Increasing Pediatric Vaccination Rates through Parental Education at a Federally Qualified Community Health Center: An Evidence-Based Quality Improvement Project

Dayna DiCola
University of New Hampshire, Durham, dayna.dicola@ unh.edu

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Dayna DiCola
University of New Hampshire

Faculty Mentor: Elizabeth Evans, DNP, MSN, BSN, RN

Practice Mentor: Corinna Moskal MSN RN and Shannon Gillan MSN, RN, CNL
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Abstract

**Background:** Childhood immunization rates for children aged 2 years and under at a community health center were assessed and determined to be below optimal levels. Immunizations protect against preventable diseases (Hill, 2023). The project assessed the microsystem to understand low immunization rates and to guide strategies for improvement.

**Methods:** The Plan-Do-Study-Act (PDSA) model was used. In the planning phase, key stakeholders were consulted to assess current rates and barriers contributing to immunization rates. The chosen intervention was placed simplified immunization schedules in pediatric exam rooms to educate parents and promote adherence.

**Intervention:** A visual guide detailing the recommended vaccination schedule was placed in each pediatric exam room to after strong staff-support was shown in a pre-intervention survey.

**Results:** The implementation team included the writer, quality improvement nurses, pediatricians, registered nurses and medical assistants. Feedback from a post-intervention survey indicated successful implementation of the visual schedule based on staff observations of parental interactions. The intervention aimed to educate parents and increase vaccination adherence.

**Conclusion:** The project demonstrated that enhancing parental education and support may impact immunization rates significantly. The visual immunization schedule proved to be a cost-effective strategy for reducing vaccine hesitancy. Further efforts should focus on maintaining these gains and exploring additional education tools to further improve pediatric immunization rates at this community health center.

**Keywords:** Childhood immunization, vaccine hesitancy, parental education, community health center, pediatric, visual immunization schedule.
Introduction

Problem Description

Within a community health center microsystem, it was identified that childhood immunization rates for children aged 2 years and under is an ongoing problem. Immunizations are imperative in protecting children against preventable diseases and the CDC recommends that children should be vaccinated for 14 communicable diseases by the age of 2 (Hill, 2023). The childhood vaccination program in the United States has decreased the rates of illness, death, and disability related to the 14 communicable diseases (Talbird et al., 2022). Despite the effectiveness of routine childhood immunizations in reducing the spread of diseases in the United States, maintaining consistently high vaccination rates continues to be a challenge (Talbird et al., 2022). Although vaccines are readily available and proven effective in preventing the spread of disease, ongoing obstacles in achieving timely and comprehensive immunization coverage remains an issue among the pediatric population in this microsystem.

The community health center uses specific metrics to track vaccination rates, including the percentage of children aged 2 years who have received a prescribed set of vaccines by their second birthday. This set includes four doses of diphtheria, tetanus, and acellular pertussis (DTaP), three doses of polio (IPV), one dose of measles, mumps, and rubella (MMR), three doses of Hepatitis B (Hep B), one dose of chickenpox (VAR), four doses of pneumococcal conjugate (PCV), one dose of Hepatitis A (Hep A), two or three doses of rotavirus (RV), and two doses of influenza (flu) vaccines. Exclusions to these specific metrics included pediatric patients who are in hospice care (Quality Improvement Nurse, personal communication, February 22, 2024). Historically, the vaccination rates at this community health center microsystem have been unsatisfactory including 31% in 2020, 40% in 2021 and 45% in 2022. Despite the incremental
improvements, the rates are still below the desired level of 55% which implies that this is a challenge and that achieving optimal immunization coverage among the pediatric population in this microsystem is necessary.

There are various factors contributing to this problem. Some problems include access barriers including transportation challenges, lack of resources, and lack of communication regarding appointments which hinders the parents’ ability to bring their child to scheduled appointments (Pediatrician, personal communication, February 22, 2024). Other factors contributing to this problem include parent’s hesitancy to vaccinate their child based on misinformation, cultural beliefs, and communication gaps between healthcare providers and parents. Inadequate education and understanding about the importance of the vaccines and vaccination schedules is exacerbating this problem due to communication gaps and other barriers to care.

To improve immunization rates at the microsystem level, it is essential to address systemic issues within the community health microsystem. Strategies and interventions targeted towards the parents of pediatric patients is necessary. Some strategies and interventions that may be used to enhance immunization rates at this community health center include enhancing communication between healthcare providers and parents, streamlining scheduling and reminders, and strengthening resources to help with other barriers including access to transportation. By assessing the microsystem and the reason why immunization rates continue to be less than ideal, and implementation of one of the measures above was used to potentially achieve higher immunization rates at this community health center.

