4-2021

Enhancing Medication Adherence Behaviors Among Ambulatory Pediatric Hematology & Oncology Patients: A Quality Improvement Project

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Abstract

Introduction Researchers have found that pediatric patients with acute lymphoblastic leukemia and adolescent patients with sickle cell disease struggle to adhere to medication treatment requirements. Because of this trend, there is a clear need to address medication adherence. The purpose of this quality improvement project was to enhance medication adherence behaviors among pediatric hematology and oncology patients and their families within an ambulatory hematology and oncology clinic.

Methods The project included a systematic literature review to identify evidence-based interventions, an organizational assessment, and a three-phase multifaceted quality improvement process. To increase patients bringing medications to appointments, 32 medication transportation bags were distributed. Objective adherence measurements were analyzed via pre and post implementation analysis of mean corpuscular volume and absolute neutrophil counts. Descriptive statistics were used to analyze subjective pre and post implementation survey trends in patient medication behaviors and staff perceptions of interventions.

Results Ultimately, the changes to subjective and objective adherence measurements were not statistically significant. Although findings were statistically insignificant, the patient population served by this clinic reported high levels of satisfaction in receiving medication adherence interventions (e.g., medication transportation bags).

Discussion High rates of staff turnover, lack of commitment to the intended interventions, the COVID 19 pandemic, and electronic health record fluctuations greatly influenced the successful integration and adoption of project expectations. Practice knowledge gained emphasized the importance of continuous quality improvement to enhance medication adherence behaviors

clinical project work, dissemination of project results and findings, and adaptability in the face of real-time clinical barriers.

Keywords

pediatric, oncology, hematology, medication adherence, adherence behaviors

Background

Treatment guidelines for pediatric patients with acute lymphoblastic leukemia, the most common pediatric malignancy, dictate daily administration of 6-mercapturine for two years (Cooper & Brown, 2015). However, for these patients, adherence rates < 90% have been found to have a 3.9-fold increased risk for relapse (Bhatia et al., 2014). Furthermore, adolescent sickle cell disease patients have been found to have adherence rates as high as 40% (Pernell et al., 2017). Due to the potential consequences of medication errors and nonadherence, there is a clear necessity to address this component of care delivery.

Furthermore, an ambulatory hematology and oncology clinic identified that their current practice did not support bagging practices, (i.e., the practice of patients and families bringing prescribed medications to all outpatient appointments). This was identified as a key area of improvement in the clinic's 2019 Children's Oncology Group audit. The Children's Oncology Group is the world's largest childhood cancer research and development organization (Children's Oncology Group, n.d.). This governing body completes annual performance assessments on collaborating organizations. Based on evidentiary support and the recommended area of improvement, this quality improvement project addressed the integration of bagging practices to enhance medication adherence behaviors among pediatric hematology and oncology patients. Bagging practice interventions are echoed in the Agency for Healthcare Research and Quality (2018) recommendation that patients bring all home medications to every outpatient appointment to assess compliance and help prevent medical errors.

The purpose of the quality improvement project was to enhance medication adherence behaviors among pediatric hematology and oncology patients and their families within an ambulatory hematology and oncology clinic. The objectives of the medication adherence quality

improvement project were to decrease self-reported missed doses of prescribed medications, increase patient and family enrollment in the patient portal within the current electronic health record, reduce notable complete blood count values associated with non-adherence, increase parental and patient reported understanding of prescribed home medications, and increase patient encounters in which patients and their families bring prescribed medications to appointments.

Literature Review

A literature review was completed through the PUBMED and CINHAL databases and followed the framework process of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis ([PRISMA], Moher et al., 2009). See Appendix A. Literature evidence to support enhanced adherence behaviors among pediatric hematology and oncology patients included the need for interventions that are multimodal, support reminder usage, a multidisciplinary approach, and use of objective and subjective adherence assessments (Badawy et al., 2017; Bhatia et al., 2014; Heneghan et al., 2020; Hullman et al., 2015; Landier et al., 2017; McGrady et al., 2015; Rohan et al., 2016; & Wu et al., 2018). The findings influenced project plan intervention selection.

Due to the clinic's pursuit of increasing bagging practices, the use of this strategy in ambulatory clinical settings was also analyzed. Bagging practices are used to facilitate medication reviews, improve provider-patient communication related to medications, and increase patient reported self-efficacy and medication management (Weiss et al., 2016). For example, an analysis of pre-post medication review practices identified an 84% increase in the number of prescriptions reviewed and a doubled frequency of necessity to alter prescription regimens based on the completed medication reviews (Weiss et al., 2016). Therefore, evidentiary support illustrated that inclusion of bagging practices into the project plan was warranted.

Methods

The quality improvement project followed a three-phase plan. Phase one, pre-implementation, consisted of disbursement of patient/family surveys and staff education. For all patients and their families meeting inclusion criteria, phase two, implementation, included patients and their families receiving interventions including medication education, reminders, and being provided a medication transportation bag. Finally, phase three was dedicated to disbursement of patient/family surveys, post-implementation staff surveys, and data collection and analysis.

Participant recruitment was attained through convenience sampling of pediatric hematology and oncology patients and their families within the project site. Participants were included if they were agreeable to completing anonymously collected surveys, and/or if they were supplied a medication transportation bag. Potential interventions included education, reminders, and/or being provided a transportation bag for medications. Therefore, there were no anticipated risks assumed by project participants. Eligible criteria to receive a medication transportation bag included having either a diagnosis of acute lymphoblastic leukemia and being prescribed daily oral mercaptopurine or having sickle cell disease and being prescribed daily oral hydroxyurea. Patients who met the criteria were retrospectively identified through audits of the electronic health record. The notes for these patients were analyzed for documentation of interventions and for analysis of complete blood cell count trends.

Objective lab value changes related to non-adherence were analyzed through evaluation of complete blood cell count trends. Complete blood cell counts include a mean corpuscular volume (MCV) and an absolute neutrophil count (ANC). Notable reductions in MCV values can indicate non-adherence to prescribed medications. On the other hand, increased levels of ANC

might indicate a lack of suppression of neutrophil development, which may indicate non-adherence. For example, Creary et al., (2014) identified a significant median increase to MCV values after implementation of an electronic adherence intervention, among sickle cell disease patients. The MCV and ANC values, for eligible patients, were evaluated pre and post to determine if there were any significant changes to the reported values.

Due to the project's quality improvement methodology, exclusion of collection of protected health information and patient identifiers, and lack of patient assumed risks, the project did not require informed consent for participation. Funding included the attainment of the Grand Valley State University Presidential Research Grant in the amount of $1,479.13. Institutional Review board determination was completed in October of 2020 and confirmed the project as quality improvement, not research.

Survey Collection

Patient and family surveys were developed to evaluate current medication adherence behaviors among this clinical population. These questions reflected current gaps in knowledge about patient practices. Therefore, the questions reflected clinical inquiry, rather than inclusion of a validated adherence assessment tool. See Appendix B. During phases one and three, the patient/family surveys were available at the front desk via an interactive tablet kiosk style SurveyMonkey link. Upon check in, all patients and families were prompted to answer the by the front desk support staff member. The staff surveys were developed based on clinical inquiry, and the chosen questions represented a pursuit of understanding for current clinical perceptions of medication adherence behaviors, clinical capacity for change, and perceptions of current patient adherence behaviors. See Appendix C and Appendix D, for pre and post staff surveys,

respectively. During phases one and three, all clinic staff were emailed an anonymous SurveyMonkey link to the pre and post-implementation survey.

Conceptual Model

The interventions and project methods were chosen based on the conceptual model, Pender's Health Promotion Model (HPM). In this clinical setting, the HPM is useful because adherence, as illustrated through the literature review findings, is complex and multidimensional. Pender's Health Promotion Model is described as a middle-range theory that is used to describe and categorize the multidimensional components of a patient's internal and external health influences (Pender, 2011). These influential components can then be integrated into included constructs of expected behaviors and cognitions. Viewing patients and their experiences through the HPM lens enhances providers' abilities to influence positive health promotion changes. Although not all constructs within the HPM were explored, the following will detail intervention alignment with model constructs.

Prior behaviors of not bringing medications to appointments were planned to be influenced through reminders and being provided a medication transportation bag. During appointments, the patient clinical care coordinator was educated to address prior behaviors through facilitation of verbalized teach back and confirmation of dosing with parents or patients depending on their ages. Review of benefits of adherence was addressed during this discussion and when new medications were prescribed. Overall, these interventions and increased accountability through clinical interprofessional collaboration were projected to increase the commitment and the health promoting behavior (i.e., medication adherence behaviors). The literature findings and targeted components of the conceptual model led to development of three

tiers of interventions: facilitators, adherence assessments, and a multidisciplinary approach. See Appendix E for fishbone diagram of chosen interventions.

Data Collection & Management

During phase three, the electronic health record notes for patients with clinic appointments were reviewed. The data was identified through electronic health record visit reports per types of diagnoses (i.e., acute lymphoblastic leukemia or sickle cell disease). The review identified patients who qualified for the medication transportation bags. Electronic health record documentation was then retrospectively analyzed for pre-implementation data. Pre and post data were collected simultaneously. The pre and post implementation data extracted from electronic health record was intended to include documentation of adherence to bagging practices as ALL, SOME, or NONE, completed patient or family teach back of home medication administration as ALL, SOME, or NONE, and levels reported via routine complete blood cell counts. The data was collected simultaneously to promote use of a paired T test or a Wilcoxon Signed Ranks Test, adherence to HIPAA, and negation of collection of patient identifiers.

Additionally, throughout all phases of the project, the clinic electronic patient portal enrollment numbers were monitored. The collected values were reported in monthly percentages of enrollment for all patients with clinic appointments. Patient portal enrollment was considered a medication adherence behavior, due to the patient and family ability to review medications, request refills, and send prescription questions to care provider team members from this internet-based health care platform. Due to the lack of pre data for comparison, patient portal enrollment trends were not analyzed for statistical significance.

The de-identified data was collected in an excel file on an encrypted flash drive and analyzed in SPSS version 20. The file was password protected and did not contain any

identifiers. Upon completion of the project, the project site was provided the flash drive and password to the clinic data managers for storage. There is no indicated future use of collected data.

Results

Qualifying Encounters

Retrospective chart review revealed a total of 72 qualifying encounters of patients who met inclusion criteria to receive a medication transportation bag. Of these 72 encounters, 13 patients had documentation of medication transportation bag receipt. Therefore, the resulting sample size for data collection and analysis was 13 patients. The post implementation documentation did not reflect intended documentation input as ALL, SOME, or NONE for either adherence to bagging practices or family teach back of home medication administration. Therefore, the analysis of these patient outcomes was unable to be evaluated.

For the remaining the 13 qualifying encounters, medication adherence measures were analyzed through SPSS, version 20, non-parametric Wilcoxon Signed Ranks Test. Wilcoxon signed-ranks tests showed that the inclusion of medication adherence interventions into clinical practice did not elicit a statistically significant change in the lab values including the MCV ($Z = 11$, $p = 0.1484$) or for the ANC ($Z = 8.5$, $p = 0.2656$). Therefore, there was no statistical significance in pre and post patient objective adherence measurement changes. Although these analyses illustrated no significant change, unexpected barriers were identified throughout the project progression. Consequently, reported insignificance might be more reflective of inadequate adoption of interventions, by clinic staff, rather than, inadequate influence of interventions on medication adherence behaviors.

Patient & Family Surveys

During phase one of the project, the pre-implementation surveys were completed at appointment check in. A total of 52 pre-implementation surveys were completed. During phase three of the project, the post-implementation surveys were again completed at appointment check in. A total of 42 post-implementation surveys were completed. See Appendix G for pre and post patient survey results. Patient diagnostic characteristics of respondents were 52.82% had a cancer diagnosis, 23.96% had a blood disorder diagnosis, and 23.22% had neither type of diagnosis. Pre and post -implementation surveys yielded key findings including a decline in reported medication adherence, as evident by an increase in response choice of missing 4 or more doses within the last two weeks from 1.92% to 4.76% of patients choosing this response choice, in the post implementation survey. A Fisher's Exact test was utilized to analyze the change for statistical significance. The analysis yielded a p value = 0.8299, therefore, this change was statistically insignificant. However, the post implementation patient and family surveys illustrated a 3.65% increase in understanding of prescribed medications. A Fisher's Exact test was utilized to analyze the increase for statistical significance. The analysis yielded a p value = 0.1160, therefore, the change was statistically insignificant.

Staff Surveys

The clinic staff were surveyed via an emailed SurveyMonkey link. All staff were provided the link and were able to anonymously provide feedback on current patient trends and perceived need for increased bagging practices. Clinic staff respondents included nurses, physicians, and clinical support staff.

