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Decreasing Hospitalization in Infants

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Decreasing Hospitalization in Infants

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Executive Summary

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Infants are the most vulnerable population at risk for serious diseases. Respiratory syncytial virus is a disease that can be detrimental in infants because of their immature lungs and immune system. According to the Center for Disease Control and Prevention (CDC), Respiratory syncytial virus infection (RSV) is associated with 14,000 death annually (Center for Disease Control and Prevention [CDC], 2019). RSV is also responsible for the primary diagnosis of hospitalized infants. The annual rate of hospitalized infants younger than six months is 20 per 1000 infants (Respiratory syncytial virus infection, 2019). The history of vaccines has played an important role in preventing serious disease such as chickenpox, measles, and tetanus. A medication called Palivizumab is a monoclonal antibody drug that has been shown to decrease and prevent hospitalization in infants (Homaira et al., 2014).

The current practice for palivizumab is to only prescribe the medication to premature infants younger than 29 weeks of gestational age or infants with cardiac or pulmonary disease (Munoz et al., 2017). All infants are at risk for being hospitalized and developing serious complication related to RSV such as fever, cough, shortness of breath, and tachypnea. Decreasing the risk of RSV will, in turn, reduce the number of hospitalized infants. Therefore, to

decrease the hospitalization rate healthcare providers should prescribe infants less than 40 weeks gestational age palivizumab.

1. Rationale for the Project

In nursing, it is well known that infants are fragile and are at the highest risk for serious illnesses because of their undeveloped immune system. The focus of decreasing mortality and hospitalization are the goal in the nursing practice. During the winter months, respiratory syncytial virus (RSV) will claim many infant's lives. RSV is a virus that attacks the lungs causing tachypnea, hypoxia, and respiratory distress, which can lead to respiratory failure. Previously there were no medications that could prevent RSV. The treatment of RSV is to provide symptomatic treatment such as supplemental oxygen, corticosteroids, and inhalers. Even with these methods of treatment infants have the potential to deteriorate and become hospitalized.

However, preventative measures can be initiated. The medication Palivizumab has shown to decrease hospitalized rate in infants from up to 15% (Lee, Kwok, Ng, and Hon, 2018). Reducing hospitalization to also reduce the risk of infants occurring nosocomial infection such as pneumonia, influenza, and coronavirus. Palivizumab is intended to be used prophylactically. Currently, palivizumab is only recommended for premature infants younger than 29 weeks or with comorbidities. Thus, the PICOT question: In infants less than 40 weeks gestational age effected with the respiratory syncytial virus (P), how does palivizumab immunization treatment (I) compare to infants with respiratory syncytial virus not treated with palivizumab (C), influence length of hospital stay over three months (T)?

a. **Project Goals**

The goal of this BENCHMARK project is to develop a program that will provide healthcare providers and parents the option of preventing RSV related illnesses to all infants. Also, the goal of this project is to be informative and bring awareness to healthcare providers of the potential effectiveness of Palivizumab. The medication is effective in two ways. Firstly, it has the capability of decreasing hospitalization rates by improving RSV symptoms. Secondly, it can prevent infants from acquiring RSV through the community.

2. Literature Synthesis

Ashkenazi-Hoffnung et al. (2014) studied whether or not nosocomial RSV was the cause of prolonging hospitalization and did palivizumab influenced the length of hospitalization. The quasi-experimental design had 873 children, admitted to the pediatric intensive care unit diagnosed with RSV. The average length of hospitalization for the infants was 12 days. 80% of those infants did not qualify for Palivizumab prophylaxis according to the American Academy of Pediatrics (AAP) guideline. The research concludes that the AAP guideline should be extended to include additional high-risk populations.

The purpose of Wang et al. (2017) research was to compare the effectiveness of palivizumab when given to infants with chronic lung disease during their first year of life and second year of life. The quantitative, retrospective study design identified 1297 infants. Of those 1297 infants, 847 were the first year of life and 450 were the second year of life. All infants that were given palivizumab prophylactically average a length of hospitalization of 4.5 days.

In a multicenter study Anderson et al. (2016) used a test-negative case-control design to identify the effectiveness of palivizumab in 849 hospitalized children younger than 24 months old, diagnosed with lower respiratory tract infection. 434 children received palivizumab and the

results concluded that palivizumab had a 62.1% effective rate at preventing intensive care unit admissions

Wegzyn et al. (2014) used a systematic literature review of randomized controlled trials, open-label non-comparative, clinical trials, and prospective observational study to identify the efficacy rate of palivizumab in reducing hospitalization rate compared to the placebo group. The sample size was more than 42,000 infants younger than 24 months old with RSV from literature online databases including Medline, Embase, BIOSIS Previews, and Derwent drug file. The research concluded that palivizumab had a 39-78% reduction rate in hospitalization compared to the placebo group.

