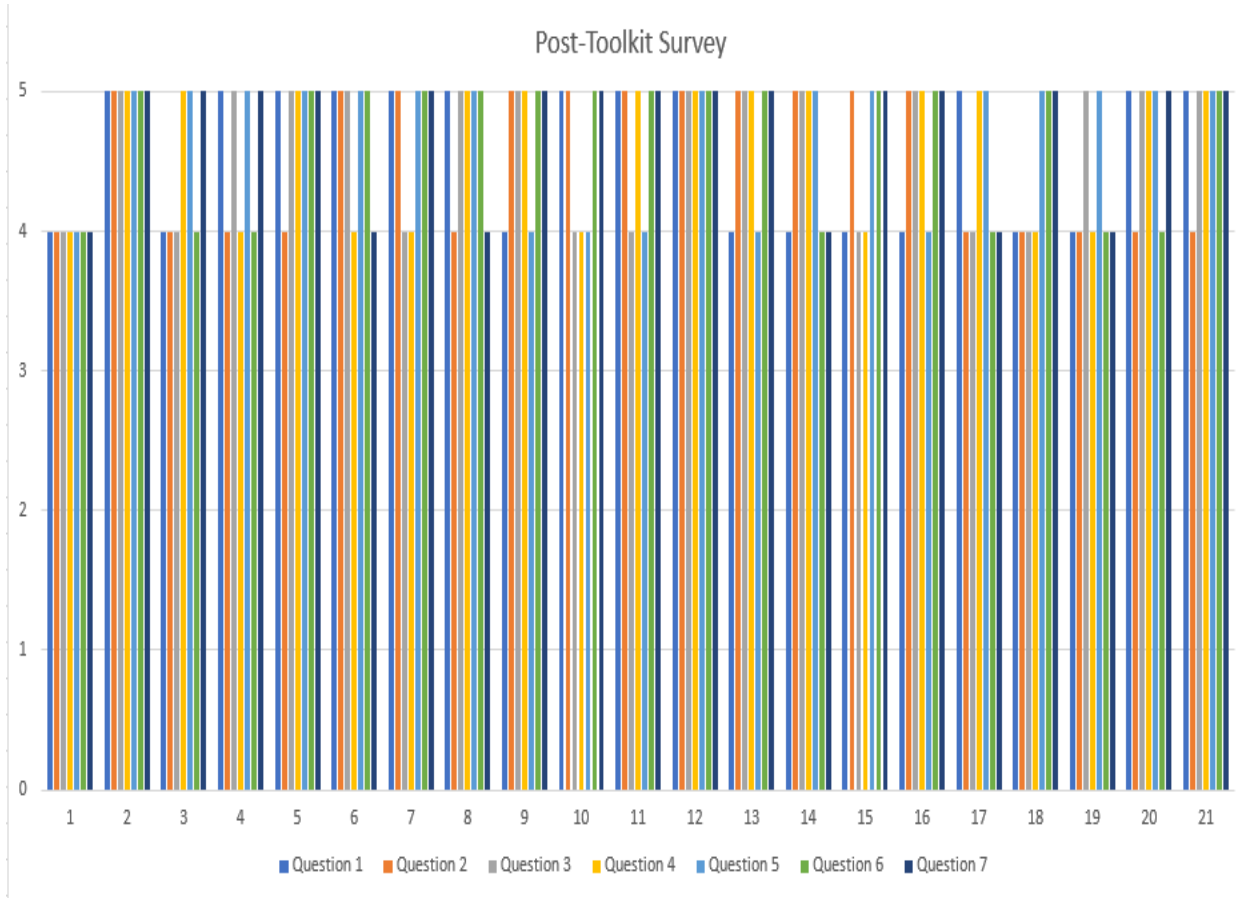


Figure P3