There was a total of 13 targeted staff members. The types of targeted staff included nurses, front desk support staff, physicians, and clinical supervisors. The staff survey was available to the entire staff, including the aforementioned staff, data managers, and ancillary

support members. The pre-implementation staff surveys yielded 19 completed surveys. Therefore, the completed number of surveys exceeded expectations for staff representation. Key findings of the pre-implementation survey included 73.68% of clinic staff reported they agree or strongly agree with multilevel collaboration on quality improvement initiatives, 88.89% of clinic staff report patients do not bring medications to their appointments, and top reported reasons for valuing medication adherence of increasing cure rates, decreased risks of relapse, and improved safety from adverse events/improved disease control. These findings supported quality improvement endeavors as results revealed staff consensus on importance of medication adherence behaviors, necessity to collaborate on quality improvement, and lack of clinical bagging practices expectations.

The post-implementation staff surveys yielded a total of 2 responses. This survey was intended to evaluate effectiveness of intervention implementation training, ease of implementation of interventions into current workflow, perceived changes to patient and family bagging practices, perceived ability to influence medication adherence behaviors, and perceived value in future adherence interventions. Mitigation for lack of engagement in post-implementation surveys included three on-site reminders by the project leader, emailed requests to assist with reminders during daily huddles via the clinical supervisor, and an on-site attempt to facilitate completion of surveys. Staff reported lack of engagement due to being “too busy” or “keep forgetting.” Due to insufficient post-implementation survey completion, the sample size was inadequate to represent staff perception saturation, and therefore, pre and post analysis was not completed on staff surveys.

Clinic Patient Portal Enrollment

Pre and post comparison yielded a 13.24% increase in patient portal enrollment. See Appendix F for monthly patient portal enrollment percentages. The increased usage of patient portal might be useful in future quality improvement endeavors. Patient portal may increase interaction of patients or family with medication information or prescription instructions. Therefore, inclusion of patient portal enrollment, and presumable interaction within the platform, was useful to monitor.

Barriers to Successful Implementation

Staff Turnover

During the implementation of this quality improvement project, the project site experienced high rates of staff turnover. In this setting turn over included, three out of four of the patient clinical care coordinators, the only clinical supervisor, the only infusion nurse, and one out of four of the physician positions were vacated. Turnover in clinical practice has been found to negatively impact quality improvement in multiple ways. Negative impacts include limited time available of remaining staff to engage in quality improvement, increased tense workplace dynamics, and decreased sustainability of quality improvement education and workflow changes (Baron et al., 2020). Therefore, the high rate of turnover was a key barrier to successful implementation and documentation of intended interventions.

Interventions to minimize negative impacts of staff turnover, included individual education of all new staff members, biweekly chart analysis and feedback of findings, and cognitive aid sign out sheets. Although many interventions were trialed, these failed to be successful at retention of education, documentation expectations, and eligibility criteria of medication transportation bag recipients.

Lack of Workflow Adoption

As previously described, the percent of documented qualifying encounters of medication transportation bags distributed was low (i.e., 18%). Another example of lack of documentation standard adoption was the lack of streamlined documentation of post distribution encounters. These encounters were not documented with the intended ALL, SOME, or NONE for either medications brought to appointments or medication teach backs being achieved. Zero post distribution encounters were documented in this way.

During implementation, chart audits were completed biweekly, the results were provided to the frontline staff (i.e., patient clinical care coordinators and clinical supervisor), re-education was completed, and signs were posted in the staff work rooms with documentation standards. However, ultimately lack of documentation significantly impacted the ability to collect and analyze patient data for statistical improvements and was a key barrier for the demonstration of project success.

Implementation of a New Electronic Health Record

The original timeline for the project took into consideration the clinic's intent to implement a chemotherapy prescribing electronic health record in January of 2021, by planning to cease implementation during the first week of January 2021. However, due to such few documented encounters, it was decided to extend the implementation phase through mid-February 2021. This proved to be unsuccessful at gaining a robust number of new documented encounters (i.e., during the extension period, only one additional documented encounter was recorded).

Implementation of a chemotherapy electronic health record absorbs extensive clinical resources (Chung et al., 2018). This was evident for the project site. Retrospectively, the implementation of two documentation changes (i.e., project documentation and new electronic

health record documentation) during the same timeframe increased strain on frontline staff. Many staff members reported that once the new electronic health record was implemented, staff had limited time and attention to allot to the project activities and documentation expectations. This is consistent with findings by Chung et al. (2018), which illustrated that prior to implementation of such an electronic health record, the standardization of documentation and workflow expectations should be achieved.

Covid-19 Pandemic

The quality improvement project was initiated in February of 2020, at the beginning of the Covid-19 pandemic. The organizational assessment and literature review findings led to the development of project interventions; however, it is realistic to assume that resources and staff dedication to interventions were increasingly strained due to the impact of Covid-19. Among varying clinical providers, 76.7% have responded that they agree or strongly agree that the Covid-19 pandemic has led to increased levels of stress (Huffman et al., 2021). For example, in the project setting, the front desk support staff reported the biggest barrier to survey facilitation as forgetfulness. Due to Covid-19, this staff member was also required to integrate Covid-19 symptom and travel screening into all appointment check ins. Therefore, the staff member would continuously and appropriately prioritize the Covid-19 screenings at appointment check in. The barriers of completing project interventions, by the front desk staff member, illustrates role strain as a result of competing immediate demands.

Project limitations

Lack of Investigator Triangulation

One notable limitation of this project was lack of investigator triangulation. The project leader was also the staff educator, data collector, and data analyzer. Therefore, there were no

additional project team members involved in triangulation of data or reporting. Investigator triangulation may have the potential to mitigate arising project challenges (Archibald, 2016). Hence, inclusion of investigator triangulation into future quality improvement projects may enhance data outcomes and overall project success.

Sample Size

The project site is considered a small regional clinic. For the fiscal year of 2019, the clinic serviced 764 patients. This total is reflective of the diverse clinical population, which services both pediatric oncology and hematology diseases and disorders. Of these patients, 26 were pediatric leukemia patients who required daily dosing of mercaptopurine, and 25 were sickle cell disease patients who required daily hydroxyurea. Therefore, the maximum anticipated sample size of medication bag recipients was about 50. However, the barriers to implementation and documentation resulted in a small sample size of 13 encounters with documentation. Furthermore, the inconsistency with intended documentation impeded statistical analysis of components of data from these documented encounters. According to medication transportation bag counts, a total of 32 bags were distributed during the implementation. Thus, the small sample size may not reflect data saturation for all medication bag recipients.

Discussion

Quality improvement efforts to increase medication adherence are influenced by many clinical factors. These factors have been described as the influence of coordination of all activities and fluctuations in team, stakeholder, or organizational needs (Moran et al., 2020). As evidence by the completed organizational assessment, the quality improvement project began with strong stakeholder engagement, frontline staff buy-in, and consensus on intervention acceptance into workflow. However, the barriers to implementation were unforeseeable and

ultimately impeded successful integration of interventions into workflow. Staff turnover greatly impacted project success and due to the vacancy of the clinical supervisor role, during implementation, this was further strained. Originally, this team member was to be responsible for continuing reminders of intervention adoption and relaying the project leader's chart audit findings. Without this staff member, after receiving education, staff members seemingly had no accountability for completing expected workflow adjustments, other than when the project leader was on site. This aligns with the reported negative impacts that lack of commitment to project interventions can have on ultimate project adoption and success (Moran et al., 2020). Upon reflection of negative impacts of barriers on multiple measurable outcomes, the consideration of outcome deficiencies as a result of inadequate adoption of interventions, by clinic staff, should be emphasized. Literature review findings stressed the importance of multimodal interventions and assessments. Therefore, due to the unforeseen barriers, the quality improvement analysis was unable to identify if, in fact, the outcomes were due to staff barriers or inadequate influence of interventions on medication adherence behaviors.

Although barriers greatly impacted measurable outcomes of the project, patient expectations and quality of care were reportedly enhanced. Reportedly, patient clinical care coordinators (i.e., the staff members responsible for bag distribution and documentation) verbalized patient and family acceptance and satisfaction of receiving medication transportation bags. One reported example came from an older adolescent who was prescribed opioids and spoke highly of receiving a medication transportation bag with a lock. He told the staff member, "I'm so glad this has a lock. I can keep all of my medications locked together now." Patient encounters such as these suggest the likelihood of increased patient satisfaction through

providing medication transportation bags to patients and their families. Although, increased patient and family satisfaction was observed, these findings were anecdotal.

Overall, the project plan represented the Actualized DNP Model (Burson et al., 2016). This model represents a generation of practice-based knowledge through application of three phases: utilization of advanced nursing knowledge, applying evidence-based findings to clinical settings, and using these pieces to enhance system, patient, or population outcomes (Moran et al., 2020). The project leader was able to integrate the Doctor of Nursing Practice skills and competencies into a succinct project plan, based on evidence-based knowledge related to medication adherence, and used this model to guide integrating evidence into practice.

Implications for Practice

Within this clinical setting, the project has key implications for practice, especially to incorporate lessons learned for potential future quality improvement cycle. First, the staff turnover and lack of engagement with post-implementation surveys and documentation expectations requires a newly completed organizational assessment. At pre-implementation, staff members were invested in the project interventions. Unfortunately, the turnover of staff led to a lack of investment in planned interventions. This was evident by failed participation in the post-surveys, after multiple attempts to engage team members in person and through reminders from their clinical supervisor. Therefore, analyzing and creating a new commitment to interventions is essential for workflow adoption and intervention success. Secondly, the patient experience can be enhanced through continued utilization of medication transportation bags. As previously described, bagging practices can increase adherence behaviors and facilitate perceptual conversation on medication benefits. Given the varying objective and subjective reported adherence among this patient population, these medication adherence interventions should

continue to be pursued. The need for these interventions is further justified by reported decrease in medication adherence, per patient and family surveys. Ultimately, it is recommended that, in future trials of integration of medication adherence interventions, the interventions are introduced into workflow in a tiered approach. This tiered approach would start with successfully implementing one piece at a time into workflow expectations, prior to adding additional interventions. Furthermore, the anecdotal finding of increased patient and family satisfaction with the medication transportation bags, identifies a missed opportunity to include such assessment in survey plans. In future implementations of adherence promoting interventions, it is then recommended, to include patient and family satisfaction with interventions as a key survey component.

Conclusion

Medication adherence behaviors among pediatric hematology and oncology patients is essential for treatment success, but adherence rates are variable. This variability in adherence requires a multifactorial approach to intervention implementation. A quality improvement project was implemented to address varying components of the complex nature of adherence. Although practice barriers impeded measurement outcomes, patient reported satisfaction with receiving interventions and the decline in reported patient adherence stresses the need to continue seeking practice enhancements to medication adherence behaviors within this population. Upon reflection, although statistical significance was not achieved the knowledge gained through creation, implementation, and analysis of the project, was important for future quality improvement endeavors. Practice knowledge gained included adaptability to real-time clinical barriers, the value of continued stakeholder buy-in throughout all phases, and the importance of dissemination of the project findings.

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Rohan, J. M., Fukuda, T., Alderfer, M. A., Wetherington Donewar, C., Ewing, L., Katz, E. R., Muriel A., Vinks, A., & Drotar, D. (2016). Measuring medication adherence in pediatric cancer: An approach to validation. *Journal of Pediatric Psychology, 42*(2), 232-244. https://doi.org/10.1093/jpepsy/jsw039

Weiss, B., Brega, A., LeBlanc, W., Mabachi, N., Barnard, J., Albright, K., Cifuentes, M., Brach, C., & West, D. (2016). Improving the effectiveness of medication review: Guidance from the health literacy universal precautions toolkit. *Journal of the American Board of Family Medicine. 29*(1), 18-23. https://doi.org/10.3122/jabfm.2016.01.150163

Wu, Y. P., Linder, L. A., Kanokvimankul, P., Fowler, B., Parsons, B. G., Macpherson, C. F., & Johnson, R. H. (2018). Use of a smartphone application for prompting oral medication adherence among adolescents and young adults with cancer. *Oncology Nursing Forum, 45*(1), 69–76. https://doi.org/10.1188/18.ONF.69-76

World Health Organization. (2003). *Setting the Scene: Defining adherence.* World https://www.who.int/chp/knowledge/publications/adherence_Section1.pdf?ua=1

Wu, Y. P., Linder, L. A., Kanokvimankul, P., Fowler, B., Parsons, B. G., Macpherson, C. F., & Johnson, R. H. (2018). Use of a smartphone application for prompting oral medication adherence among adolescents and young adults with cancer. *Oncology Nursing Forum*, *45*(1), 69–76. https://doi.org/10.1188/18.ONF.69-76

Zerillo, J., & Walsh, K. (2017). Home medication safety and adherence. In C. Dandoy, J. Hilden, A. Billet, & B. Mueller (Eds), *Patient Safety and Quality in Pediatric Hematology/Oncology and Stem Cell Transplantation* (pp. 239-252). Springer, CHAM. https://link.springer.com/book/10.1007%2F978-3-319-53790-0