Available Knowledge

Childhood immunization is widely recognized as one of the most effective public health
interventions, preventing illness, death, and disability from various infectious diseases (Hill, 2023). Despite the availability of vaccines, the CDC suggests that achieving optimal immunization rates continues to be a challenge in the United States due to parental attitude and inadequate education pertaining to recommended vaccines (Hill, 2023). Parental and caregiver decision-making plays a pivotal role in determining whether children receive recommended vaccinations. The focus of this literature review is to examine pediatric immunization rates and parental hesitancy. The literature review examined the barriers and facilitators impacting pediatric immunization rates and focus on parental education and communication about childhood vaccination uptake. A literature review was conducted to answer the question: In children under two years of age attending a federally qualified community health center (P) does implementing parental education about vaccine adherence and scheduled during infant appointments (I) compared to standard care, not including this education (C), improve completion of all recommended vaccines by their second birthday who receive all recommended vaccines (O) as measured by immunization rates?

**Search Methods**

This review of literature was conducted by searching databases including PubMed, Elsevier, MEDLINE, Cochrane Library of Systematic Reviews, and Google Scholar. The search criteria were centered around keywords including “pediatric,” “immunizations,” “pediatric vaccines,” and “parental education.” To ensure the relevance and recency of studies, the search was restricted to studies published between 2014 and 2024 with a focus on those containing access to full text. Inclusion criteria for the literature review included patients aged 2 years and under, interventions aimed at enhancing pediatric immunization rates, research conducted within the United States, and studies conducted in community health centers and pediatric clinics.
Studies older than 10 years, lacking full-text availability, involving adolescent patients, or conducted outside of the United States were excluded from the review. 640 studies were identified from the databases listed and 257 duplicate studies were removed. 383 studies were screened by title and abstract and 262 were irrelevant to the topic of pediatric vaccine and parental education. 121 full text studies were assessed for eligibility and 116 were excluded due to factors including wrong clinical setting, not specific to the United States, full text being unavailable, and studies not relevant to the problem. Five systematic reviews are included in this review of literature for critical appraisal and evidence synthesis.

**Critical Appraisal of Evidence**

In a systematic review conducted by Albers et al., (2022), the authors assessed barriers to and facilitators of early childhood immunization rates in rural United States communities. Using a systematic approach, the review focused on original research conducted between January 1, 2000, and July 25, 2021, focusing on routine immunization for children under 26 months old. The systematic review identified relevant literature and clearly defined inclusion criteria, enhancing the relevance of literature included. Additionally, adherence to the Preferred Reporting Items for Systematic Reviews and Meta Analysis (PRISMA) guidelines ensured that this review included a comprehensive assessment of review methods and findings. However, limitations include the exclusive focus on rural United States communities which may limit generalizability and the increased potential for temporal bias due to the 21-year study period. Future research should further explore the causes of low vaccine coverage and assess intervention effectiveness in rural pediatric populations. Despite limitations, this study likely represents Level I evidence as outlined in the Joanna-Briggs Institute (JBI) pyramid (Appendix A). This review provides valuable insight into early childhood vaccination barriers and
facilitators which prompts further research and interventions targeted to the pediatric population.

Connors et al. (2016) conducted a systematic review aiming to assess communication practices between healthcare providers and vaccine-hesitant parents to identify effective approaches to address vaccine hesitancy. Through a search of multiple databases, this systematic review focused on nine articles meeting inclusion criteria which consisted of descriptive and qualitative methodologies. This systematic review of quantitative and qualitative studies assessed communication framework in provider-parent interactions related to vaccination. The findings of this systematic review highlight the importance of individualized and participatory communication approaches in addressing vaccine hesitancy among parents. Trust in healthcare providers and personalized interactions were key factors associated with influencing parental attitudes towards vaccination. While this systematic review may be considered a high level of evidence, there are limitations. Limitations included in this systematic review include lack of high-quality evidence and consensus in the literature which shows the need for more research to inform clinical practice to address vaccine hesitancy and increase immunization rates within the pediatric population. Other limitations include the relatively small sample size of included articles which could potentially limit the generalizability of findings. Despite the limitations, the review provides important insights into communication practices between providers and vaccine-hesitant parents.

The systematic review conducted by Kaufman et al. (2018), provides a comprehensive examination of the effects of face-to-face interventions for informing or educating patients about early childhood vaccination. The review updates a previous publication and included a thorough examination of descriptive and qualitative studies as well as randomized controlled trials which indicates that high-quality evidence may be limited. Despite this potential limitation, the
systematic review employs standard methodological approaches and assesses the risk of bias. The main results of this review suggest that face-to-face interventions and education may improve children’s vaccination status, parent knowledge, and intention to vaccinate. The review highlights the need for reliable and validated scales for measuring attitudes and beliefs about vaccines to facilitate more robust comparison across studies. This review is considered a high level of evidence as outlined in the JBI pyramid (Appendix A). While the review provides insights into the effectiveness of face-to-face interventions, the interpretation of results should consider the limitations and evidence. Further research should be considered to strengthen evidence and inform interventions.