Pre-Sensory Room Survey Result

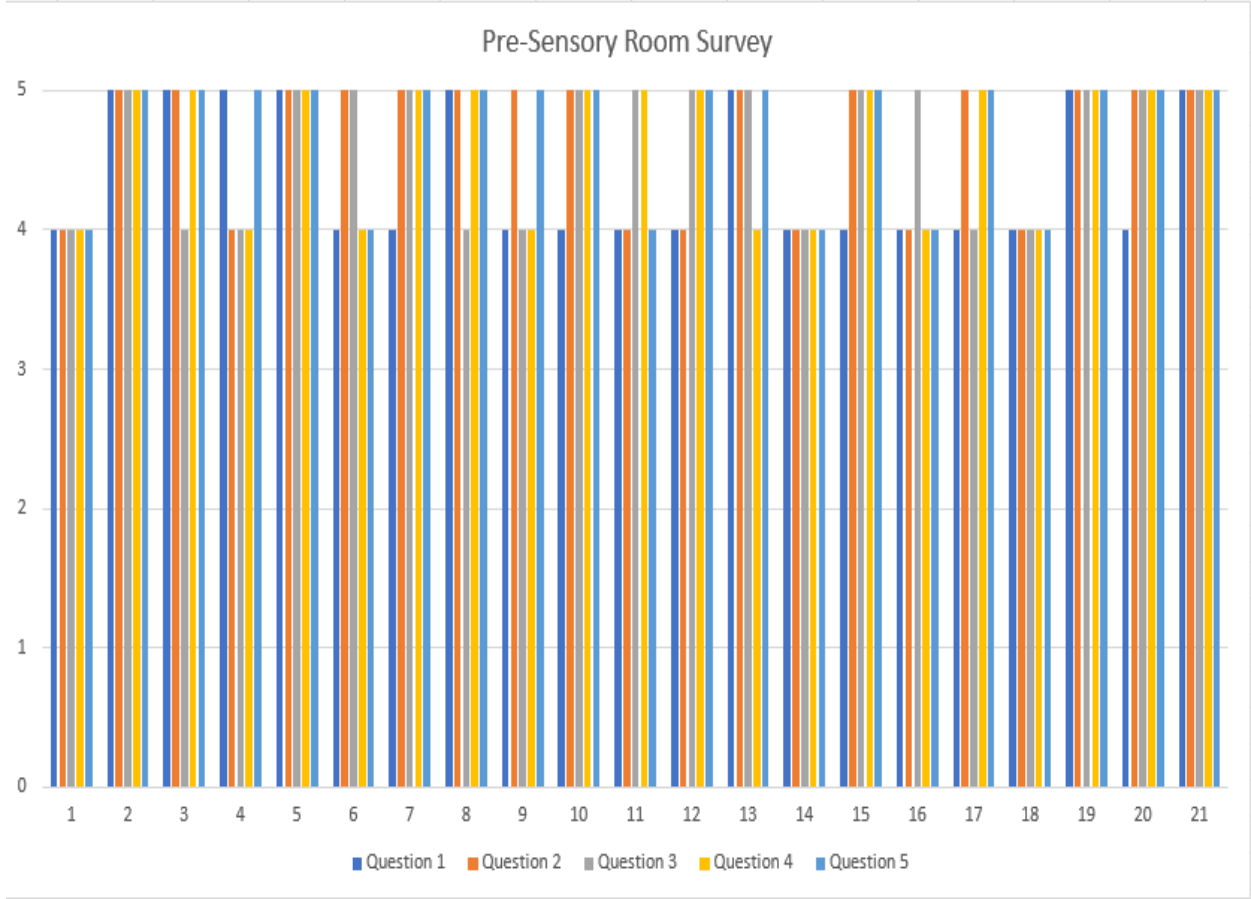
