

IMPLEMENTATION OF A MODIFIED DIABETES DECISION AID FOR FILIPINO TYPE II
DIABETIC PATIENTS

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Abstract

Type II diabetes presents a significant health challenge among Filipino populations, exacerbated by low health literacy and treatment adherence rates. This six-month study implemented a modified Filipino version of a diabetes medication decision aid to address these issues. Pre- and post-test questionnaires, along with hemoglobin A1C measurements, assessed the intervention's impact on seven participants recruited from the Primary Care Clinic of Hawaii - Waipahu. Findings revealed a notable 10% improvement across knowledge, comfort, and treatment adherence domains post-intervention. Additionally, all participants affirmed the aid's usefulness, emphasizing its role in enhancing patient education and empowerment. Despite overall positive outcomes, a 28.6% increase in HbA1c% in some cases highlights the need for further investigation into contributing factors. Continued refinement and customization of the decision aid, based on patient feedback and clinical insights, are crucial for sustaining positive outcomes and promoting patient-centered care in diabetes management practices. This study underscores the importance of culturally tailored interventions in addressing healthcare disparities among minority populations. Further analysis is warranted to evaluate the long-term efficacy and scalability of such interventions.

Table of Contents

Abstract.....	ii
Table of Contents	iii
Introduction	1
Background.....	3
Problem Statement.....	4
Purpose and Objectives	7
Framework.....	8
Synthesis of Evidence.....	9
Project Design/ Methods	17
Data collection.....	18
Analysis	22
Results	22
Discussion.....	25
Limitations.....	27
Implications	29
Conclusion.....	30
<i>Appendix A:</i>	
<i>Mosby's Level of Evidence Chart</i>	Error! Bookmark not defined.
<i>Appendix B:</i>	
<i>Stetler Model of Research Utilization</i>	Error! Bookmark not defined.
<i>Appendix C</i>	
<i>Literature Synthesis</i>	Error! Bookmark not defined.
<i>Appendix D</i>	
Pre-Test Questionnaire	39

Appendix E

List of Tables **Error! Bookmark not defined.**

Appendix F

List of Graphs **Error! Bookmark not defined.**

References45

Introduction

Asian Pacific Islanders, particularly Filipinos, are genetically predisposed to developing diabetes and its complications. (Lee & Taira, 2005; Raquinio et al., 2021). Limited health literacy (HL) is a common theme among people who have type II diabetes (T2D), along with high rates of non-adherence to treatment regimens and poor health outcomes (Sarkar et al., 2010; Juarez et al., 2013; Lee & Taira, 2005).

According to the National Institute of Diabetes and Digestive and Kidney Disease, Diabetes is estimated to affect over 37.3 million Americans and is more prevalent among racial and ethnic minority populations such as African American, Latino, Pacific Islander, and Asian (CDC, 2022; Raquinio et al., 2021; Uchima et al., 2019). Hawaii is a large multicultural state comprising multiple ethnic groups, including Native Hawaiians, Chinese, Filipinos, Japanese, Korean, and other Pacific Islanders. (Uchima et al., 2019; Juarez et al., 2013; Lee & Taira, 2005). Filipinos have remarkably higher prevalence and incidence rates of T2D (Lee & Taira, 2005; Andrew et al., 2013; CDC, 2020). Filipino Americans are at a 2.5-fold increase for developing T2D than white people and higher than other Asian Pacific Islanders (Raquinio et al., 2021). Moreover, Filipinos have high rates of limited health literacy and low adherence rates to treatment regimens (Lee & Taira, 2005; Sentell et al., 2011).

The American Diabetes Association (ADA) revealed in March 2018 cost of diagnosed diabetes increased to \$327 billion annually from the last estimate in 2012 of \$245 billion (ADA, 2018). This 26% increase in diabetes costs sheds light on how important it is to manage the effects of diabetes. Healthcare costs and diabetes complications can be reduced if adherence rates to medication treatment increase (Juarez et al., 2013; Lee & Taira, 2005).