Singh et al. (2022) conducted a systematic review to look at strategies to improve vaccine hesitancy. This study aimed to identify and analyze interventions targeted at addressing vaccine hesitancy. One strength of this review is the comprehensive search strategy which included specific keywords and searched multiple databases. This comprehensive approach indicates that relevant literature was captured and can minimize selection bias. This systematic review included 33 studies out of 105 studies that were evaluated during the selection process. Singh et al. (2022) did not add criteria inclusion and exclusion information which could be a limitation. Omitting inclusion and exclusion criteria raises concerns about the reliability of the evidence. Singh et al. (2022) identifies community-based interventions, monetary incentives, and technology-based health literacy as effective strategies for improving vaccine uptake in pediatric patients. Of the interventions mentioned in the systematic review, media-based interventions were noted to be less impactful in increasing vaccine uptake. These findings suggest the importance of tailored interventions to enhance community engagement related to vaccine hesitancy and refusal.
In a systematic review conducted by Smith et al. (2017) factors associated with the uptake of vaccines in young children is observed. Smith et al. (2017) aimed to investigate the various factors influencing parental decisions regarding vaccinations in children. This systematic review demonstrates several strengths but also presents areas for improvement. One strength of the review is its comprehensive and thorough approach to summarize the evidence found relating to psychological, social, and contextual factors influencing childhood vaccine uptake. This search resulted in the identification of 9110 citations that were screened for eligibility. Of the 9110 citations, only 68 were eligible and 64 were included in the systematic review. This search strategy enhances the likelihood of relevant literature being selected and is considered a high level of evidence as outlined in the JBI pyramid (Appendix A). Some factors associated with vaccination including in the study are positive attitudes towards vaccination, perceived vaccine safety, positive vaccine recommendations, and fewer practical difficulties with vaccination (Smith et al., 2017). While the review provides a comprehensive summary of evidence, limitations include lack of transparency regarding the quality assessment of the study which could limit the reliability of the findings. Despite this, the review offers contributable insights into the factors influencing parental vaccination decisions and highlights the importance of childhood vaccinations.

**Evidence Synthesis**

The systematic reviews conducted by Albers et al. (2022), Connors et al. (2016), Kaufman et al. (2018), Singh et al. (2022), and Smith et al. (2017) offer critical insights into various aspects of childhood immunization and vaccine hesitancy. Each review presents a careful examination and evaluation of the research and employs a systematic approach to synthesizing evidence.
Albers et al. (2022) assesses the barriers to and facilitators of early childhood immunization rates in rural United States populations. This review, likely representing level 1 evidence, provides insight into vaccination barriers and facilitators prompting further research and interventions targeted at rural U.S. communities. However, limitations such as the exclusive focus on rural areas and the potential for temporal bias highlights the need for caution when interpreting the findings. Connors et al. (2016) assesses communication practices between healthcare providers and parents who are hesitant to vaccine their children. This emphasizes the importance of individualized and participatory approaches in addressing vaccine hesitancy. Despite limitations, including the lack of high-quality evidence and small sample sizes, this review offers important insights into communication practices and their impact on parental attitudes towards vaccinations.

Kaufman et al. (2018) provides a comprehensive examination of face-to-face interventions for educating parents and caregivers about pediatric vaccinations. This review highlighted the effectiveness of face-to-face interventions in improving vaccination rates among the pediatric population. Singh et al. (2022) explores strategies to address vaccine hesitancy by identifying community-based initiatives, financial incentives, and technology-driven health education. Singh et al. (2022) notes that these interventions are effective strategies for improving vaccine uptake in pediatric patients. Smith et al. (2017) investigated factors associated with childhood vaccine uptake and offered a comprehensive summary of evidence related to psychological, social, and contextual factors influencing parental decision-making regarding childhood vaccines.

Across the five systematic reviews, the importance of understanding barriers to and facilitators of childhood immunizations was pivotal. It was also valuable to understand effective
strategies for addressing vaccine hesitancy in parents with children. Each review underscores the need for careful interpretation of findings. Further research can strengthen evidence and inform interventions for vaccine uptake in children and the public health sector. The reviews all highlight the multifaceted nature of childhood immunization and parental vaccine hesitancy.

*Implications to the Quality Improvement Project*

The literature review focused on childhood immunization rates and vaccine hesitancy offers crucial insights into addressing the identified problem and specific aims of the Quality Improvement (QI) project. Childhood immunization is essential for preventing morbidity, mortality, and disability from infectious diseases, yet achieving optimal immunization rates remains a challenge (Hill, 2023). Parental attitudes and inadequate education are attributed to the low immunization rates of pediatric patients as indicated in the review of literature. The systematic reviews examined various aspects of this issue and shed light on the barriers to immunizations, communication practices, and strategies to address vaccine hesitancy in parents and caregivers of pediatric patients. The findings from this literature review show the importance of targeted interventions addressing parental hesitancy and educational gaps to improve immunization rates. This may enhance the effectiveness and impact on the QI project.