Homaira, Rawlinson, Snelling, and Jaffe (2014) researched the effectiveness of palivizumab in preventing RSV hospitalization in high-risk children younger than 2 years old. The research was done by using a narrative systematic review approach. The literature search included an online database from Medline, Embase, CINHAL, Google Scholar, and Global Health. The sample size had over 90,000 high-risk infants with and without chronic lung disease, congenital heart disease, cystic fibrosis, and down syndrome. The results showed in all the articles, there was approximately a 19% reduction in RSV hospitalization in children that received palivizumab compared to those who did not receive it.

Kong et al. (2018) researched the impact of the decision made the AAP in changing the guidelines for palivizumab in 2014. The research was done by using data from commercial and Medicaid claims to identify hospitalization rates and admission status. The data showed a correlation between the new guidelines and the increase in hospitalization associated with RSV. In conclusion, RSV associated hospitalization increased by 2.7-fold compared to 2013.

Lee et al. (2018) evaluated the hospitalization rate for infants less the 29 weeks gestational age. The retrospective study found a cohort of 135 premature infants that were hospitalization in Hong Kong and 40 of those infants received palivizumab. The researchers found a 5-15.8% decrease in hospitalization rate in infants who received the medication.

Lin et al. (2019) evaluated the effects of administering six-monthly doses of palivizumab to premature infants hospitalized with RSV. The sampling technique was taken from Taiwan's National Health Insurance and the Birth Certificate Application database. The study's subjects were infants born on or younger than 28 weeks and those born between 29- and 35-weeks gestational age with bronchopulmonary dysplasia disease. According to the findings, there was zero RSV related hospitalization for infants between 29- and 35-weeks gestational age that received palivizumab compared to 2.19% of infants hospitalized that did not receive palivizumab.

The study done by Pirante et al. (2019) is to compare the effect that RSV had on hospitalization in infants born between 29 to 35 weeks gestational age and how the new change made by the Italian Drug Agency recommendation on palivizumab affect hospitalization rate. The data was collected from three neonatal intensive care unit (NICU) from Italy. The result showed "restricting eligibility for palivizumab reimbursement led to a significant increase in respiration syncytial virus-associated hospitalization but had no impact on hospitalizations for other respiratory viruses (Pirante et al. 2019, p. 78).

Moore et al. (2019) did a retrospective cohort study measuring the effectiveness of palivizumab in respiratory syncytial virus on confirmed infection in high-risk infants less than 2 years old. The aim of the study was to determine palivizumab's effectiveness in reducing the detection of RSV depending on the dosage. The study sample 24,367 infants which was taken

from two tertiary neonatal intensive care units at a hospital in Western Australia. Infants that received just one dose had a 74% lower RSV incidence than the control group who did not receive palivizumab (Moore et al., 2019). With just a single dose of palivizumab, infants are at a lower risk of acquiring RSV.

Belleudi et al. (2018) did a retrospective cohort study evaluating the impact of the change in reimbursement decision made for prescribing palivizumab and the rate of RSV related hospitalization in infants less than 2 years old. The focus of the study is to identify what kind of effects did the new limitation on palivizumab treatment have on infants diagnosed or hospitalized with RSV. The study sample consisted of a large data in Italy. The data was collected from three main sources the Certificate of Delivery Care, Drug Claims Registry, and Hospital Information System. The sample size was 284,902 infants younger than 24 months old. There was a 48% reduction in palivizumab prescription without any difference in the increase in hospitalization in infants younger than 2 years old (Belleudi et al., 2018).

Cetinkaya et al. (2017) used a prospective observational study design to research which infants' age population could benefit from the use of palivizumab prophylactically. The aim of the study is to "determine the ideal target preterm population that might benefit from palivizumab prophylaxis by establishing the main risk factors for acute RSV-related infections" (Cetinkaya, 2017, p. 1630). The study sample consisted of 202 preterm infants under 1 year old. The sample was taken from a tertiary care center in Istanbul, Turkey from October 2015 and April 2016. The study found that 77% of the infants older than 29 weeks gestational age were hospitalized for RSV. This concludes that infants of all ages are at risk for RSV and can develop complications.

3. Project Stakeholders

The stakeholders impacted by the proposed change are the American Academy of Pediatrician (AAP), physicians, healthcare providers, hospital administrations, patients and their family. Physicians, physician assistance, nurse practitioners, and nurses will have the opportunity to be involved in this change because they play a large role in prescribing and monitoring the patient's outcome. The committee of the AAP are the gatekeeper for this change and permission from the organization will be recommended to implement this change. The AAP committee establishes guidelines for providers to follow. Currently, the AAP guideline for palivizumab is only for infants younger than 29 weeks gestational age or have hemodynamically significant congenital heart disease or chronic lung disease.