Appendix A

Flow Diagram of PRISMA Search Selection

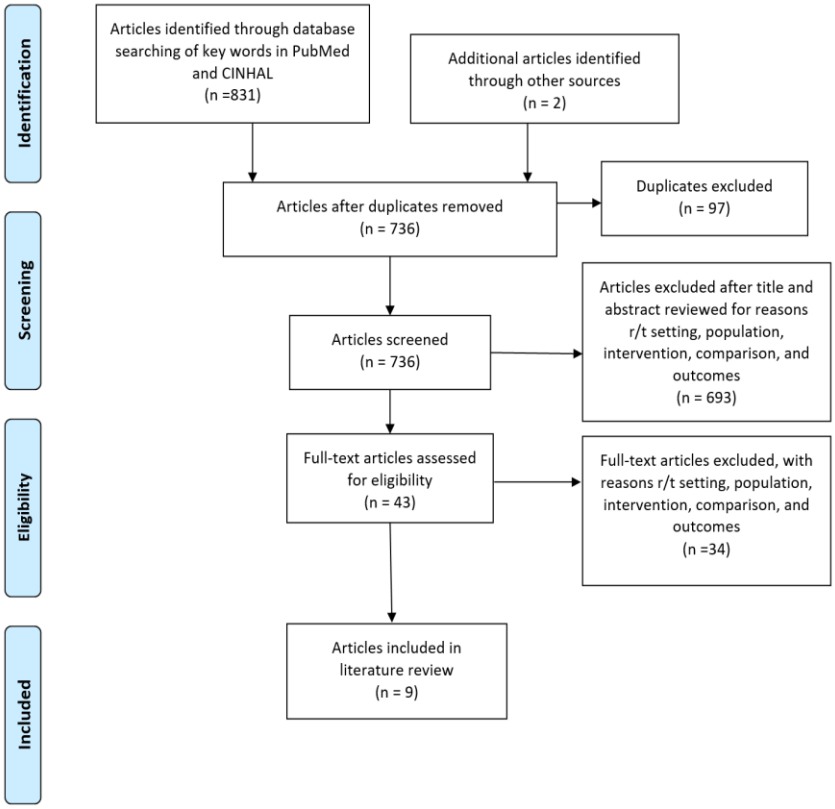


Figure 1. Flow diagram of search selection process. Adapted from "Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement," by D. Moher, A. Liberati, J. Tetzlaff, D. Altman, and PRISMA Group. Copyright 2009 by PLoS Medicine.

Appendix B

Pre and post-implementation patient and family surveys

Question Title

1. The child who has an appointment today has which type of diagnosis

Cancer diagnosis (for example Leukemia, Lymphoma, and Rhabdomyosarcoma)
Blood disorder (for example Sickle Cell, Thalassemia, and Fanconi Anemia)
Neither

Question Title

2. In the last two weeks how many times has the child missed a dose of a prescribed medications?

0
1-3
4 or more

Question Title

3. If you answered more than zero to the last question, which of the following best explains why a dosed was missed

forgot
cost of medications
to avoid side effects
child's behaviors
not applicable based on previous question
Other (please specify)

Question Title

4. I can describe the reason for my/my child's prescribed medications

All
Some
None

Question Title

5. Were all prescribed medications brought to the appointment today?

Yes
No

Figure 2. Pre and post implementation patient/family surveys

Appendix C

Pre-implementation Staff Survey

Pre-implementation Staff Survey

Question Title
1. What is your job role?
Nurse
Physician
Clinic Support Staff
Other

Question Title
2. How important is increasing medication adherence among your patient populations?
A great deal
A lot
A moderate amount
A little
None at all

Question Title
3. Among your patients, what are your top three reasons for increasing medication adherence?
Reason 1:
Reason 2:
Reason 3:

Question Title
4. What have been the obstacles, if any, you've encountered when trying to attain your patient medication adherence goals? (Select all that apply.)
Cost of medications
Lack of patient/family understanding of prescribed medications
Lack of time with patients
Patient/family distrust in prescribed medications or length of therapy
Lack of dedicated medication educator
Patient population age
I have not encountered any obstacles
Other (please specify)

Question Title
5. I am able to positively influence medication adherence behaviors among my patients.
Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

Question Title
6. Patients bring their medications to every visit.
Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

Question Title
7. We engage all levels of clinic staff to collaborate on quality improvement initiatives.
Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

Question Title
8. Our patients/families are influential in identifying quality improvement goals.
Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

Question Title
9. Our current workflow process encourages and supports patients and families in gaining knowledge, skills, and resources to engage in their care plans, in a meaningful way.
Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

Figure 3. Pre implementation staff survey

Appendix D

Post-implementation Staff Survey

Staff Post-implementation Survey

Question Title

1. The training provided adequately prepared me for the implementation of the adherence promoting interventions

Reminding patients about MyChart benefits
Yes, Somewhat, No, N/A to my role
Enrolling patients in MyChart
Yes, Somewhat, No, N/A to my role
Distribution & instructions of medication transportation bags
Yes, Somewhat, No, N/A to my role
Facilitation of medication administration teach backs
Yes, Somewhat, No, N/A to my role
Reminding patients to bring medications to all appointments
Yes, Somewhat, No, N/A to my role

Question Title

2. After integrating the adherence promoting interventions, patients now bring their medications to clinic appointments

Always
Usually
Sometimes
Rarely
Never

Question Title

3. The adherence promoting interventions were difficult to accomplish because of my current workflow

Reminding patients about MyChart benefits
Yes, Somewhat, No, N/A to my role
Enrolling patients in MyChart
Yes, Somewhat, No, N/A to my role
Distribution & instructions of medication transportation bags
Yes, Somewhat, No, N/A to my role
Facilitation of medication administration teach backs
Yes, Somewhat, No, N/A to my role
Reminding patients to bring medications to all appointments
Yes, Somewhat, No, N/A to my role

Question Title

4. I am able to positively influence medication adherence behaviors among my patients.

Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree

Question Title

5. The clinic should continue implementing adherence promoting interventions

Yes
No
No opinion

Figure 4. Post implementation staff survey

Appendix E

Fishbone Diagram of Chosen Interventions

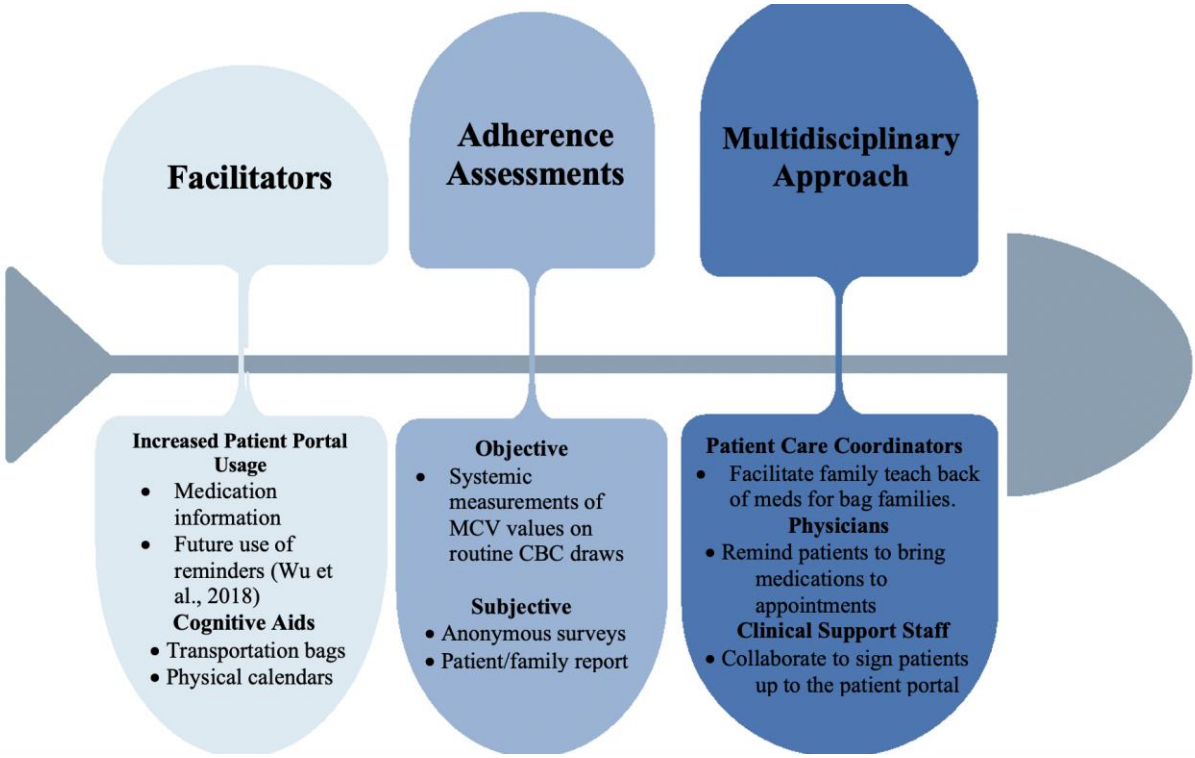


Figure 5. Fishbone Diagram of Interventions

Appendix F

Clinical Patient Portal Enrollment Trends

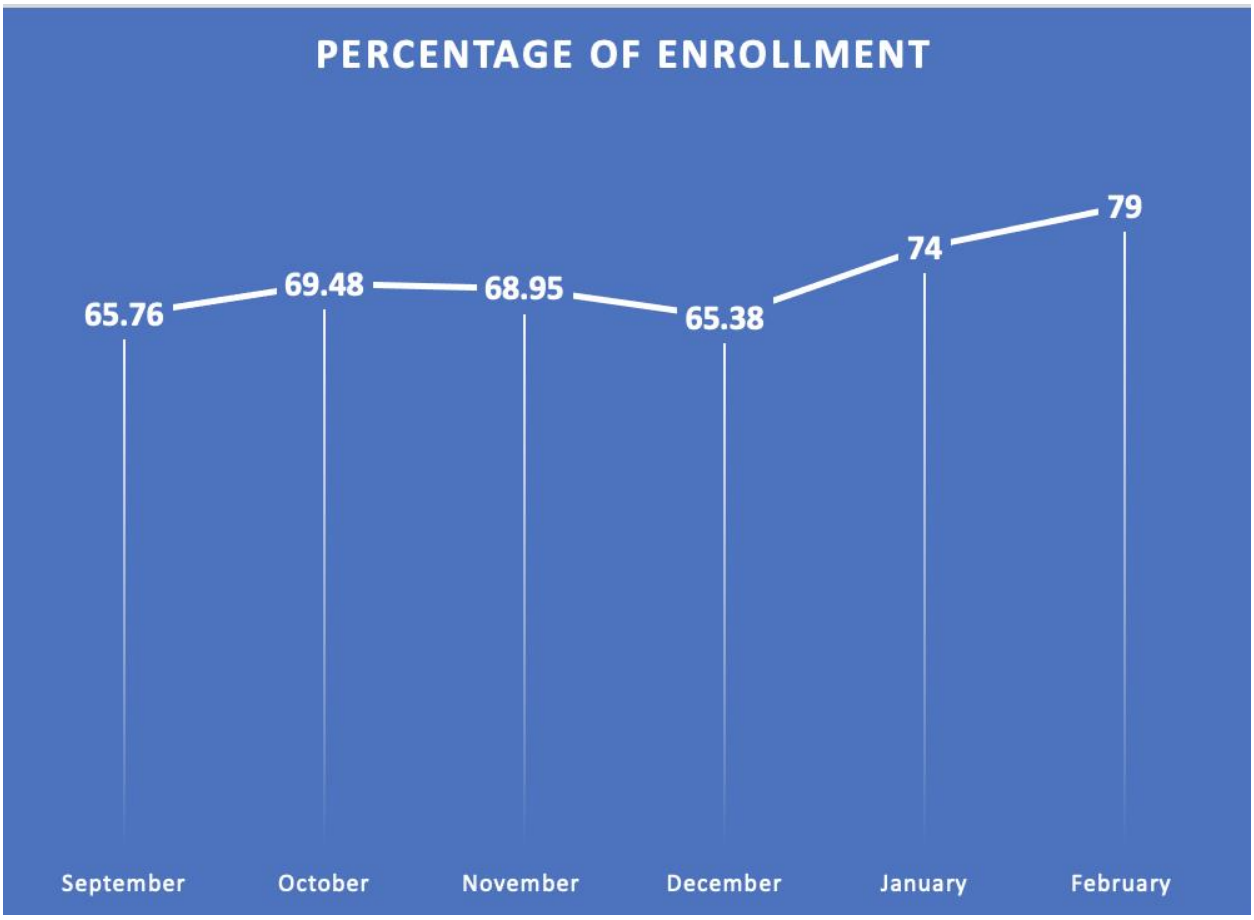


Figure 6. Patient portal percentage of enrollment, per month 2020-2021

Appendix G

Pre and Post Implementation Patient and Family Survey Results

Patient Medication Check In Survey				
The child who has an appointment today has which type of diagnosis?	**PRE**		**POST**	
Answer Choices	Responses		Responses	
Cancer diagnosis (for example Leukemia, Lymphoma, and Rhabdomyosarcoma)	56.86%	29	48.78%	20
Blood disorder (for example Sickle Cell, Thalassemia, and Fanconi Anemia)	23.53%	12	24.39%	10
Neither	19.61%	10	26.83%	11
	Answered	**51**	**Answered**	**41**
	Skipped	**1**	**Skipped**	**1**
I can describe the reason for my/my child's prescribed medications.				
Answer Choices	Responses		Responses	
All	78.85%	41	82.50%	33
Some	13.46%	7	5.00%	2
None	7.69%	4	0.00%	0
N/A	Not Offered During Pre		12.50%	5
	Answered	**52**	**Answered**	**40**
	Skipped	**0**	**Skipped**	**2**
Were all prescribed medications brought to the appointment today?				
Answer Choices	Responses		Responses	
Yes	21.15%	11	14.29%	6
No	78.85%	41	61.90%	26
N/A	Not Offered During Pre		23.81%	10
	Answered	**52**	**Answered**	**42**
	Skipped	**0**	**Skipped**	**0**
In the last two weeks how many times has the child missed a dose of a prescribed medications?				
Answer Choices	Responses		Responses	
0	78.85%	41	78.57%	33
1-3	19.23%	10	16.67%	7
4 or more	1.92%	1	4.76%	2
	Answered	**52**	**Answered**	**42**
	Skipped	**0**	**Skipped**	**0**
If you answered more than zero to the last question, which of the following best explains why a dosed was missed?				
Answer Choices	Responses		Responses	
Forgot	20.93%	9	11.11%	3
Cost of Medications	0.00%	0	0.00%	0
To Avoid Side Effects	0.00%	0	0.00%	0
Child's Behaviors	0.00%	0	3.70%	1
Not Applicable Based on Previous Question	60.47%	26	66.67%	18
Other (please specify)	18.60%	8	18.52%	5
	Answered	**43**	**Answered**	**27**
	Skipped	**9**	**Skipped**	**15**