Healthy People 2030 defines personal health literacy as “the degree to which individuals

have the ability to find, understand, and use information and services to inform health-related decisions and actions for themselves and others,” which changed from the Healthy People 2020 definition (Health People, 2030). The redefined definition of personal health literacy is to encourage people to utilize the information to make a well-informed decision. Health literacy is vital and is the key to explaining health disparities that exist by predicting health status and behaviors in people (Ydrin, 2021; Sentell et al., 2011). Limited HL is associated with a decreased comprehension of medication instructions, thus leading to increased poor adherence rates to treatment regimens (Sarkar et al., 2010).

Interventions to improve health literacy can reduce the effects of diabetes and its complications in ethnic and minority populations (Ydirin, 2021). Methods of improving health literacy include making health information attainable through various outlets that are language-appropriate such as media platforms, “no-read-no-write” friendly pamphlets, or tools like patient decision aids (PtDAs) (Ydirin, 2021; Macalalad-Josue et al., 2019). PtDAs can be web-based tools, treatment cards, or worksheets used during the shared decision-making process (SDM) between patients and their providers (Macalalad-Josue et al., 2019).

Macalalad-Josue et al. (2019) found that specific features to increase comprehension for patients with low health literacy include creating simple graphs and tables, simple probabilities, and reducing textual information. This led to the development of a Filipino Diabetes Medication decision aid, modified from Mayo Clinic’s Diabetes Medication Choice decision aid. Patients and providers expressed satisfaction with the Filipino Diabetes Medication decision aid.

Culturally appropriate interventions, such as tailoring PtDAs to be culturally relevant, is necessary to make them effective in the Filipino population (Raquinio et al., 2021; Maglalang et al., 2017). Increasing health literacy among the Filipino population will improve health literacy

and adherence rates to treatment regimens. This project aims to implement a modified Filipino version of a diabetes medication choice decision aid to increase understanding of their disease process, patient knowledge of medications, and diabetic medication adherence in the Filipino type II diabetic population over 6 months versus current practice.

Background

Filipinos with type II diabetes have low health literacy and adherence to treatment rates (Lee & Taira, 2005; Sentell et al., 2011; Malalang et al., 2017; Sakar et al., 2010). Low healthy literacy levels are common among minority populations, especially those with English as their second language (Sayah et al., 2012). Common barriers to adherence include limited HL and the complexity of treatment regimens (Juarez et al., 2013; Sayah et al., 2012). According to The Diabetes Study of Northern California, limited HL is a barrier to diabetes self-management because individuals have difficulty understanding when to take the medications and which dosages to administer. Therefore, it is important to address and increase limited HL in populations at risk for diabetes and its complications. Health literacy rates can be increased through interventions, like PtDAs, bridging the healthcare disparities gap (Sentell et al., 2011).

The advantages of PtDAs are that they improved “patient knowledge, informed patient choices, increased participation during the SDM process, and improved decision self-efficacy” (Macalalad-Josue et al., 2017). PtDAs are useful, especially when there is no best “treatment” for the patient despite all the available evidence. Utilizing PtDAs gives patients tangible evidence that allows them to examine their options while having the clinicians explain things they may not understand or find confusing. Patients can provide their personal expert knowledge about how they perceive their disease affects them and their symptoms. Whereas the providers bring their clinical expertise to the table. PtDAs provide patients with the necessary information

to help them decide on the best treatment choice. To effectively use PtDAs, it is important that the patient can utilize them at varying health literacy levels. PtDAs are a feasible platform, as they should be made intentionally for all patients with varying HL levels (McCaffrey et al., 2013). It is important to consider those with low to limited HL levels because these tools can be provided to help bridge the gap between the inequities in healthcare.

Diabetes is a chronic condition that affects the Filipino population. Thus, the project will be conducted at a Filipino primary care clinic that caters to a predominately Filipino community. Moreover, at this clinic, most patients are Filipino immigrants with English as their second language, thus presenting with limited health literacy levels. Implementing a Filipino version of a diabetes medication choice decision aid would be best suited for this site.

There is limited data that exist, particularly regarding Filipino PtDAs for diabetes. Nonetheless, PtDAs that have been created, a commonality is that culturally tailored interventions are favored among participants and clinicians specific to the target populations. Some of the data shed light on promising outcomes of using PtDAs, such as patients' increasing their understanding of their disease and increased participation during SDM processes. With positive outcomes such as these, the implementation of established culturally tailored decision aid will be used to increase health literacy levels in this population, Filipino type II diabetics.