4. Planned Evaluation

The change project is an ongoing process of monitoring, collecting data, and continuously evaluating palivizumab's effectiveness at reducing hospitalization. The data that will be monitored are the rates of hospitalization in infants diagnosed with RSV. Hospitalized infants will be evaluated for symptoms such as hypoxia, tachypnea, shortness of breath, fever, cough, running nose, nasal congestion, anorexia, or retractions. The other data that will be evaluated is whether the infant received palivizumab. Also, that data that will need to be evaluated are the length of hospitalization, results of rapid RSV testing, and age of gestation. To determine whether the intervention is successful the rate of hospitalized infants that received palivizumab will be less than hospitalized infants that did not receive the medication.

5. Timetable

During the first week of October, the change project data will be collected from neonatal intensive care unit and pediatric clinics. The next two weeks will be recruiting healthcare providers and seeking approval for the project. During this week building rapport will be the

primary goal. In the fourth and fifth weeks going into September, educating staff members about the efficacy of palivizumab, the reason it is given as a five series injection, and symptoms of an allergic reaction will be the goal. The sixth week will be focusing on assessing, administering the medication, and logging data. For the next six months will be following up with parents bi-weekly and assessing their infant's symptoms and collecting additional data of hospitalization status.

6. Data Collection Methods

The context of caring concept has a large role in the development of the change project because it provides evidence of positive outcomes for patient's outcome (Melynk & Fineout-Overholt, 2015). The site of the change project will be at Titus Regional Medical Center NICU. It has three NICU beds in a locked facility. Data that will be collected for the change project are how many infants are hospitalized for RSV related illnesses such as lower respiratory tract infection, tachypnea, and hypoxia. Other data that will be collected are RSV nasal swab test, palivizumab status, gestational age, and length of hospitalization. Guidelines are used as a systematic approach to guiding healthcare. Data on length of hospitalization due to RSV and death rate caused by RSV are needed to warrant a change. Continuation of data collection about the recipient health outcome and determining palivizumab's effectiveness will also be monitored during this time. These data will help analyze the effectiveness of palivizumab in reducing the length of hospitalization.

7. Cost Benefits

Bringing this change will have an associated cost from delegating personnel to creating an educational presentation, advertisements, and the initial cost of having the medication in stock. Ongoing costs for sustaining the change will be needed for educating healthcare

personnel, keeping the medication in inventory, and advertisements. The estimation for implementing this change project is about $75,389. The proposed amount is significantly expensive and will need further board evaluation to decide if the hospital will be willing to pay.

The benefits of reducing hospitalization rate in infants is the reduced risk of acquiring nosocomial infection, improving infant's overall health outcome, decreasing death rate associated with RSV, and prevention of RSV associated illness. The average cost for hospitalization of an infant that has one or fewer risk factors between 32-35 weeks gestational age is $150,000-$800,000 dollars (Olchanski et al., 2018). The average cost of palivizumab is estimated to be $800 per dose. Therefore, if palivizumab can prevent one hospitalization the organization can save at least $150,000 dollars and 14,000 lives.

8. Overall Discussion and Results

There are no results from this project as of this time. However, I have received positive feedback from pediatricians and nurses about the project. The pediatrician provided many well-thought-out suggestions and concerns which are being accounted for. Nurses has also voiced concerns about the increase rate of RSV diagnosis this year in infants.

Conclusion

Most infant become sick during the winter seasons. The most common are respiratory disease due to their premature lungs. This change project will have a positive impact on infants during the winter season by decreasing the rate of hospitalization, RSV related symptoms, and cost. Palivizumab has the potential to be cost-effective and improve infant's health outcomes. Implementing this change project will promote many infant's health outcomes and most importantly save lives.

Recommendation

It is recommended that evaluating the guideline for palivizumab to cover a larger age population. The next step will be successfully implementing the change project at a facility. I would personally recommend future students to make sure their change project is a topic that greatly interests them. This will promote excitement and higher quality outcome. The recommendation that I have for my colleagues are to stay updated on changes that are being made to healthcare and medicine. The recommendation that I have for my patients is to be proactive about their healthcare and know that there is a financial assistance program that provides support.
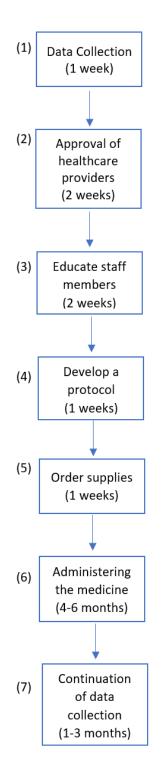
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Appendix

(1) Data Collection
(1 week)

(2) Approval of healthcare providers
(2 weeks)

(3) Educate staff members
(2 weeks)

(4) Develop a protocol
(1 weeks)

(5) Order supplies
(1 weeks)

(6) Administering the medicine
(4-6 months)

(7) Continuation of data collection
(1-3 months)