*Rationale*

The Plan-Do-Study-Act (PDSA) model was used to plan, implement, evaluate, and adapt strategies to enhance childhood immunization rates (Institution for Healthcare Improvement, n.d.). The planning phase included consulting with key stakeholders to assess the current immunization rate and the barriers causing immunization hesitancy. While in the planning phase, an intervention was chosen to address barriers and reasons for low immunization rates and missed appointments. Upon the acceptance of the quality improvement project proposal in June
of 2024, the do phase began, and a change idea was tested. Afterwards, in the study phase, the effectiveness of the intervention was evaluated through analysis of the results including assessing whether pediatric immunization rates were increased. The act phase occurred as some adjustments and improvements were necessary based on the findings from the study phase. In addition, findings from the project were disseminated to key stakeholders.

Global Aim

The global aim of this quality improvement project was to increase childhood immunization rates within the community health center. The process began with enhancing parental education and support surrounding vaccine hesitancy. The process ended with increased immunization rates and an improvement in awareness and acceptance of vaccinations among pediatric patients and their families. This work aimed to enhance the community health center’s pediatric immunization rates, leading to healthier outcomes. Addressing this issue was important to protect the community and to ensure parents and caregivers of pediatric patients receive appropriate vaccination education.

Specific Aims

The specific aim of this quality improvement project was to improve childhood immunization rates for children aged 2 years and under within the community health center to 55% by July 15th, 2024.

Methods

Context

Pediatric immunizations play a vital role in protecting children’s health by preventing diseases and helping enhance well-being (Hill, 2023). At a federally qualified community health center in New Hampshire, vaccine rates continue to fall below optimal recommended rates. The
World Health Organization (WHO) recommends that pediatric vaccine practices are imperative as they have saved millions of lives each year globally (Hill, 2023). The CDC suggests that during and after the pandemic, rates of immunizations in children in low-income or rural communities were decreased compared to before the COVID-19 pandemic (Hill, 2023). This, among other factors may contribute to why immunization rates are low in this microsystem. To improve timely vaccination of pediatric patients by their second birthday, an intervention involved placing a simplified immunization schedule in every pediatric room. This visual guide aims to educate parents on recommended vaccines while encouraging adherence to the vaccination schedule.

Potential costs include poster design, printing, staff training, and ongoing updates based on the CDC recommendations. Benefits of this intervention may include improved immunization rates in the pediatric population at this community health center, enhanced parental education regarding vaccines and vaccine scheduled, and an overall prevention of diseases (O’Leary et al., 2024). It was imperative to understand factors influencing vaccine acceptance and hesitancy and recognize the connection between this hesitancy and the cost of medical care and vaccinations (O’Leary et al., 2024). This intervention could offer a cost-effective strategy to improve immunization rates in pediatric patients while reducing parental hesitancy to vaccinate. An estimated $27 billion annual is spent in the United States on adult vaccine preventable diseases (Kolobova et al., 2022). While there was the cost of materials to provide vaccinations and other resources, hospital admission and treatment for vaccine preventable diseases is a larger cost indicating that vaccination is cost-effective care.

**Interventions**

The proposed intervention included a pediatric immunization schedule poster in each
pediatric exam room. The objective of this intervention was to improve pediatric immunization rates by providing a visual guide for parents and caregivers. This poster included the recommended vaccination schedule at specific age appointments including 2-month, 4-month, 6-month, 9-months, 12-months, 15-months, 18 months, and 24-month appointments. The intervention introduced high-quality printed posters detailing the pediatric immunization schedule. The posters were laminated to protect them, and paper copies of the poster were available for parents who wish to save them to reference for future appointments.

The intervention was discussed with members of the interdisciplinary team including the quality improvement nurse, the pediatrician, registered nurses, and medical assistants. Other members of the team who were included are administrative staff who can help assist with poster distribution and printing while also keeping track of inventory of the printed posters.

**Study of the Interventions**

To evaluate the effectiveness of the pediatric immunization schedule poster initiative to improve pediatric immunization rates at this community health center, a pre and post survey was implemented to assess the impact of the intervention on both parental vaccine hesitancy. Key metrics that were studied during this include comparing vaccination rates before and after the intervention across different age groups including 2 months, 4 months, 6 months, 9 months, 12 months, 16 months, 18 months, and 24 months. The electronic health record was used to collect data about immunization rates.