Problem Statement

Type II Filipino diabetics with poor glycemic control thus have a higher risk of developing diabetes complications due to a lack of treatment adherence and limited health literacy. Current practice at the Primary Care Clinic of Hawaii - Waipahu (PCCH-W), managing diabetes is managed by the primary care provider and Endocrinologist. Typically, medications

will be prescribed along with verbal instructions on how to take the medications and lifestyle changes. Follow-up appointments of 3 or 6 months are scheduled to monitor the patient's glycemic control and adherence to treatment regimens. The clinic encounters are typically conducted in English and sometimes in Filipino, Tagalog or Ilokano - dependent on the patient and available provider. However, the materials and instructions provided to the patients about treatment are printed in English and rarely taken home.

The focus of the problem is education, where providing a modified Filipino version of diabetes medication choice decision aid to be used as an informational guide that can be used in clinics and taken home. The PtDA is based on the Diabetes Medications Choice Decision Aid developed by the Mayo Clinic and adapted by Anna Macalalad-Josue and her team to fit the needs of type II Filipino diabetics in the Philippines (2017). The PtDA is composed of 8 treatment cards with varying topics. For the project, only 5 cards will be used, including daily routine, sugar testing, weight change, medication side effects, and hypoglycemia side effects. The topics selected were based on the clinic needs and results from the article that developed the modified decision aid as the commonly referred to treatment cards were daily routine, daily sugar testing, weight change, and medication side effects. The hypoglycemia card was added because it is one of the serious adverse side effects of diabetes that can lead to hospitalizations and indicates poor glycemic control (Macalalad-Josue et al., 2017).

The problem was identified by a needs assessment by Dr. Paula Aquino, APRN, who expressed Dr. Anna Lo's, an endocrinologist, need to improve diabetes management in this population. It was noted that there is a low adherence rate to treatment as glycemic control is inconsistent. Moreover, the patients are known to express understanding after the provider provides the prescription and lifestyle suggestions. Still, upon follow-up lab, results will reflect

little to no change in hemoglobinA1c levels. Providers have noted that some patients express understanding even if they don't understand during the visit due to low health literacy, shame in not understanding, and poor communication due to the language barrier. Also, some patients will return to the clinic and say they stopped taking medicine because they didn't like how it made them feel. This can be attributed to poor education about medication side effects and the consequences of not taking medications.

The focus is enhancing education in this population to improve adherence to treatments and better manage glycemic levels. The idea began with developing a booklet for patients to take home and refer to. Upon research, it was found that PtDAs have been useful in populations with low health literacy and improved confidence levels in patients to participate in the SDM process. After continued research, the translated diabetes medication choice decision aid in Filipino was discovered. The results from piloting the translated decision aid were promising and practical to apply to this clinic. The difference is in the application of the patient decision aid. It will not be used purely as a decision aid but also as a supplemental informational guide to help the patient better self-manage their diabetes. The information on the PtDA will remain the same and be presented in the same format as the Filipino version.

As previously stated, the problem is type II Filipino diabetics with poor glycemic control have a higher risk of developing diabetes complications due to a lack of treatment adherence and limited health literacy. The parameters will be focused on patients at the PCCH-W who are Filipino type II diabetics, diagnosed with diabetes within the last 5 years, presently have uncontrolled glycemic levels, issues with treatment adherence, and English is their second language.

Purpose and Objectives

This project aims to implement a modified Filipino version of the diabetes medication choice decision aid for Filipino Type II diabetics to increase their limited health literacy and adherence to treatment rates. As a result, Filipino type II diabetic patients will increase their knowledge about diabetes, diabetic medications, comfortability in diabetic management, and diabetic medication adherence rates.

The newly modified decision aid will be carefully curated from the Filipino-translated PtDA (Macalalad-Josue et al., 2017), created from the diabetes medication choice decision aid developed by Mayo Clinic. The modified decision aid will be updated to current evidence based-guidelines. The PtDA will be screened for spelling and grammatical errors by the stakeholders who are also fluent in Tagalog. The modified version will be presented to the participants in English and Tagalog, with the target being primarily Tagalog-speaking patients.