Figure 7. Patient & family survey results

Enhancing Medication Adherence Behaviors Among Ambulatory Pediatric Hematology & Oncology Patients

Desiree Palmer, BSN, RN

DNP Project Final Defense

April 19, 2021

Grand Valley State University
Kirkhof College of Nursing

Acknowledgements

Faculty Advisors	**Dianne Conrad DNP, FNP-BC, FNAP**
	Amy Manderscheid DNP, RN, AGPCNP-BC, AGNP-C, CMSRN
Site Mentor	**Carla Schwalm, MD**
Funding	**GVSU Presidential Grant Award**

Objectives for Presentation

1. Explore the clinical phenomenon of medication adherence among this patient population.

2. Synthesis of literature support and theoretical framework for interventions, organizational assessment findings, and project plan.

3. Discuss results of the medication adherence promotion quality improvement (QI) project.

4. Obtain approval for DNP completed project.

Organizational Setting

- Ambulatory pediatric hematology and oncology clinic (PHOC)
- Affiliated with a large non-profit system
- 2019 Children's Oncology Group audit
  - Showed need for increased pursuit of adherence behaviors
  - Suggested bagging practices

Clinical Phenomenon

- World Health Organization definition of medication adherence
  (World Health Organization, 2003)

- Among this patient population, adherence is **essential** for treatment success and symptom management

- PHOC considerations for addressing and enhancing medication adherence behaviors
  - Adherence assessments are considered essential standards of care (Pai & McGrady, 2015)
  - Bagging practices (Agency for Healthcare Research and Quality, 2018)
    - Organization considering this modality
  - 2019 Children's Oncology Group Audit
    - Clinical gap identified adherence promotion
    - 88.89% of staff respondents ⟹ patients do not bring medications

Organizational Assessment Findings

- Canadian Foundation for Healthcare Improvement Assessment Tool (Canadian Foundation for Healthcare Improvement, 2015).

- Staff Survey and Interviews
  - 73.68% of clinic staff reported they agree or strongly agree with multilevel collaboration on QI initiative
  - 88.89% of clinic staff report patients do not bring medications to their appointments
  - Top reasons for valuing medication adherence included increase cure rates, decrease risks of relapse, improved safety from adverse events/improved disease control

Figure 1. The Canadian Foundation for Healthcare Improvement's assessment tool six levers of healthcare improvement. Retrieved from https://www.cfhi-fcass.ca/docs/default-source/itr/tools-and-resources/self-assessment-tool-2014-e.pdf

SWOT Analysis

Strengths

Part of a large healthcare system
Clearly defined vision, mission, and strategic plan

Clear and concise goals
Internal quality improvement system for integration into micro and macro levels
Stakeholder buy in
Quality improvement physician champion

Weaknesses

Lack of dedicated time

Limited staff quantity

Percentage of patient engagement with patient portal is low

Lack of time to provide care and document for complex patient population

Potential apprehension to workflow adjustments

Opportunities

Improving quality documentation

Fully utilize the tools available in the EHR

Increase evidence of compliance with Joint Commission standards

Decrease excess healthcare utilization of patients (McGrady et al., 2018)

Threats

Reduction in clinic's desired intervention production

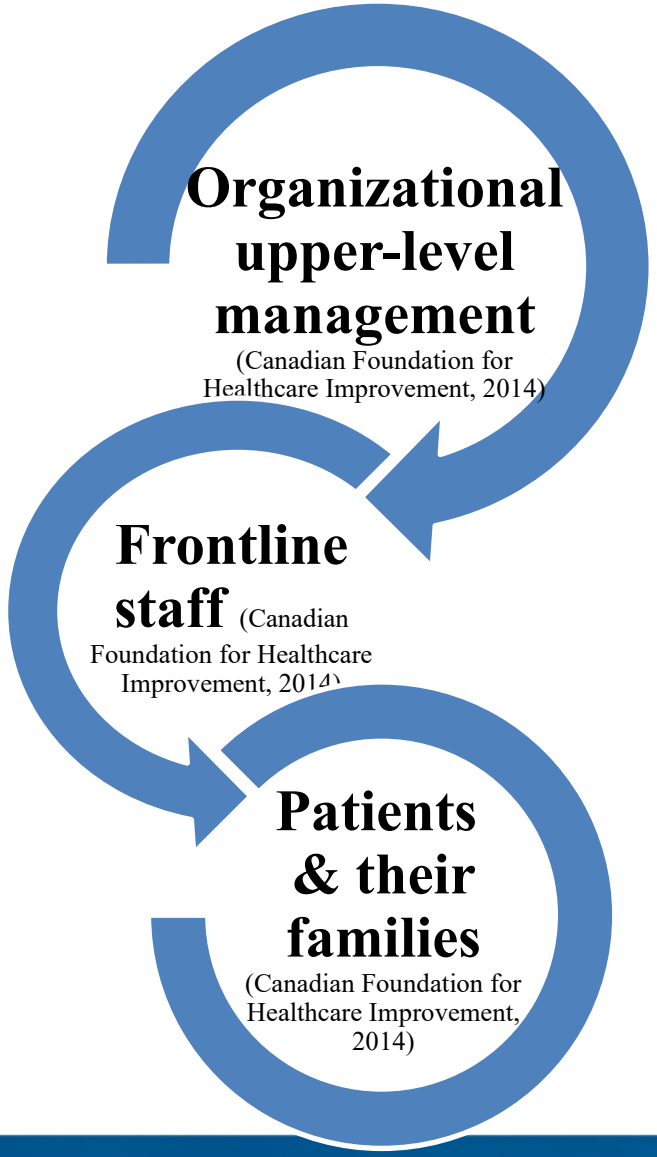
Intervention sustainability once funding for intervention is reduced

Program sustainability once DNP student completes project

Potential for decreased payment from government sponsored insurance programs that quantify quality measures for pay-for-reporting (Centers for Medicare and Medicaid Services, 2020)

COVID-19

Key Stakeholders



Hospital leadership
Informatics system builders

Physicians
Nurses
Clinical support staff

Pediatric aged patients
Parents, caregivers, sources of familial support

Clinical Practice Question

Will the creation and implementation of a medication adherence promotion quality improvement project:

- **decrease self-reported missed doses of prescribed medications,**
- **increase patient and family enrollment in the electronic patient portal**
- **reduce notable decreases to MCV values associated with non-adherence,**
- **increase parental and patient reported understanding of prescribed home medications, and**
- **increase patient encounters in which patients and their families bring prescribed medications to appointments?**

Literature Review

Purpose Identify medication adherence clinical and patient practices among pediatric hematology and oncology patients.

Aims

1. Among pediatric hematology and oncology patients and their families, what are identifiable barriers and facilitators of medication adherence?
2. Among pediatric hematology and oncology patients, are self-reported and familial reported adherence assessments effective in identification of nonadherence?
3. Among pediatric hematology and oncology patients, what does the evidence indicate as the clinical standard to best promote medication adherence?

Identified Themes & Applications to Practice

1. Barriers and facilitators are multifactorial (Badawy et al., 2014; Badawy et al., 2017; Bhatia et al., 2014; Heneghan et al., 2020; Hullman, Brumley, & Schwartz, 2015).

2. The variety of reasons and barriers to adherence behaviors necessitates a multidisciplinary approach to intervention programs (Hullman, Brumley, & Schwartz (2015; McGrady et al., 2015; Wu et al., 2018).

3. A multimodal approach to adherence assessments produces a more robust adherence report (Landier et al., 2016; Rohan et al., 2016).

Conceptual Model for Phenomenon: **Pender's Health Promotion Model**

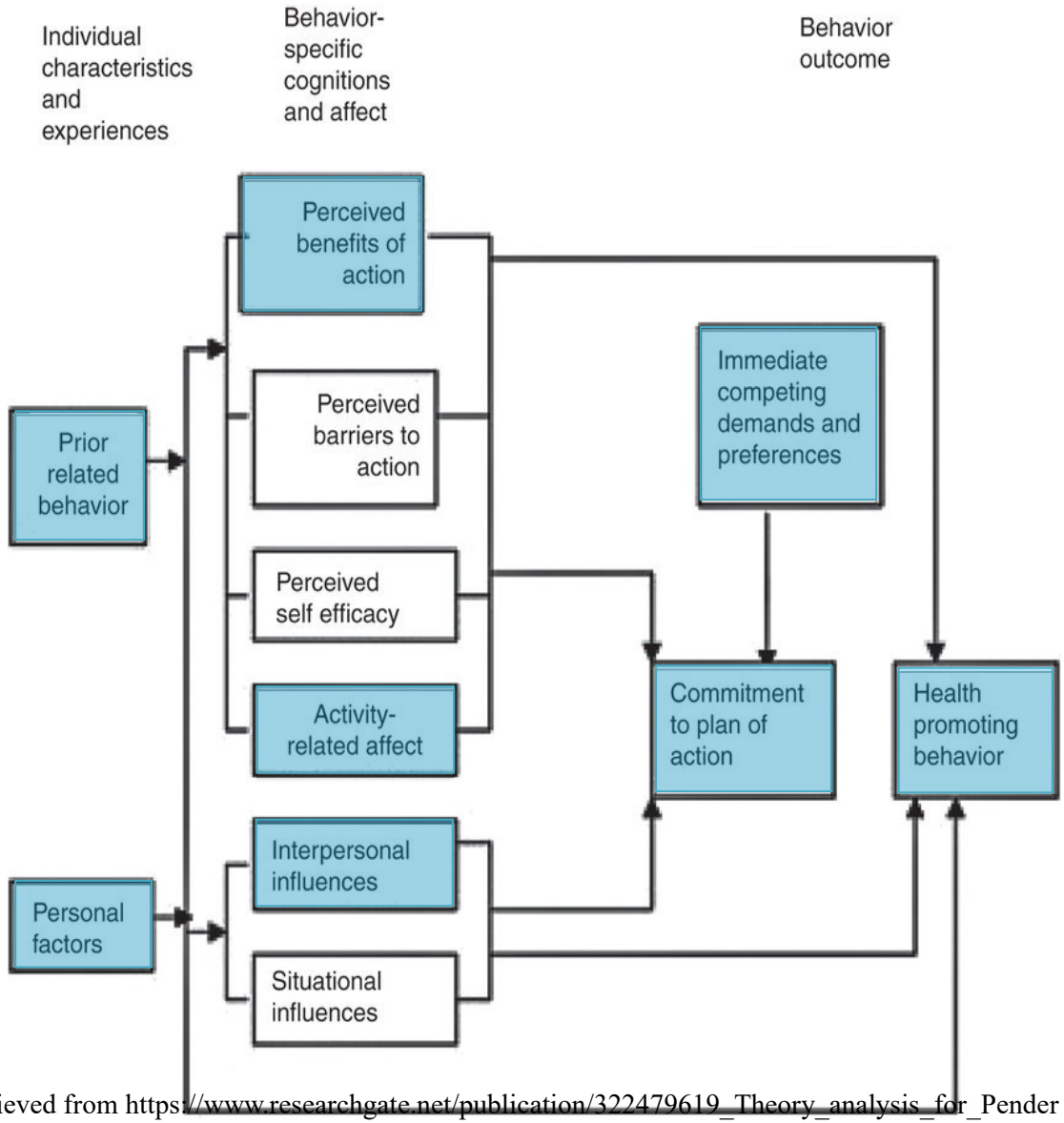


Figure 3. Pender's Health Promotion Model Diagram. Retrieved from https://www.researchgate.net/publication/322479619_Theory_analysis_for_Pender%27s_health_promotion_model_HPM_by_Barnum%27s_criteria_A_critical_perspective