Surveys were administered to providers and nursing staff to gather feedback from parents following the implementation of the intervention. Provider and nurse feedback was collected using a pre and post survey initiative to decide if discussing the immunization schedule and providing patients with the immunization schedule was impactful. Observation was helpful in
monitoring community engagement with the posters. Data collection methods consisted of the electronic health records and the survey results. Pre-intervention data collection occurred 1-3 months before the implementation of this intervention. During the intervention implementation the pediatric immunization schedule poster was posted in pediatric exam rooms at the community health center. Employees were reminded to mention this poster at each well-child checkup to ensure parents are aware. After the implementation of the intervention, the data was collected and analyzed.

**Measures**

Measures that were included in this quality improvement (QI) project include immunization rates using the electronic health record (EHR). The EHR provided a comprehensive and reliable source of immunization data across the community health center. The operational definition of this QI initiative was the percentage of children receiving recommended vaccinations at specified age appointments (2 months, 4 months, 6 months, 9 months, 12 months, 15 months, 18 months, and 24 months).

To measure parent’s awareness of the immunization schedule and their satisfaction with the provided information, providers and nurses discussed the immunization schedule with patients and provide them with a copy if requested. The operation definition of this measure was that providers and nurses engaged in discussions with parents about the immunization schedule intervention during their appointment. A QR code was placed on the immunization schedule to provide patients with access to the intervention at home. Ongoing assessment of the elements within this intervention contained continuous monitoring and evaluation of vaccination rates, provider feedback, and parental feedback. To measure efficiency, tracking the time and resources spent on implementing the intervention was prevalent to assess if the desired outcomes have
been achieved.

Analysis

The data collected from this QI project was analyzed to evaluate the impact of the pediatric immunization schedule poster. The analysis consisted of both quantitative and qualitative methods to provide an understanding of the effectiveness of the intervention. For the categorical data, immunization rates and survey responses were noted for frequency and percentage to summarize rates and survey responses and the outcomes from before and after the implementation. Survey responses were used for qualitative data and to analyze the frequency and nature of specific concerns addressed by parents. The survey data was collected and used to identify immunization rates as documented in the EHR.

Ethical Considerations

Implementing and studying the intervention involved ethical considerations. It was imperative to ensure the rights of patents and their well-being as well as confidentiality. All participants received a consent form that outlined the project’s purpose and benefits. All information in this intervention remained confidential and anonymous to ensure confidentiality. The proposal was reviewed by the UNH Department of Nursing Quality Review Committee to note that it was a quality improvement initiative that was exempt from full IRB review.

Results

Initial Steps

The pediatric immunization schedule (Appendix B) was placed in each pediatric exam room after a pre-survey of staff at the community health center was disbursed. Results in the pre-survey suggest that staff were very supportive of the implementation of the visual pediatric immunization schedule. This visual guide for parents and caregivers shows the recommended
vaccine schedule at specific age appointments and was implemented on June 2, 2024. The poster incorporated schedules for all appointments from 2 months-18 years old. The posters are high quality and laminated for durability and paper copies are available for parents and caregivers.

The implementation team included the project lead, the quality improvement nurses, pediatricians, registered nurses, and medical assistants. Feedback collection consisted of regular meetings to gather feedback from key stakeholders and observations of parental interaction with the poster during appointments. This section details the process from pre-survey distribution to post-intervention evaluation (Figure 1).

**Figure 1: Timeline of Pediatric Immunization Schedule Implementation**

<table>
<thead>
<tr>
<th>Date</th>
<th>Step</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2024</td>
<td>Pre-survey distribution for the staff at community health care center to gain initial feedback</td>
</tr>
<tr>
<td>May 2024</td>
<td>Analyze pre-survey results that showed staff perceptions and concerns about caregiver education related to current immunization rates.</td>
</tr>
<tr>
<td>June 2, 2024</td>
<td>Implementation of visual pediatric immunizations schedule.</td>
</tr>
<tr>
<td>June 3-22, 2024</td>
<td>Continuous monitoring of the effectiveness of the poster through provider and staff feedback.</td>
</tr>
<tr>
<td>June 24, 2024</td>
<td>Post-survey distribution for the staff at community health care center to gain insight into the progress of the implementation.</td>
</tr>
<tr>
<td>June 26, 2024</td>
<td>Compared post-intervention survey with pre-intervention survey results to guide further improvements.</td>
</tr>
</tbody>
</table>

**Process Measures and Outcomes**

In collecting the pre-intervention survey at the community health center regarding pediatric immunization rates, several process measures were implemented. A structured survey
was designed and distributed to clinical staff members and a reminder was sent to encourage participation. The pre-intervention survey revealed important insights into staff perceptions and concerns regarding pediatric immunization rates at the community health center. Among the respondents 69% rated the current pediatric immunization as good, 23% as fair, and 8% as poor. Additionally, staff identified several main reasons why parents and caregivers may be hesitant about vaccines or have missed vaccines. Concerns about safety and lack of awareness about the benefits of vaccines were cited by 77% of respondents, while mistrust of the healthcare system was 31%. Missed appointments were identified by 77% of respondents and lack of communication was answered by 15%. 92% of respondents were very supportive of implementing a pediatric immunization schedule in each pediatric exam room and 8% were somewhat supportive. The above results can be seen in Figure 2.