Pre-test questionnaires will be administered during phase 1, which involves the introduction of the project to the participants. Post-test questionnaires will be conducted at the 6-month follow-up, phase 3. These surveys will utilize the Likert scale and will be analyzed based on the participants' responses. Additionally, apart from the survey data, participants will undergo blood work, including hemoglobin A1C (HbA1C) tests. HbA1C results will be obtained during phase 1, the 3-month follow-up (phase 2), and the 6-month follow-up (phase 3) to assess the impact of the intervention on diabetes management and maintenance.

The project will be implemented at the PCCH-W in the Endocrinologist's Office, Dr. Anna Lo. Dr. Lo and Dr. Aquino will hand-select participants for this project who will fit the criteria for this project. They will oversee the project and ensure the protocol is followed for accurate results. This includes a proper explanation of the goal of the modified decision aid to

the participants in phase 1, phase 2, and phase 3. Moreover, they will ensure that the participants complete pre- and post-questionnaire and blood work during phase 1 and 3, respectively.

The modified decision aid will be developed to be translated into Tagalog, which will make it easier for those who are primarily speaking Tagalog. To ensure feasibility and accessibility and account for limited health literacy, the decision aid will be written at a grade 8 level, visually captivating with bright colors, and use simple graphics. Moreover, the textual content will be limited, combined with the usage of pictures to help convey the intended message. As previously noted, the internal stakeholders will screen the information to ensure that the grammar in Tagalog is appropriate and that the information is properly conveyed.

The project will be implemented over a 6-month timeline, from July 2023 to December 2023. Each participant's data will be included from the start of July 2023 and be followed until the end of December 2023. Between July and December 2023, at the three-month mark around October 2023, follow-up clinic visits will be conducted. Data collection and analysis will begin and be completed in January 2024.

Framework

The framework selected to be applied is The Stetler Model of Research Utilization (see appendix B). Stetler's Model is appropriate for this project because it allows practitioners to take research and apply it with evidence-informed practice to elicit formal change within organizations (Stetler, 2001). It takes the research use as the initial step as a critical thinking process then takes the application of evidence-based practice allowing for the enhancement of research. Stetler's Model is composed of a 5-phase process which includes preparation, validation, comparative evaluation/decision making, translation/application, and evaluation.

The first phase, preparation, is determining the needs within the clinic then researching evidence-based interventions that could be a solution. For this project, this includes consideration for the current practice within the clinic for managing uncontrolled diabetes and determining what are barriers for this problem and what interventions would be best suited for the clinic's population. The second phase, validation, is reviewing, analyzing, and organizing the research then assessing its overall quality and level of evidence. At this phase, research studies are chosen to be included or eliminated based on its credibility then further synthesized. The third phase is the evaluation/decision-making phase, which occurs when the findings are evaluated and if it is feasible for application. During this phase, similarities and differences are identified, which allows the project coordinator to decide if the findings are appropriate for application into clinical practice. The fourth phase, translation/application, is where the formal project protocol and change strategies are developed for the implementation of the proposed intervention from the summarized findings. The final phase, evaluation, which focuses on reviewing the goals of the project and determining if they were achieved. The data collected from the project will be analyzed to further ascertain if the implemented intervention is worthwhile to continue at the clinic.

Synthesis of Evidence

PubMed, CINAHL, and Google Scholar databases were used to search the literature. In CINAHL, subject headings "diabetes medication choice decision aid," "diabetes patient decision aid," and "Diabetes decision aid Filipino" were utilized. Major headings, "diabetes and low health literacy," were used as an alternative search term. However, searches in CINAHL databases presented no pertinent articles. The CINAHL searches were excluded, and searches continued with PubMed and Google Scholar. In Google Scholar, the first search for "Diabetes

medications choice decision aid Filipino” led to many searches that continued in PubMed. In PubMed, searches were conducted with subject headers (MeSH) “ diabetes medication choice decision aid,” “diabetes patient decision aid,” “ Filipinos in Hawaii,” “Filipino diabetes management,” “ with “health literacy” as a subcategory. This search was combined with subject headers “Hawaii Filipinos,” “adherence or compliance,” and “diabetes management.” The databases were filtered for “human,” “English” language, and within the last fifteen years. The population was set for Filipinos and Filipinos in Hawaii, ages 18 and above.