Setting & Project Design

- **Quality improvement in an ambulatory pediatric hematology and oncology clinic.**

- **The clinic and parent organization have a vested interest in promoting adherence**
  - Enhance patient outcomes
  - Compliance with Children's Oncology Group audit recommendations
  - Compliance with JCAHO standards

- **Participants**
  - Convenience sample of clinic patients or their families willing to complete the anonymous surveys
  - Patients prescribed either oral daily chemotherapy or hydroxyurea
  - Clinic staff
    - Front desk staff, Patient Clinical Care Coordinator RNs (PCCCs), Stakeholder leadership who receive potential ROI protocol
  - Potential sample size of 51 patients

Ethical Considerations

- ✓ IRB determination by Grand Valley State University
- ✓ Facility determination by Research Department agreed with GVSU IRB
- ✓ "Not Research"

Implementation Framework-PDSA (Institute for Healthcare Improvement, 2018)

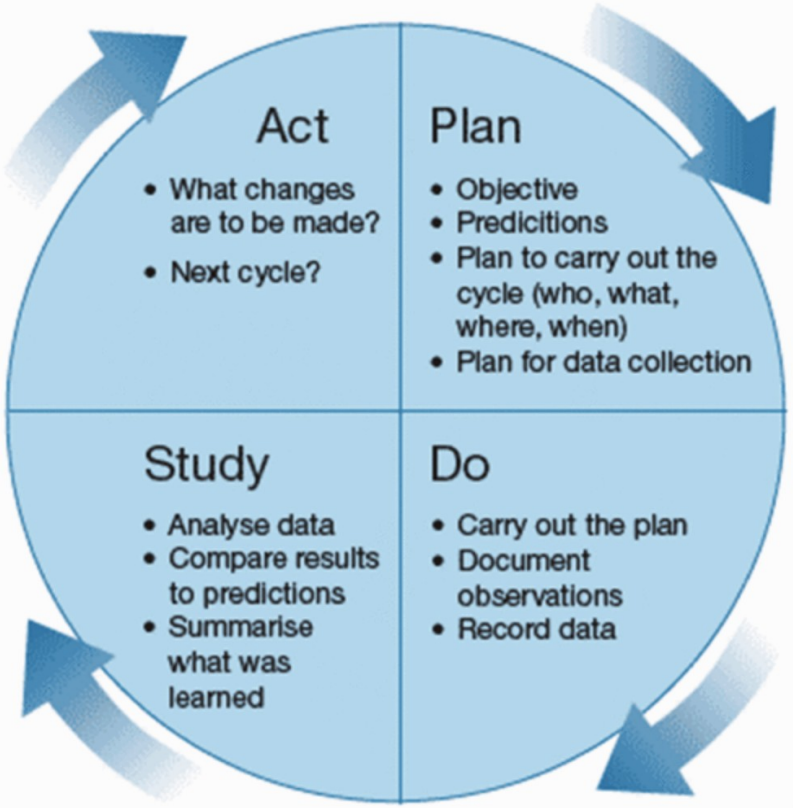


Figure 4. Crowfoot, D., & Prasad, V. (2017). Using the plan–do–study–act (PDSA) cycle to make change in general practice. *Innovait, 10*(7), 425-430. doi:10.1177/1755738017704472

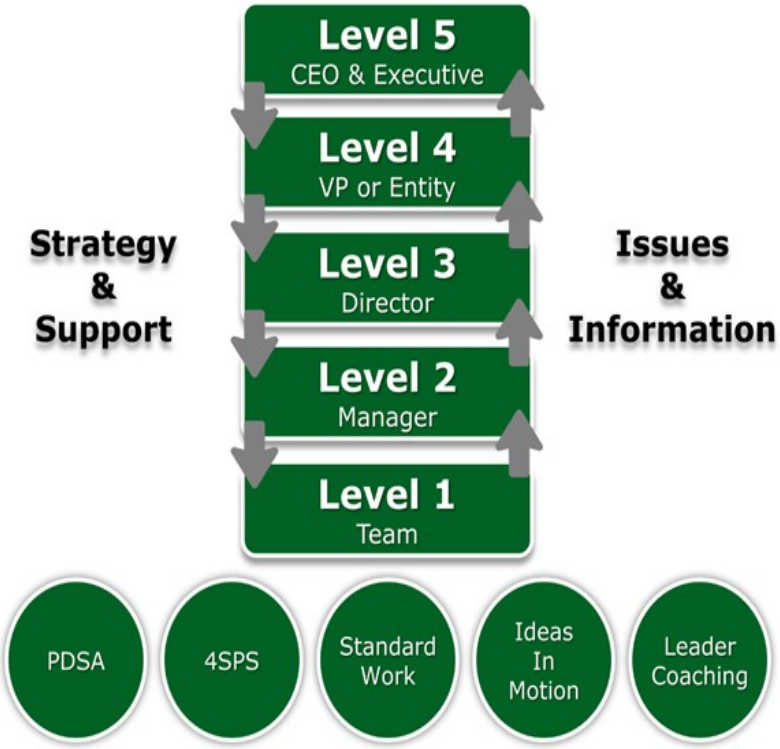


Figure 5. Organizational ladder approach to quality improvement. Retrieved from https://sharepoint2016.XXXhg.org/sites/XXX/_layouts/15/SignOut.aspx

Implementation Strategies (Powell et al., 2015)

1. Stakeholder engagement
2. Conduct local needs assessment
3. Assess readiness
4. Access new funding
5. Education of staff
6. Patient/Family feedback
7. Distribute educational materials
8. Workflow adjustments
9. Facilitation

Implementation Strategies

Implementation Strategy	Description	Framework Alignment
Stakeholder Engagement (Powell et al., 2015)	Completed staff surveys. Completed interviews with staff. Project updates at midpoint and completion.	Plan Act
Conduct local needs assessment (Powell et al., 2015)	Completed staff surveys. Completed interviews with staff.	Plan
Assess readiness (Powell et al., 2015)	Completed staff surveys. Completed interviews with staff.	Plan
Access new funding (Powell et al., 2015)	Presidential Grant.	Plan

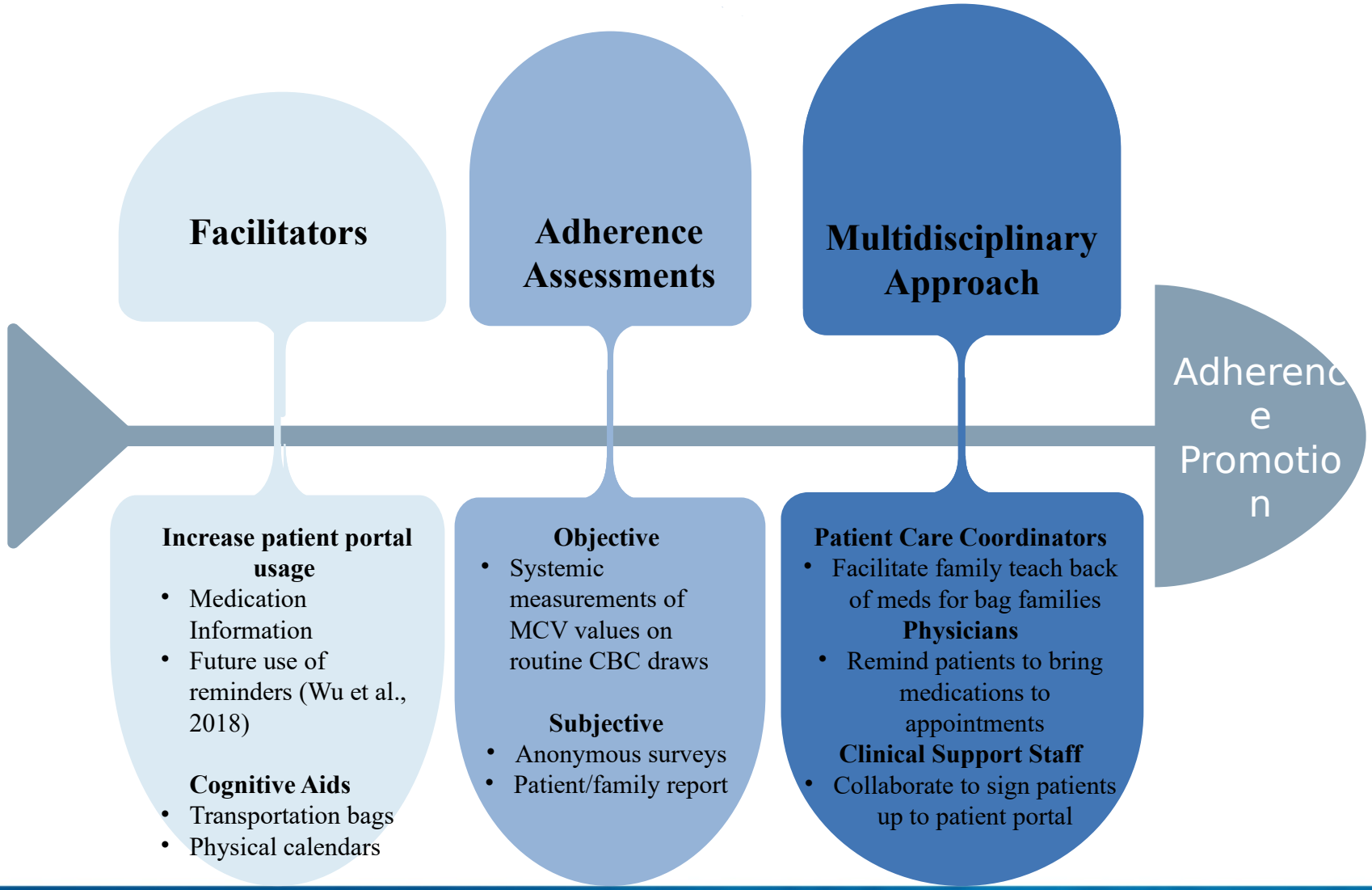
Implementation Strategies Cont.

Implementation Strategy	Description	Framework Alignment
Education of staff (Powell et al., 2015)	Two education meetings. Ongoing reminders or clarifications at huddles.	Do
Patient/Family engagement (Powell et al., 2015)	Front desk surveys.	Do Study
Workflow adjustments (Powell et al., 2015)	Encouragement to enroll in patient portal by front desk staff. Distribution of medication bags by PCCCs.	Do Study Act
Facilitation (Powell et al., 2015)	Collaborative determination of interventions. Ongoing interprofessional support.	Plan Act

Implementation Strategies Cont.

Implementation Strategy	Description	Framework Alignment
Distribution of educational materials (Powell et al., 2015)	At training meetings and reminder posted on clinic huddle board. Room signs to promote patient portal knowledge.	Do

Fishbone Diagram of Interventions



Methods

Methods			
Intervention	**Participant**	**Evaluation Method**	**Data Collection**
Staff interventions	Front Staff • Check in Survey • Promotion of Patient portal	• Pre/Post comparison	• EHR audit (Feb-Oct)
	PCCC • Bag Distribution • Documentation	• EHR documentation by PCCC	• EHR audit (Oct)
	Physicians • Remind patients of bagging practices • Monitor/order MCV • Notify team if concerns for non-adherence	• EHR accessible lab values	• EHR audit (Feb-Oct)

Methods

Patient Interventions	Patients and families	Evaluation Method	Data Collection
	Providing Bags	• EHR documentation by PCCC	• EHR audit (Oct-Feb)
	Reminding of Bagging Practices	• EHR documentation by PCCC • Patient/family Pre-post surveys	• EHR audit (Oct-Feb) • Survey pre-post comparison
	Patient portal usage promotion	• EHR enrollment reports	• EHR audit (Aug-Feb)
	Cognitive aids of patient portal benefits in all rooms	• EHR enrollment reports	• EHR audit (Aug-Feb)
	Patient portal enrollment assistance	• EHR enrollment reports	• EHR audit (Aug-Feb)
	Validating Medication Administration through Teach-Backs	• EHR documentation by PCCC	• EHR audit (Oct-Feb)
	Objective Adherence Monitoring via MCV values	• EHR accessible lab values	• EHR audit (Oct-Feb)

Staff Education

- October 2020
- 100% of frontline staff members educated
- One on one education for new staff members
- Re-education completed during on-site chart audits
- Staff documentation template reminders posted in workroom