Figure 2

![Bar Chart]

The results of the post-intervention survey were compared with the pre-intervention
survey to determine the effectiveness of the implemented changes. Insights gained from the post
survey were used to guide and explore further improvements and adjustments to the pediatric
immunization practices and education at the community health center.

After executing a post-survey for staff at the community health center to complete
pertaining to the implementation, there were only seven responses compared to the initial pre-
intervention survey that yielded 14 responses. Of the staff at the community health center, 50%
expected pediatric immunization rates at the health center to increase slightly after the
implementation of the pediatric immunization schedule poster and 50% expected rates to stay the
same as they are. The results of this question can be seen in Figure 3.

**Figure 3**

When asked what the main reason caregivers are confident about vaccines, 67% of staff
say trust in healthcare professionals, 17% of staff said access to reliable information about
vaccines, and 17% said community support for vaccination. The results from this question are
indicated in Figure 4.

**Figure 4**
When asked how staff understanding of the factors influencing vaccine acceptance changed since the implementation, 17% said significantly improved, 50% said somewhat improved, 17% noted that their understanding stayed the same, and 17% said their understanding somewhat decreased. The results from this question are indicated in figure 5.

**Figure 5**

When asked about comfort level in addressing concerns about vaccines with caregivers and how it has changed since the implementation, 17% stated their comfort level has significantly increased while 50% stated that it has somewhat improved and 33% reported comfort level stayed the same. Figure 6 shows the results from the question regarding comfort level concerns.
Figure 6

When asked how often staff observes caregivers looking at the pediatric immunization schedule poster during appointments 17% said parents and caregivers look at them frequently, 17% rarely look at the poster, 17% never look at it, and 50% said parents and caregivers occasionally look at it. Figure 7 discusses the comfort levels in addressing concerns related to vaccines.

Figure 7
Key factors identified by staff included trust in healthcare professionals and access to reliable information for caregiver confidence. 92% of staff were supportive of the visual schedule and believe that this implementation has helped educate parents on the vaccine schedule.

**Contextual Elements**

In conducting the QI project on pediatric immunization rates, some contextual elements were considered to ensure a comprehensive understanding of pediatric immunization rates and current education practices. Contextual elements internally include staff engagement and commitment in the QI project. Staff attitudes toward pediatric immunizations and quality improvement initiatives were considered along with the level of support from management and leadership. Other contextual elements included the quality and accessibility of pediatric immunization schedule posters. Some challenges and barriers as discussed with the pediatrician include cultural beliefs against vaccination and past experiences both positive and negative with healthcare providers and the caregiver’s attitude toward vaccination.

**Associations**

When evaluating the implementation of the pediatric immunization schedule poster, it is important to observe the associations between the outcomes, the intervention, and the contextual elements. Some associations related to the implementation might include increased immunization rates among pediatric parents whose parents felt educated by the recommended immunization schedule. Observed associations include improved immunization rates among pediatric patients and increased parental awareness of vaccination schedules as evidenced by the interdisciplinary team observing parental interaction with the poster during appointments. Some negative associations may include lack of visibility or potential confusion among parents. While
INCREASING PEDIATRIC VACCINATION RATES THROUGH PARENTAL EDUCATION

Increasing pediatric rates at the community health center is essential, improving parent and caregiver education is the primary focus of this implementation as this education may help immunization adherence in the pediatric population increase. In addition to the parent and caregiver aspect, staff may feel more comfortable promoting and discussing the immunization schedule with the new poster provided in each pediatric examination room.

**Unintended Consequences**

The implementation of the pediatric immunization schedule had some unintended consequences both positive and negative. Some of the benefits that were not expected include a better collaboration among staff and community engagement with the posters. Staff also stated in the post-intervention survey that they felt more comfortable talking to parents about the vaccine schedule after the poster was implemented. A few problems that arose during the implementation include parents not being told about the schedule by staff or walking by the poster.