Diabetes and its management is an ongoing crisis that increased over the years. However, articles on Filipino patient decision aids in diabetes management are limited. A total of 40 articles were obtained from the query. The oldest articles were from 2005 and 2008, but the most recent was from 2021. 9 articles were obtained within the last 10 years, while the remaining were from the last 15 years. After filtering for pertinent and removal of duplicate articles, a total of 16 articles resulted and were critically appraised.

Criteria for article selection were that the articles focused on Filipino diabetes medication decision aid, Filipinos with diabetes or T2DM, Filipinos and health literacy, Filipinos and medication adherence and compliance, diabetes in Hawaii, hypoglycemia and health literacy, and patient decision aids and health literacy. The selection of these specific criteria supports the basis of this project by highlighting the common theme of how highly Filipinos are impacted by diabetes. To improve the poor outcomes in Filipino type II diabetics, it must be determined what interventions would be most effective. An effective intervention is a culturally tailored PtDA translated into the Filipino language, Tagalog. The goal of the project is to implement a PtDA curated by Filipino people and given to the appropriate target population to improve health literacy and adherence rates.

The articles selected were mainly trials explaining how Filipinos are impacted by diabetes, their low health literacy, and adherence rates affecting their poor outcomes. The other articles explained how culturally tailored interventions such as PtDAs translated into Filipino were effective in the target population, increasing health literacy levels and improving health outcomes.

Mosby's grading system was used to appraise the articles and determine the level of evidence (see Table 1). According to Mosby's grading scale, Level I (Systematic Review or Meta-analysis) is the strongest evidence, and Level VII is the weakest (authority opinion and/or committee reports). Most articles were assessed as descriptive or qualitative studies (Level VI). Only one article was a level I; the rest were a mix of levels II, III, IV, V. However, a high level of evidence for this topic may have yet to exist due to research limitations and the nature of the clinical question (Ackley et al., 2008)

The evidence compiled for the project could be more extensive. Some articles would state that due to a lack of research on minority populations, Asian, Asian American, Pacific Islanders, and Native Hawaiian, more research needs to be done in these populations. Thus, with the evidence compiled, some information referenced was from 15 years ago. Nonetheless, current research about diabetes and the management of diabetes in the Filipino population has been obtained within the most recent years. The three common themes among the evidence are discussed accordingly 1) low adherence rates and low health literacy levels, 2) low health literacy and patient decision aids, and 3) culturally curated patient decision aids.

Diabetes is associated with low health literacy levels and poor outcomes (Malalang et al., 2017; Sakar et al., 2010). Low health literacy levels are common among minority populations, especially for those with English as their second language (Sayah et al., 2012). Low health

literacy can affect healthy behaviors that can impact an individual managing their health, such as chronic diabetes (Ydrin, 2021; McCaffrey et al., 2013; Sayah 2012). Filipinos with type II diabetes have been found to have both high rates of low adherence to treatments and health literacy (Lee & Taira, 2005; Sentell et al., 2011; Malalang et al.,2017; Sakar et al., 2010). Health literacy rates can be increased through interventions, bridging the healthcare disparities gap (Sentell et al., 2011).

According to The Diabetes Study of Northern California, limited HL is a barrier to diabetes self-management because individuals have difficulty understanding when to take the medications and which dosages they should be administering. They may also have issues when calculating dosage due to energy expenditure or caloric intake, leading to improper dosing. Moreover, problems with limited HL occur when the individual cannot accurately interpret blood glucose levels or trends that require self-adjustment to prevent hypoglycemic episodes. These are potential reasons why type II diabetics have difficulty with treatment adherence, which boils down to their limited HL levels.