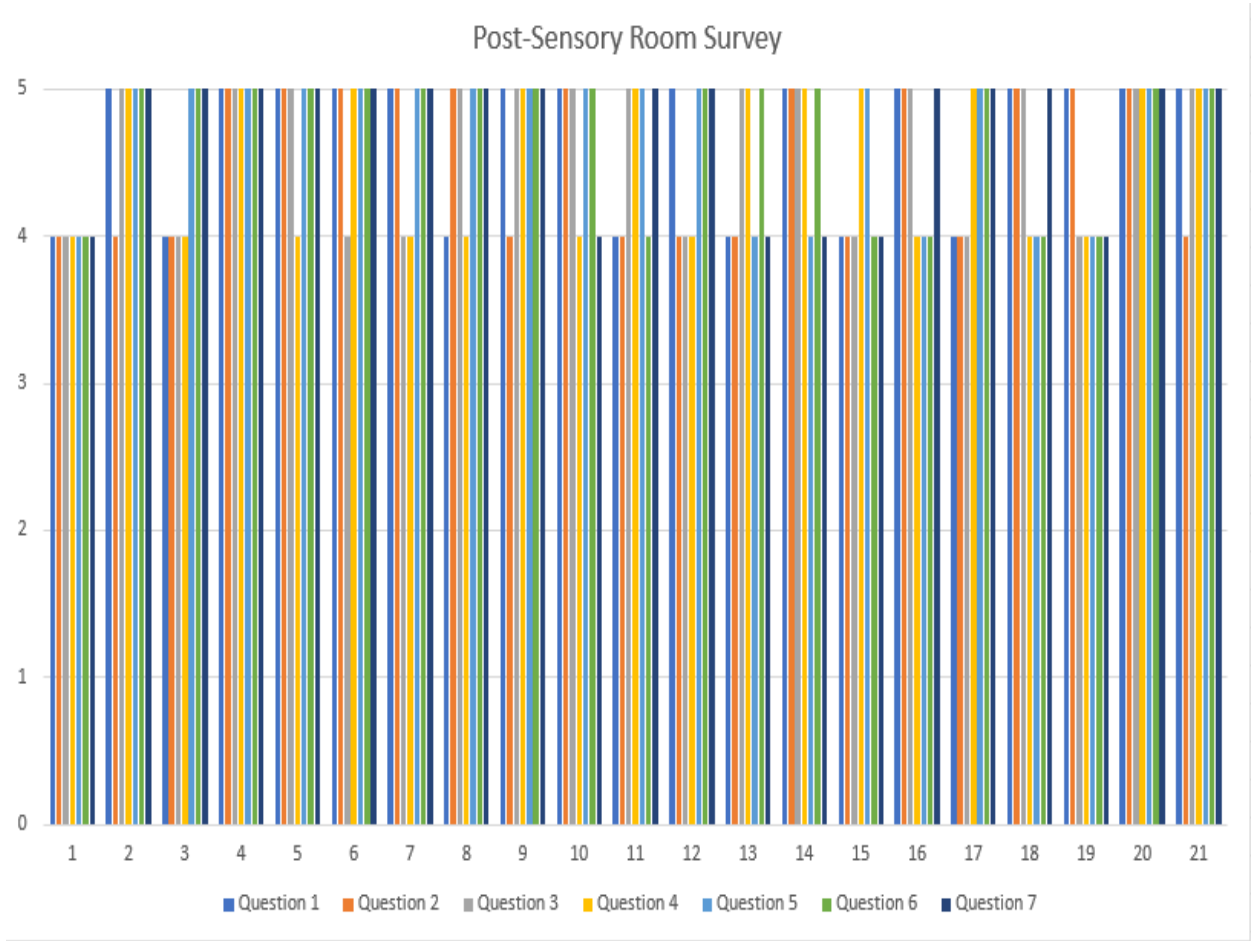