Medication Transportation Bags

- Bag funding
- Benefits of bags

Figure 6. Razbag prototype ordered by the WMPHOC.
Retrieved from https://www.razbag.com/collections/razbag-medicine-bags/products/traveler-medication-bag-w-tsa-lock-free-pillbox-hold-5-various-sizes-of-prescription-bottles-and-2-large-pockets

Analysis Plan & Measures

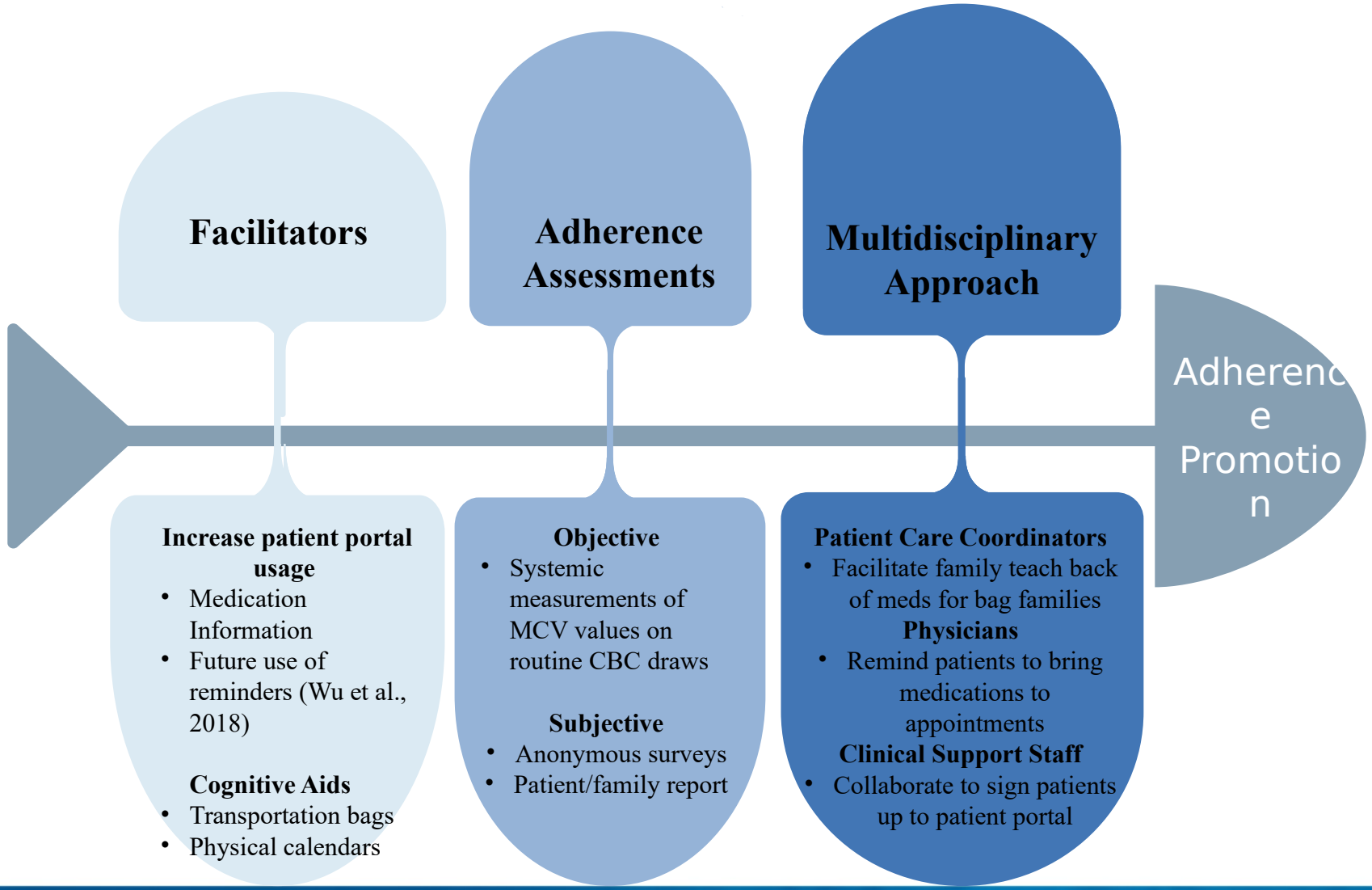
Measure	Tool	Measurement Plan
Enrollment in patient portal	Electronic record system	Descriptive statistics. Pre-post implementation percentage report comparison.
Types of patients	Patient/family survey results	Descriptive statistics. Percentage of hematology patients. Percentage of oncology patients.
Reasons for non-adherence	Patient/family survey results	Descriptive statistics. Pre-post implementation percentage report comparison.
Rates of non-adherence within the last two weeks	Patient/family survey results	Descriptive statistics. Pre-post implementation percentage report comparison.
Rates of medications brought to appointments	Patient/family survey results	Descriptive statistics. Pre-post implementation percentage report comparison.
MCV changes associated with non-adherence	Electronic record system	Paired T test Pre-post comparison of average point reduction of MCV values.

Budget & Resources

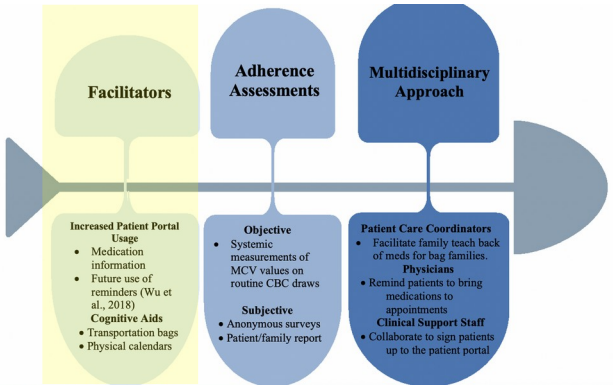
Revenue	
Project Manager Time (in-kind donation of student)	15,552.00
Team Member Time:	
Clinical Nurse Supervisor	127.71
Patient Care Clinical Coordinators (3)	383.13
Physician site mentor	1,439.90
Front Desk Staff	121.62
Consultations	
Statistician (in kind donation)	87.48
Sources of funding	
GVSU Presidential Grant	1,479.13
Bronson Foundation	1,498.40
TOTAL INCOME	20,689.37
Expenses	
Project Manager Time (in-kind donation of student)	15,552.00
Team Member Time:	
Clinical Nurse Supervisor	127.71
Patient Care Clinical Coordinators (3)	383.13
Physician site mentor	1,439.90
Front Desk Staff	121.62
Consultations	
Statistician (in kind donation)	87.48
Equipment	
Front desk iPad for patient surveys	1,000.00
Meeting space	0.00
Cost of report covers	14.98
Cost of laminating pouches	16.09
Cost of medication transportation bags	2,946.46
Cost of printing for information reports and MyChart room signs	25.20
TOTAL EXPENSES	21,714.57
Net Operating Plan	-1,025.20

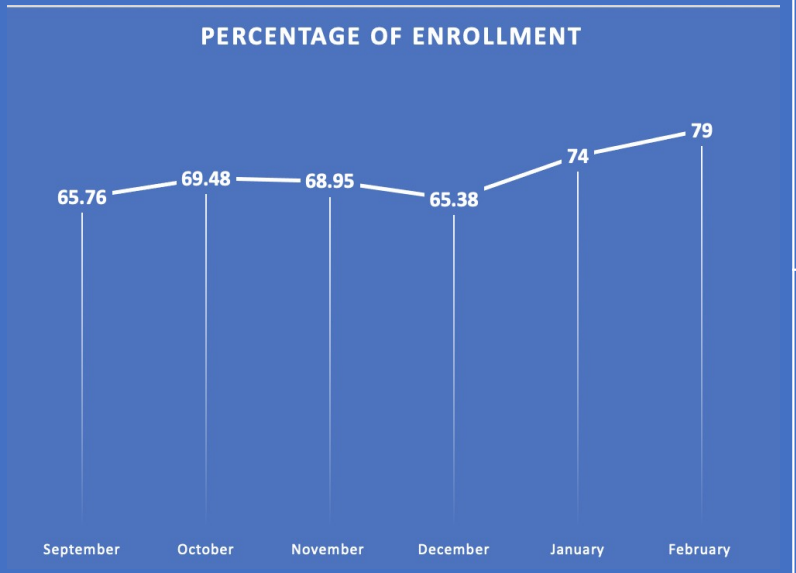
- Key sources of funding
- Potential costs related to equipment expenses
- Personnel costs were calculated based on average state reported salaries (Salary.com, 2020)

Results of Interventions



Facilitators



Patient Portal Enrollment	Cognitive Aids
	**Bags** • 32 distributed • 13 documented distributions **Medication Calendars** • Not a change to current workflow