Adherence to treatment regimens is crucial in the management of diabetes. Managing glycemic levels reduces healthcare costs and complications of diabetes (Lee & Taira, 2005). Common barriers to adherence include limited HL and the complexity of treatment regimens (Juarez et al., 2013; Sayah et al., 2012). Therefore, it is important to address and increase limited HL in populations at risk for diabetes and its complications.

An effective intervention to increase health literacy levels is using a patient decision aid (PtDAs). PtDAs are developed to be used by many and can be used to increase health literacy levels, however they have to be developed with features that make it useable by the target population. PtDAs can be presented in various ways, such as web-based tools, videos,

audiobooks, worksheets, treatment cards, and more. It was found that paper-based PtDAs were favored among patients and providers as they can be used both in the clinic and taken to the patient's homes (Ng et al., 2014). Physical PtDAs may be more widely accepted among patients and providers as it allows both parties to physically refer to the PtDA easily. Also, by allowing the patient to take the PtDA home, they can refer to it as needed if they cannot recall information. Moreover, one study found it easier for patients over 50 to utilize a paper-based PtDA due to decreased familiarity with technology. One disadvantage to a paper-based PtDA is the cost of printing multiple copies versus a computer-based PtDA that requires a one-time fee for developing the PtDA and web-page maintenance and updates. Nonetheless, how a PtDA disseminates information, its purpose is to be used during clinical consultations to help patients decide on their treatment options.

PtDAs help facilitate conversations between clinicians and patients about their treatment options during the SDM process (Macalalad-Josue et al., 2017). The SDM process, a patient-centered approach, allows both parties to work together by looking at the available evidence and mutually agreeing on the best treatment for the patient. PtDAs are useful, especially when there is no best “treatment” for the patient despite all the available evidence. Utilizing PtDAs gives patients tangible evidence that allows them to examine their options while having the clinicians explain things they may not understand or find confusing. Patients can provide their personal expert knowledge about how they perceive their disease affects them and their symptoms. Whereas the providers bring their clinical expertise to the table.

Sometimes, patients lack participation in the SDM process due to limited health literacy (HL) (Macalalad-Josue et al., 2017). However, studies have revealed that when individuals with limited HL levels are presented with adequate information, they, too, can participate in decision-

based discussions and increase their knowledge. For those with limited HL, it may require the presentation of the information to be suited to their level for this effect to occur. Thus, PtDAs are a feasible platform, as they should be made intentionally for all patients with varying HL levels (McCaffrey et al., 2013). Such features of an effective PtDA include limited textual information, use of graphics (tables, graphs, pictures), bright colors, and simplified presentation. It is important to consider those with low to limited HL levels because these tools can be provided to help bridge the gap between the inequities in healthcare.

It is vital to consider various cultural factors impacting diabetes management in Hawaii. Individuals must be willing to participate in diabetes self-management as they may delay treatment until complications arise, leading to poor outcomes. Culturally appropriate interventions should be considered in treatment plans. It may entice the patients to participate in their treatment, thereby reducing lifestyle factors that increase high rates of T2DM (Sheer et al., 2021). Therefore, developing a treatment plan or tool must be curated cognisant to be culturally relevant and applicable to the target population.

Malalang et al., found in a meta-analysis that health outcomes were improved in diverse ethnic populations when the interventions implemented were culturally tailored to the specific population (2017). In Malalang et al., study, they implemented a few effective cultural adaptation strategies. This included obtaining input from Filipino communities, such as community leaders, members, and providers who serve Filipino communities. Members of these communities are knowledgeable about the culture and language, which makes their contribution valuable and relevant. The study was conducted in both Tagalog and English, accounting for Filipino native-speaking individuals. Also, the participant's family members were encouraged to attend the monthly research visits to accommodate the family-oriented culture.

A patient was quoted, “*People are aware of our culture. I don’t have to explain, people understand what I’m talking about when we talk about certain kinds of food that is part of our culture...*” This quote is powerful because it highlights how patients can relate to the providers feeling secure through a sense of camaraderie between them. This is further supported by findings that effective intervention should be culturally tailored to the specific populations as the “one shoe fits all” is not the best approach but “including the people” in their care is (Hsu et al., 2012). This allows patients to connect with the providers when they feel like they understood, which can improve adherence to healthy behaviors, such as diabetes self-management.