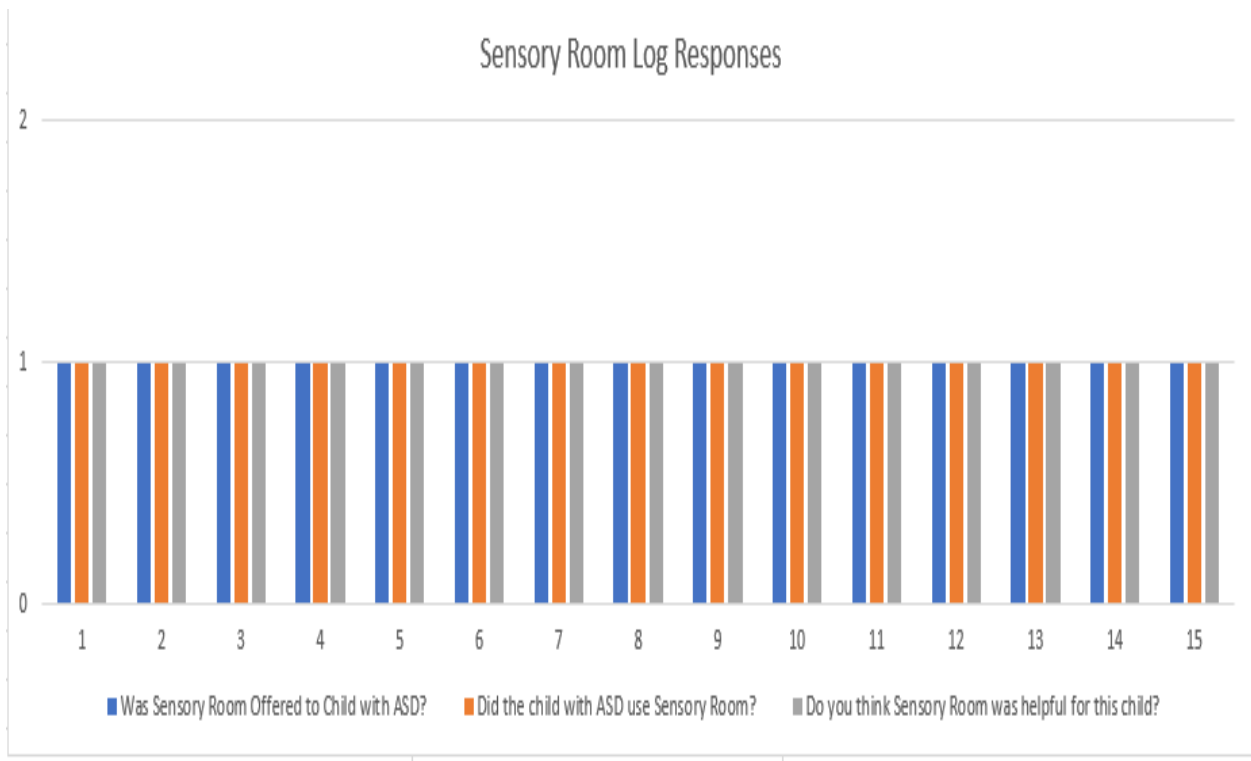
Figure P4

Post-Sensory Room Survey Result



Appendix R

Sensory Room Log Responses Result



Appendix S

Statement of Determination



UNIVERSITY OF
SAN FRANCISCO

School of Nursing and
Health Professions

DNP Statement of Determination

Evidence-Based Change of Practice Project Checklist Outcome

The SOD should be completed in NURS 7005 and NURS 791E/P or NURS 749/A/E

Project Title:

Streamlining Care for Children Living with Autism Spectrum Disorder

This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). **Student may proceed with implementation.**

This project involves research with human subjects and **must be submitted for IRB approval before project activity can commence.**

Student Last Name: Rostami Jafarabad Student First Name: Siavash

CWID Number: 20453182 Semester/Year: 7th/2021

Student Signature: *Siavash* Date: 04/20/2021

Chairperson Name: Trinette Radasa

Chairperson Signature: *Trinette Radasa* Date: 05/07/2021

E

DNP SOD Review Committee Member Name: Mahmoud Kaddoura

DNP SOD Review Committee Member Signature: Mahmoud Kaddoura Date: 4/10/2021