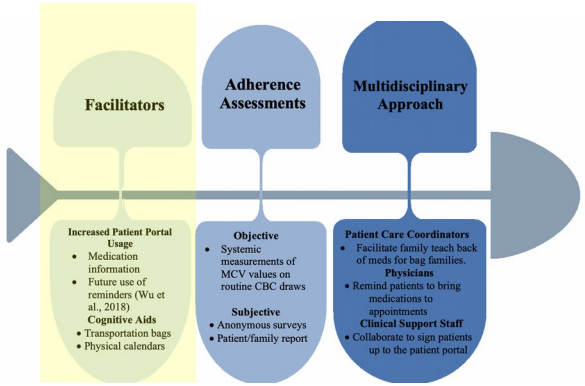
Implementation Strategies

- Patient/Family engagement
- Workflow adjustments
- Facilitation

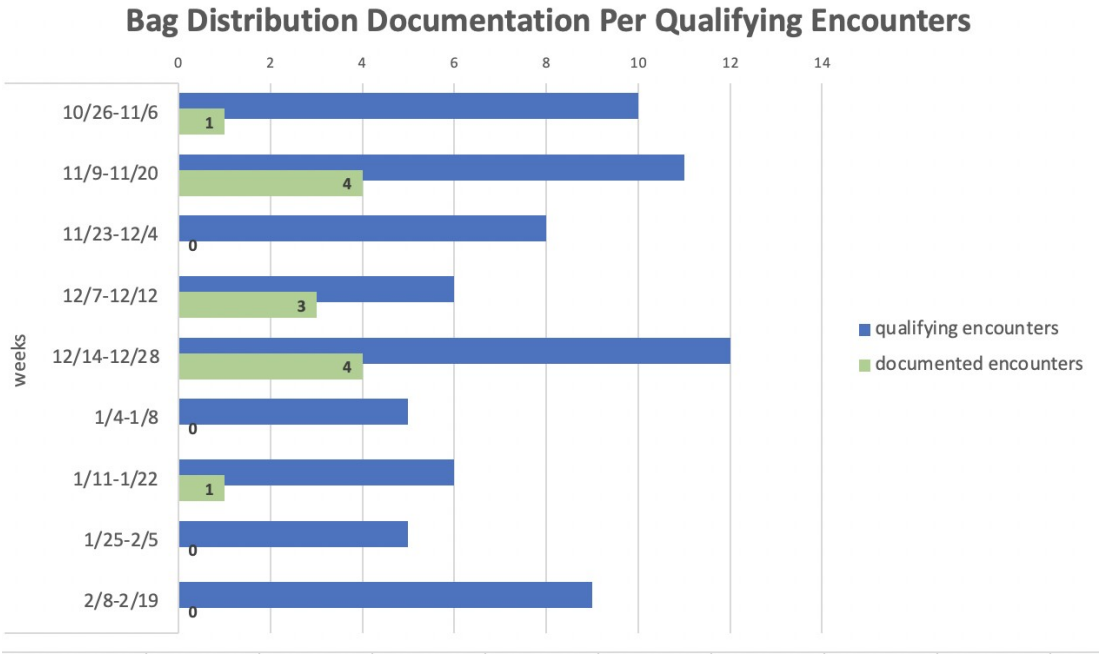
Health Promotion Model

- Prior behaviors
- Interpersonal influence

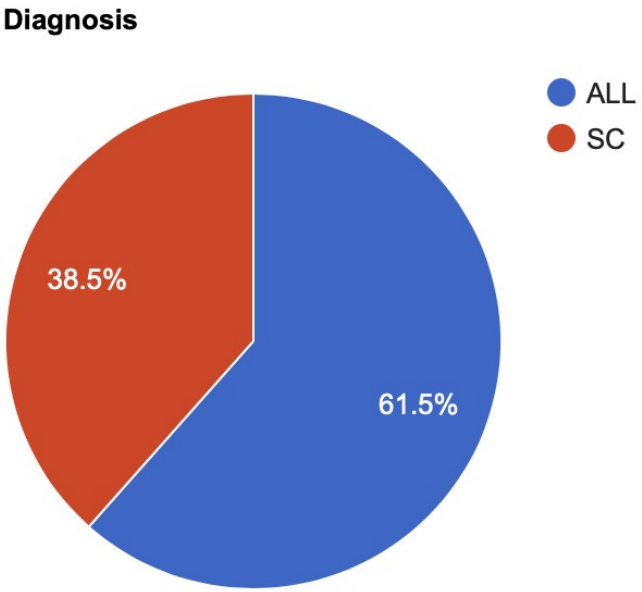
Bag Distribution



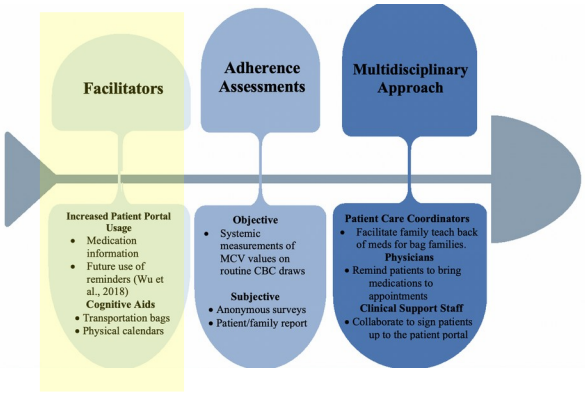
Medication Bag Documented Encounters



Patient Characteristics

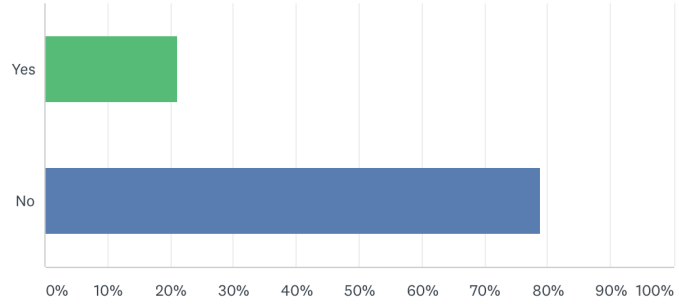


Bagging Practices



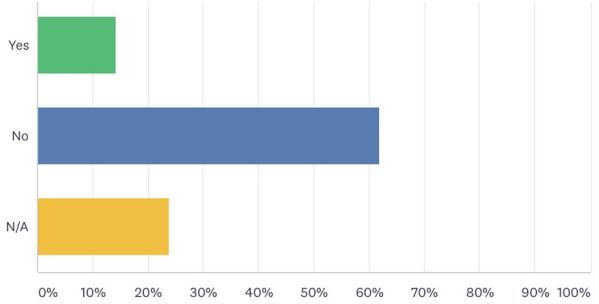
Were all prescribed medications brought to the appointment today?

Pre



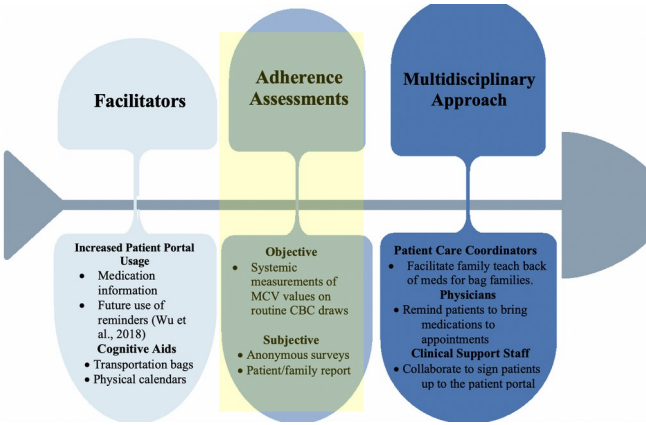
ANSWER CHOICES	RESPONSES	
Yes	21.15%	11
No	78.85%	41
TOTAL		52

Post



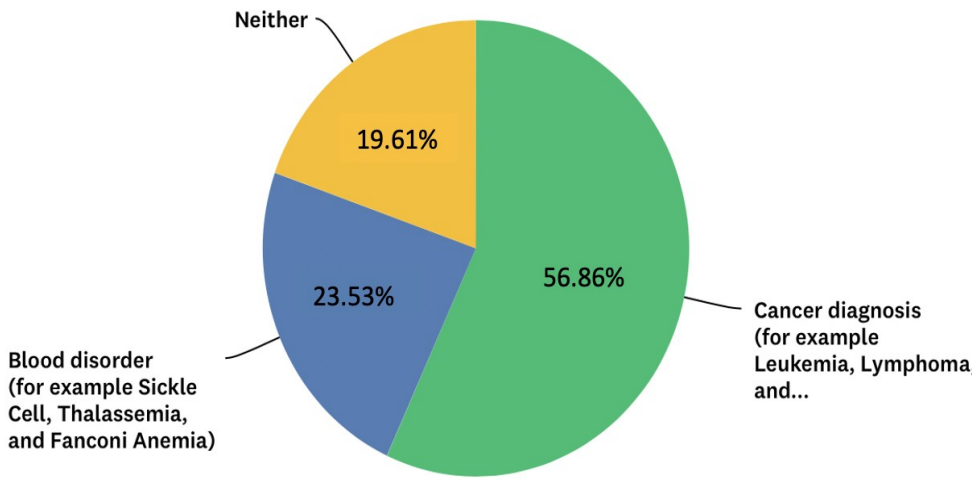
ANSWER CHOICES	RESPONSES	
Yes	14.29%	6
No	61.90%	26
N/A	23.81%	10
TOTAL		42

Patient Characteristics- Surveys



The child who has an appointment today has which type of diagnosis?

Pre



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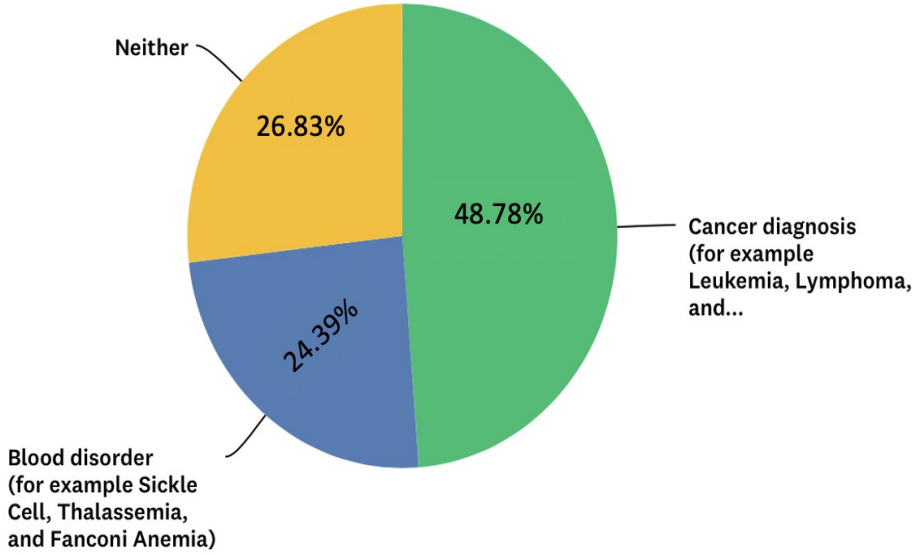


Patient Survey Results

Patient Medication Check In Survey

The child who has an appointment today has which type of diagnosis?

Answer Choices	Responses		Responses	
Cancer diagnosis (for example Leukemia, Lymphoma, and Rhabdomyosarcoma)	56.86%	29	48.78%	20
Blood disorder (for example Sickle Cell, Thalassemia, and Fanconi Anemia)	23.53%	12	24.39%	10
Neither	19.61%	10	26.83%	11
	Answered	**51**	**Answered**	**41**
	Skipped	**1**	**Skipped**	**1**

I can describe the reason for my/my child's prescribed medications.

Answer Choices	Responses		Responses	
All	78.85%	41	82.50%	33
Some	13.46%	7	5.00%	2
None	7.69%	4	0.00%	0
N/A	Not Offered During Pre		12.50%	5
	Answered	**52**	**Answered**	**40**
	Skipped	**0**	**Skipped**	**2**

Were all prescribed medications brought to the appointment today?

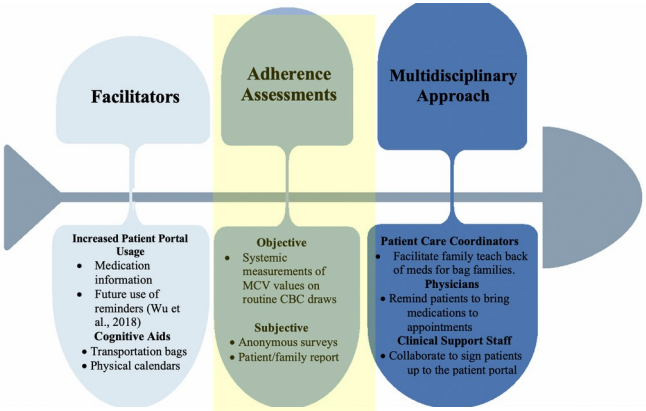
Answer Choices	Responses		Responses	
Yes	21.15%	11	14.29%	6
No	78.85%	41	61.90%	26
N/A	Not Offered During Pre		23.81%	10
	Answered	**52**	**Answered**	**42**
	Skipped	**0**	**Skipped**	**0**

In the last two weeks how many times has the child missed a dose of a prescribed medications?

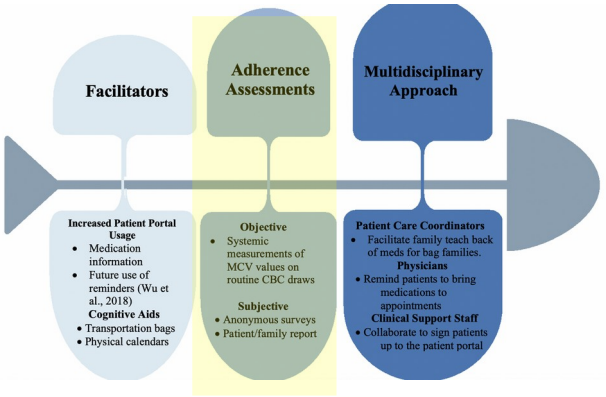
Answer Choices	Responses		Responses	
0	78.85%	41	78.57%	33
1-3	19.23%	10	16.67%	7
4 or more	1.92%	1	4.76%	2
	Answered	**52**	**Answered**	**42**
	Skipped	**0**	**Skipped**	**0**

If you answered more than zero to the last question, which of the following best explains why a dosed was missed?

Answer Choices	Responses		Responses	
Forgot	20.93%	9	11.11%	3
Cost of Medications	0.00%	0	0.00%	0
To Avoid Side Effects	0.00%	0	0.00%	0
Child's Behaviors	0.00%	0	3.70%	1
Not Applicable Based on Previous Question	60.47%	26	66.67%	18
Other (please specify)	18.60%	8	18.52%	5
	Answered	**43**	**Answered**	**27**
	Skipped	**9**	**Skipped**	**15**



Adherence Assessments



Objective
Lab Values

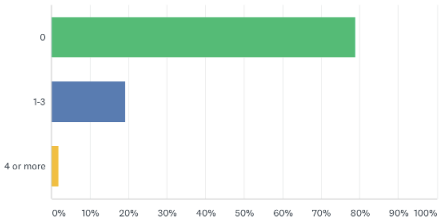
MCV & ANC lab values

- Wilcoxon Signed Ranks Test
- Insignificant changes pre/post

Subjective

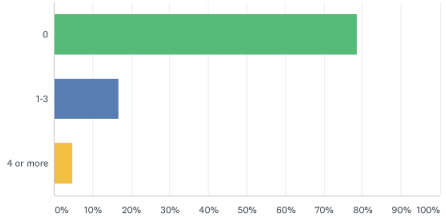
In the last two weeks how many times has the child missed a dose of a prescribed medications?

Pre



ANSWER CHOICES	RESPONSES	
0	78.85%	41
1-3	19.23%	10
4 or more	1.92%	1
TOTAL		52

Post



ANSWER CHOICES	RESPONSES	
0	78.57%	33
1-3	16.67%	7
4 or more	4.76%	2
TOTAL		42

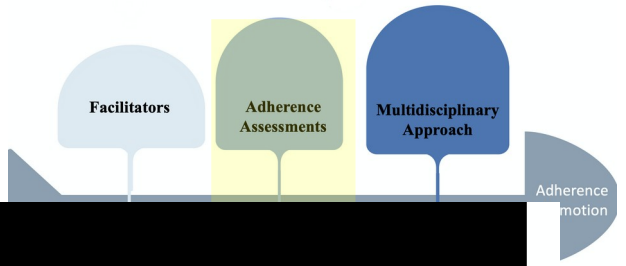
Implementation Strategies

- Patient/Family engagement
- Workflow adjustments
- Facilitation

Health Promotion Model

- Prior behaviors
- Interpersonal influence
- Commitment
- Health promoting behavior

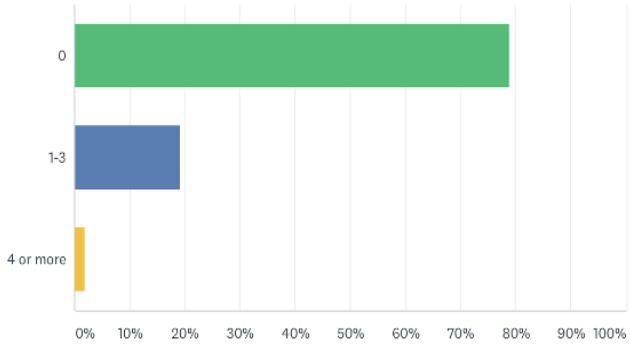
Adherence Assessments



Subjective

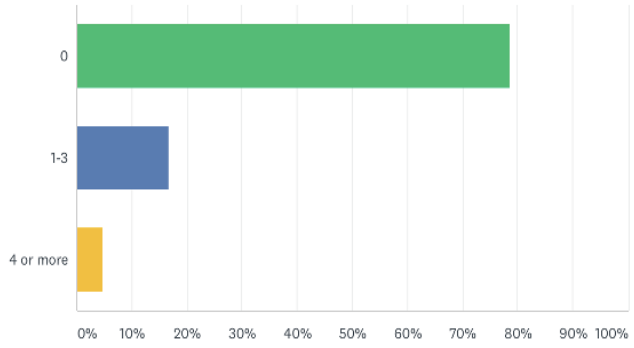
In the last two weeks how many times has the child missed a dose of a prescribed medications?