The Diabetes Medications Choice Decision Aid was created by Mayo Clinic and adapted by Anna Macalalad-Josue and her team to fit the needs of type II Filipino diabetics in the Philippines (2017). Clinicians and patients favored the Filipino version of the PtDA because it was designed to cater to type II Filipino diabetics with low HL levels. The Filipino version of the PtDA was more graphic-based and contained less textual information. Macalalad-Josue et al., found that these patients were more receptive to the Filipino version of the decision aid and found it easy to understand as it was visually comprehensible (2017).

Much of the evidence presented was similar, with many of the introductions focusing on the impact of diabetes on the Filipino population in the introductions and purpose to highlight the need for research to mitigate health disparities in the Filipino population. Many methods in the literature focus on qualitative and iterative processes. Other methods included systematic reviews, cohort studies, and cross-sectional, retrospective, and prospective analyses. The variation of methods gives value to the literature as different approaches were used to obtain results pertinent to this search. Some of the evidence presented had large sample sizes using state-specific or integrated healthcare databases. Evidence that focused on single trials had a

small size, approximately less than 75 participants. The results and conclusions were similar and consistent throughout the literature review. All of which had common themes of requiring more research and a need to continue research in this specific area.

Consistent among the literature is that there is a need for evidence specific to the rapidly growing minority populations, specifically Filipinos, due to the current lack of research. Some research has been completed in developing patient decision aids, acknowledging their effectiveness and the need for them. Still, specific application in low-middle-income countries with target populations of low health literacy is scarce. There is a consensus that Filipinos are at risk for developing diabetes and its complications. Thus, research into mitigating the risks is a priority. Common themes of low levels of health literacy and decreased treatment adherence rates are contributing factors to poor self-management of diabetes in these populations. Some evidence highlights cultural factors that may implicate why some patients are reluctant to diabetes management, which should be further researched. Specific evidence regarding patient decision aids and the effects on health literacy are not directly assessed and should be further examined, though it is a potential correlation. Some studies also presented data retrieved from census studies around 10 - 15 years ago. These studies should be updated to reflect the current magnitude of the effects of diabetes on the Filipino population. The strength of the literature evidence is moderate as most of the evidence was specific to the Filipino population and was of level IV evidence and above. The varying levels of evidence gave a full range of significant studies in evaluating valuable information. However, some area for improvement in the literature is that it needed to be more extensive and easier to obtain. The literature search was narrowed despite the use of multiple variations of keywords and phrases. Also, other weaknesses in the data included the inclusion of data from 15 years ago due to the limited articles available.

Project Design/ Methods

This quality improvement project, conducted with the University of Hawaii at the Manoa campus, aims to implement a modified Filipino version of a diabetes medication choice decision aid into clinical practice. Consent was obtained by both the Mayo Clinic for the original Diabetes Medications Decision Choice Decision Aid and by Anna Angelica Macalalad-Josue for the Filipino version of the decision aid. This is a non-research QI project. This project does not seek to answer a new question and utilizes established interventions supported by evidence in the literature (see Appendix [C]).

The project will be implemented under Dr. Anna Lo at the Primary Care Clinic of Hawaii - Waipahu (PCCH-W) at the endocrinology office. This clinic is primarily Filipino-based and serves a predominantly Filipino community. Most providers are fluent in Filipino, either Tagalog or Ilokano. Known for its fast-paced environment, provider-patient interactions at PCCH-W typically last 10 minutes, resembling the efficiency of an urgent care setting.

The target participant total is n=10. Participant criteria include individuals of Filipino ethnicity who predominantly speak Tagalog with English proficiency as a secondary language. Participants must have been diagnosed with T2DM within the past five years, exhibiting uncontrolled glycemic levels and a documented history of non-compliance with treatment. Participants were selected from Dr. Anna Lo's patient database at PCCH-W.

The intervention implemented the modified Filipino version of the decision aid to serve as an informational guide, supplementing the educational materials and verbal instructions provided to the participants by the providers. The modified PtDA was recreated from the original Filipino version, incorporating the latest clinical information and tailored to the clinic's

population needs. Visually, the revised version remained identical to the original. The PtDA was printed in booklet form, comprising eight color pages, and distributed to each participant.