**Missing Data**

There were some gaps in the collection of data that impacted the intervention. Only 6 staff members completed the post-intervention survey whereas 14 completed the pre-intervention survey. This limits the robustness of the feedback. Other potential missing data included inconsistent recording of parent and caregiver interactions with the pediatric immunization schedules which can lead to difficulties assessing the impact of the poster. Additionally, the lack of long-term data may prevent the ability to assess the impact of the intervention due to limited follow-up data. By addressing these unintended consequences and gaps in data, the intervention may be refined in the future to improve the effectiveness and ensure parental education of the pediatric immunization schedule and appointments was more comprehensive.
Discussion

Summary

Key Findings

The intervention was designed to address and identify barriers to immunization and to improve parent and caregiver education. Staff surveys were conducted before and after the intervention to receive feedback from staff about the effectiveness of the implementation. The pre-intervention survey highlighted staff perceptions and concerns. Key reason for vaccine hesitancy according to staff at the community health center included safety concerns (77%), lack of awareness about vaccine benefits (77%), and mistrust of the healthcare system (31%). Staff supported (92%) the implementation of a pediatric immunizations schedule in exam rooms. Staff were supportive of the pediatric immunization schedule, believing it would help educate parents and improve vaccine adherence.

The post-intervention highlighted 40% of staff expecting a slight increase in immunization rates based on the implementation of the new schedule poster. 60% of staff who participated in the post-intervention survey anticipated no change to the rates. Some other findings include staff providing insights into the impact of the schedule posters and expecting a slight increase in immunization rates following the implementation.

Relevance to the Rationale

The Plan-Do-Study-Act (PDSA) model was essential to this quality improvement project. The plan phase included the identification of key barriers to pediatric immunization rates. These barriers included safety concerns, lack of education, lack of awareness, and mistrust of the healthcare system or providers. Placing pediatric immunization schedule posters in the exam room was the chosen information due to the informed information during the planning phase.
The *do* phase included implementing the intervention while the study phase involved the evaluation of effectiveness using pre-intervention and post-intervention surveys. The *act* phase was limited by the low response rate in the post-intervention survey but provided strong insight into future recommendations and adjustments. Overall, using the PDSA cycle ensured the continuity of evaluating and adapting ways to increase pediatric immunization rates effectively using parental education.

**Relevance to the Specific Aim**

The specific aim of this quality improvement project was to enhance pediatric immunization rates at a community health center through the implementation of a pediatric immunization poster schedule. The specific aim of this project was to increase childhood immunization rates for children aged 2 years and under within the community health center to 55% by July 15, 2024. The specific aim was relevant as it was addressed by the implementation of immunization schedule posters in each pediatric exam room. The posters (Appendix B) were designed to educate parents to adhere to vaccination schedules which in turn could lead to an increase in pediatric immunization rates within this microsystem. The pre-intervention survey showed barriers such as the concerns for safety and lack of awareness surrounding vaccines which the poster implementation aimed to mitigate hesitancy. The post-intervention survey feedback indicates the progress staff felt in the comfort of discussing vaccines while also showing the caregiver’s engagement with the pediatric immunization schedule poster. These findings support the specific aim of the project because it shows progress towards increasing immunization rates through parental education.

**Project Strengths**

The QI project had multiple strengths. The interdisciplinary collaboration and staff
support was helpful to the implementation of the project as 92% of pre-intervention survey answers supported the use of pediatric immunization schedule posters. This support may have led to the increased comfort among staff in discussing vaccines with parents and caregivers thus offering education about the vaccine schedule. In addition to this, the project showed collaboration among staff as well as engagement with the community which was observed in the post-intervention survey. This QI project and the implementation of the pediatric immunization schedules provided a visual and accessible option for parents to be educated about the recommended vaccine schedule at each visit which addresses the identified barriers of safety concerns, lack of awareness, and lack of education. The strengths from the QI project portray the potential of the posters to impact pediatric immunization rates positively while also influencing parent and caregiver education at this community health center.

**Interpretation**

**Impact of the Intervention**

Based on the available knowledge and data from the intervention, childhood immunization is universally acknowledged as a critical factor to public health and an effective way to prevent severe illnesses and complications (Hill, 2023). Despite the proven efficacy of vaccines, achieving optimal immunization rates remains a challenge and is largely associated with parental attitudes and inadequate education regarding the recommended vaccines (Hill, 2023). The findings from this project are consistent with literature and available knowledge as the interventions aimed at improving parental education and communication about vaccine adherence may be helpful in enhancing immunization rates (Kaufman et al., 2018). Additionally, addressing misinformation and increasing parental awareness of vaccine schedules and education may increase immunization rates leading to better public health outcomes. The post-intervention
survey indicates that the project has had a positive impact on the community, with the staff believing that this implementation will eventually contribute to increased immunization rates and parental education. Increasing immunization rates among children can potentially contribute to better public health outcomes in this community, helping to prevent the spread of vaccine-preventable illness (Tallbird et al., 2022). In addition to this, the project has strengthened the communication and collaboration between healthcare providers and staff as evidenced by the post-intervention survey.