Pre



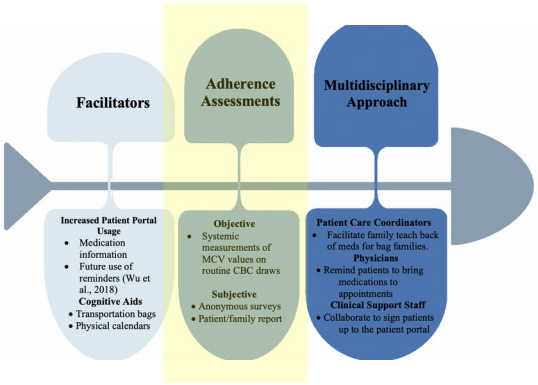
ANSWER CHOICES	RESPONSES	
0	78.85%	41
1-3	19.23%	10
4 or more	1.92%	1
TOTAL		52

Post



ANSWER CHOICES	RESPONSES	
0	78.57%	33
1-3	16.67%	7
4 or more	4.76%	2
TOTAL		42

Medication Knowledge

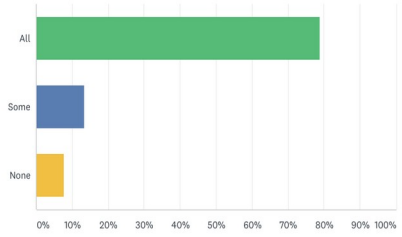


Understanding of Prescribed Medications

I can describe the reason for my/my child's prescribed medications?

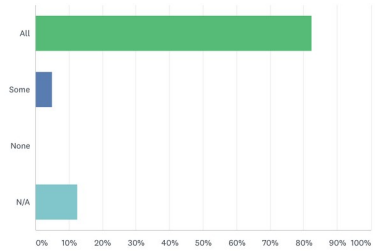
- Percentage of "ALL" response increased by 3.65%
- Per Fisher's Exact, insignificance change
- Alteration to survey included answer response of N/A for those not prescribed any home medications

Pre



ANSWER CHOICES	RESPONSES	
All	78.85%	41
Some	13.46%	7
None	7.69%	4
TOTAL		52

Post



ANSWER CHOICES	RESPONSES	
All	82.50%	33
Some	5.00%	2
None	0.00%	0
N/A	12.50%	5
TOTAL		40

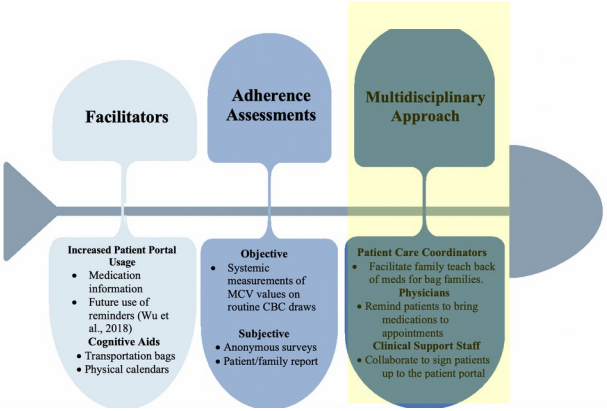
Implementation Strategies

- Patient/Family engagement
- Workflow adjustments
- Facilitation

Health Promotion Model

- Perceived Benefits

Multidisciplinary



Staff Survey Responses

- Potential incongruence of clinical value of adherence interventions between prior staff and new staff
- Pre implementation surveys = 19 respondents
- Post implementation surveys = 2 respondents

Implementation Strategies

- Workflow adjustments
- Facilitation

Health Promotion Model

- Interpersonal influence
- Commitment
- Immediate competing demands

Clinical Practice Question

Will the creation and implementation of a medication adherence promotion quality improvement project:

- **decrease self-reported missed doses of prescribed medications,**
  - **Not achieved, per subjective survey responses**
- **increase patient and family enrollment in patient portal**
  - **Achieved, 13.24% increase in patient portal enrollment**
- **reduce notable decreases to MCV values associated with non-adherence,**
  - **Per Wilcoxon Signed Ranks Test, statistically insignificant**
- **increase parental and patient reported understanding of prescribed home medications, and**
  - **Percentage of "ALL" response increased by 3.65%, Per Fisher's Exact Test, insignificant**
- **increase patient encounters in which patients and their families bring prescribed medications to appointments?**
  - **Poor documentation**
  - **Not achieved, per subjective survey responses**

Discussion

Actualized DNP Model

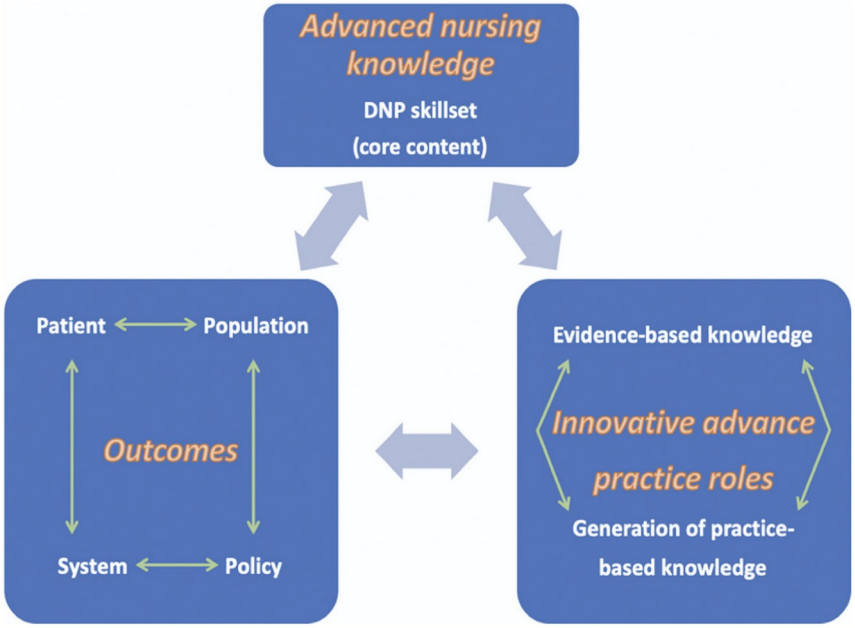


Figure 6. Burson, R., Moran, K. & Conrad, D. (2016) Why hire a DNP? The value added impact of the practice doctorate. Journal of Doctoral Nursing Practice, 9(1), 152–157. https://doi.org/10.1891/2380-9418.9.1.152

Knowledge Gained

- Variability in adherence continues
- Staff turnover
- Role vacancy impact
- Anecdotal finding of patient satisfaction
- External impact of Covid-19

Barriers

Barrier	Evidence of barrier	DNP student adjustments
Staff Turnover	Infusion nurse Three patient care clinical coordinators Clinical Supervisor	Connected with each new hire, either in person or via Zoom, to complete training on project, role expectations, and documentation needs.
Lack of workflow adoption by nurses	0 documented encounters correctly documented Poor documentation of bag distribution	Re-education of staff members on how to document Signs placed in work areas on how to document interventions Biweekly chart analysis and feedback Biweekly patient bag distribution sign out sheet Neon pink label sticker added to each bag stating for PCCC to document distribution of the bag One on one meeting with clinical supervisor to brainstorm ways to engage nurses and remind them to document interventions
Implementation of new EHR system	Planned implementation for January 2021	Unable to impact this barrier
Covid-19	2020 Pandemic strained healthcare systems nationwide	Unable to impact this barrier

Implications for Practice

- Anecdotal finding of patient feedback of receiving bags
- The main “barrier” was the lack of workflow adoption which reduced documented encounters and follow through of adherence facilitators
- Survey results indicated decline in adherence among patient population-
  - Indicates increasing importance of streamlining adherence interventions into current workflow
- Potential to increase revenue with use of CPT protocol
- Addressing barriers and facilitators in future endeavors

Medication Therapy Management

Presented to clinic as an added value to project, implementation or use was not part of project objectives

- All Medicaid patients with a cancer diagnosis qualify for medication therapy management encounters (XXXXX Pharmacists Association, n.d.). These encounters are tiered.

- For each qualifying patient, the first encounter is allowed 15 minutes and can be billed by a pharmacist or other clinical individual using CPT code 99605 (XXXXX Pharmacists Association, n.d.).

- CPT code 99605 pays $50 once per 365 days. Subsequent medication therapy management encounters are billed under CPT code 99606, are allotted 15 minutes, and may be billed up to seven times in 365 days. CPT code 99606 reimburses at $25 per encounter.

- Presented to the project setting as a two-sided document with EHR steps for inputting the CPT code, and rationale and qualifying services on the back

Conclusions

- Unforeseeable barriers impacted data collection and analysis
- Potential for the clinic to continue medication adherence interventions may require a re-evaluation and organizational assessment
- Potential for both patient and system outcome enhancements, from further trials of implementation of such interventions
- Project facilitators and barriers require real-time adaptability and continued pursuit of stakeholder buy-in. Although statistical significance was not achieved, this project represented a thorough DNP analysis, plan, and evaluation
  - Examples of facilitators: multidisciplinary approach, cognitive aids, interaction with patient portal
  - Examples of barriers: staff turnover, Covid-19, implementation of new electronic health record
- Knowledge gained was vital to gaining competencies in DNP essentials

Sustainability Plan

- **Identify adherence champion** (Powell et al., 2015)
- **Future use of medication transportation bags** (Weiss et al., 2016; Zerillo & Walsh, 2017)

  Streamline documentation to support future use and expansion of eligible criteria.
- **Based on first cycle metrics and feedback, continue PDSA cycles for two more rounds** (Christoff, 2018)

  Led by the identified champion
- **CPT coding protocol recommendation plan** (XXXXXX Pharmacists Association, n.d.)

  Consider incorporating new CPT code to increase revenue and financially support future implementation and support of medication adherence interventions.

Dissemination

- **Organizational**
  - **Each provider will receive a copy of the results of this project and the manuscript.**
  - **The results will be be posted in the site's workroom, so that frontline stakeholders can receive project outcomes.**
  - **The completed manuscript will be distributed among upper-level hospital stakeholders, via email by the project site mentor.**

- **Scholarly**
  - **The GVSU Presidential Research Grant graduate department will receive the manuscript and results.**
  - **GVSU Graduate Scholarly Showcase.**
  - **Manuscript will be submitted to Scholarworks for scholarly and public dissemination.**

DNP Essentials Reflection

DNP Essential (American Association of Colleges of Nursing, 2006)	**Reflection**
I. Scientific Underpinnings for Practice	Literature Review Analysis of current adherence promoting interventions
II. Organizational and Systems Leadership for Quality Improvement and Systems Thinking	Collaboration with site and faculty mentors Project planning, proposal, implementation Pursuit of integration of CPT code Ongoing leadership as project leader throughout all phases of the project
III. Clinical Scholarship and Analytical Methods for Evidence-Based Practice	Identification of evidence-based interventions Selection of implementation and conceptual models Integration of models into project plan
IV. Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care	Chart audits Data extraction Use of EHR dashboards to monitor patient portal enrollment

DNP Essentials Reflection

DNP Essential (American Association of Colleges of Nursing, 2006)	**Reflection**
V. Health Care Policy for Advocacy in Health Care	Institutional engagement in clinical bagging standards and policies Engagement in creation of clinical policy for usage of medication therapy management CPT codes
VI. Interprofessional Collaboration for Improving Patient and Population Health Outcomes	Planning, proposing and implementation of the project Ongoing audit and feedback throughout implementation Analysis of pre and post adherence behaviors
VII. Clinical Prevention and Population Health for Improving the Nation's Health	Prevention of side effects of non-adherence through increasing adherence behaviors Disseminating findings
VIII. Advanced Nursing Practice	Coordination of increased patient satisfaction Evaluation of therapeutic (i.e., medication adherence) interventions

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