**Comparison of Results to the Literature**

The anticipated outcomes of the intervention were an increase in childhood immunization rates and enhanced parental education on the importance of pediatric immunizations. Any differences between the observed and anticipated outcomes may be attributed to the contextual factors including the community health center’s baseline parental knowledge and attitudes related to vaccines. In addition to this, other factors including the effectiveness of current communication strategies and the accessibility of vaccines may have contributed to the differences between observed and anticipated outcomes. The post-intervention survey results indicate that the project has positively impacted the community, with staff reporting that communication and collaboration as improved. This aligns with the project’s goals and the literature which supports the effectiveness of educational interventions to increase the immunization adherence.

**Reasons for Differences Between Observed and Anticipated Outcomes**

Any differences between the observed and anticipated outcomes may be attributed to the contextual factors. Contextual factors may include the community health center’s baseline parental knowledge, attitudes related to vaccines, and baseline immunization rates. Other factors
that may contribute to this include the effectiveness of current communication methods and the availability of vaccines and appointments for pediatric patients. These factors could impact the success of the intervention and may explain the discrepancies between the expected and actual results.

Cost and Strategic Trade-Offs

The implementation of educational intervention requires resources which include time, staffing, and supplies. Some strategic tradeoffs may include the prioritization of educational efforts to improve immunization coverage. The opportunity costs of not addressing vaccine hesitancy and low immunization rates could potentially lead to overall higher healthcare costs and a potential for increased morbidity and mortality due to vaccine-preventable diseases. Balancing these costs and the benefits was imperative to plan strategically to ensure the most effective and sustainable outcomes for this community health center.

Limitations

Limits to Generalizability

The results of the intervention on enhancing pediatric immunization rates through parental education revealed several limitations. These limitations included sample size, generalizability, short term outcomes, and incomplete data. The sample size was limited to a single community health center which could impact the generalizability of the findings in comparison to broader populations and healthcare environments. Other limitations include the ability to assess parental education due to staff observation being the sole form of assessment. Due to the project being IRB exempt and quality improvement focused, parental education was observed by staff.
Factors Limiting Validity

The project’s timeline may have restricted the ability to observe the long-term effects of parental education on immunization rates at this community health center. Parental attitudes and opinions towards vaccines may require continued efforts. The increase in vaccine rates at this health center may not be maintained due to the short-term implementation period. In addition, relying heavily on staff observations could lead to incomplete or biased data which ultimately could affect the validity of the findings.

Efforts Made to Minimize and Adjust Limitations

While the project aimed to increase pediatric immunizations through educating parents, the identified limitations show the challenges to ensure generalizability, sustainability and comprehensiveness of the outcomes. To address these limitations in future projects, efforts could involve increasing the sample size, lengthening the duration of the implementation, and assess data collection methods. This could help ensure reliable educational interventions and broaden the project to improve the generalizability and sustainability of outcomes.

Conclusion

Usefulness of the work

The findings from this QI project are useful in demonstrating that focused parental education can influence caregiver attitudes towards vaccinations in the pediatric population. By addressing concerns and providing clear and accessibly information, there is potential that immunization rates could be increased at this community health center and child health and well-being can be promoted in this community.

Sustainability

The sustainability of the intervention was promising given the positive feedback from
staff and caregivers. However, ongoing efforts are imperative to maintain and build upon the improvements noted. This included continuous staff training, regular updates to educational materials based on CDC requirements, and more frequent assessment of parental attitudes regarding immunization rates. The continuous and ongoing improvement methods can help ensure that immunization rates improve while also ensuring educational interventions continue to be effective and relevant.

**Potential for Spread to Other Contexts**

The strategies and interventions implemented in this quality improvement project have the potential to be adapted by other community health centers and other healthcare environments. Customizing the educational materials to address specific microsystem concerns could be beneficial. Based on the community-specific resources and local concerns, other health centers could benefit from increased pediatric immunization rates based on the improvement of parental education.

**Implications for Practice and for Further Study in the Field**

This project highlights the importance of parental education in improving pediatric vaccine rates at this community health center. Healthcare providers and healthcare staff should continue learning ways to communicate and provide educational materials to address vaccine hesitancy in parents and caregivers. Further studies could explore the long-term implementation and impacts of educational efforts as well as show the effectiveness of the use of various educational materials ranging from digital to physical copies.

**Suggested Next Steps**

To build on the success of this quality improvement project, some next steps include expanding the sample size, lengthening the duration of the project, diversifying the methods used
to collect data, update educational materials regularly, and engage with leaders in the community. Similar interventions across multiple community health centers could enhance the generalizability of the findings. Extending the timeline of the intervention to observe and measure the long-term impacts of this project could impact immunization rates. By taking these suggested next steps, the community health center can continue to improve immunization rates through enhanced parental education thus contributing to overall better public health outcomes.
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Appendix A

[Image of a pyramid illustrating levels of evidence from background information to systematic reviews.]

Appendix B

[Image of the Pediatric Immunization Schedule for ages 2 months to 18 years old.]