Endocrinologist Dr. Lo and Dr. Aquino, APRN, supervised interns at the clinic in participant selection. Providers at PCCH-W were briefed about how to explain and use the PtDA to be disseminated to the participants. The participants completed a paper-based pre-questionnaire to obtain a baseline for assessing their knowledge about their disease, medications, and treatment adherence. The paper-based post-questionnaire was collected at the end of the study to determine if there was a change in the participants' baseline results from the pre-questionnaire. In addition to the questionnaires, participants completed blood work, including a complete blood count (CBC) panel with a hemoglobin A1c (HbA1c) result during two clinical encounters, phase 1 and phase 3. HbA1c results for phase 1 might include HbA1c measurements obtained within the preceding three months.

During phase 1, participants were introduced to the PtDA, completed the pre-questionnaire, and underwent blood work. Subsequently, patients were instructed to return to the clinic for a 6-month follow-up, constituting phase 3. In phase 2, patients received phone calls to evaluate PtDA usage and remind them to schedule their phase 3 follow-up. Finally, during phase 3, participants underwent a repeat CBC and HbA1c testing and completed the post-questionnaire.

Data Collection

The project aims to increase the patients' limited health literacy and adherence to treatment rates. Thus, patients were assessed in areas of knowledge about diabetes, diabetic medications, comfortability in diabetic management, and diabetic medication adherence rates.

Data was collected from November 2023 to March 2024. The data collected included the pre-questionnaire and post-questionnaire results of 7 participants. The results were based on the

participant's responses to the Likert-based questions. The post-test questionnaire allowed us to analyze and determine whether there was an increase or decrease in the participants' knowledge of diabetes, diabetes medication, and treatment adherence.

Moreover, the participants will have completed blood work for the HbA1c results. The participants' HgbA1C was compared from phase 1 to the 5-month follow-up clinical encounter, phase 3. These results highlight whether the modified decision aid proves to be an effective tool in helping the participants adhere to their treatment plan.

The questionnaire results were collected directly from the participants during Phase 1 and Phase 3. The results were collected through a structured pre- and post-questionnaire comprising six Likert scale questions. The Likert scale, a commonly utilized measurement tool, enabled the participants to express their agreement or disagreement with given statements on a graded scale of 1-5. The questionnaire consisted of six questions, each designed to assess specific aspects of the patient's knowledge about T2DM, comfortability in individual care management and medication injection, and treatment adherence. Participants were asked to rate their responses on a scale of 1 to 5, with 1 indicating strong disagreement and 5 indicating strong agreement. HbA1c results were gathered during Phase 1, representing the initial visit, and at the end of Phase 3, marking the final visit. Furthermore, the post-questionnaire comprised two questions, one of which was a binary yes or no inquiry. The final question was optional and allowed participants to provide a free response.

To gauge the questionnaire's reliability, researchers could analyze the consistency of participants' responses across different time points. This might entail comparing how participants rated the Likert scale questions in Phase 1 versus Phase 3 of the study to determine if their ratings remained consistent.

To evaluate content validity, content expert Dr. Aquino verified that the chosen Likert scale questions adequately address the patient's understanding of T2DM, comfort level in managing care, administering medication, and adherence to treatment. This ensured the questions comprehensively aligned with the study's objectives and were relevant to the topic.

The study chose three distinct categories—knowledge, comfortability, and treatment adherence—to examine various aspects of the participant's health literacy and adherence rates. The knowledge domain aimed to evaluate participants' understanding of T2DM and medications, assessing their comprehension of the disease process and the medications prescribed. This domain served as a measure of participants' health literacy levels. The comfortability domain sought to gauge participants' willingness to actively manage their T2DM treatment plan and their comfort level with injectables if necessary. It aimed to discern whether changes in this aspect correlated with an inclination to take action regarding their care as they became more familiar with T2DM management. Lastly, the treatment adherence domain aimed to assess whether compliance increased following the implementation of the PtDA.

A paper-based table was created to ensure participant eligibility and establish a correlation between participant identification numbers and their corresponding information on the questionnaires, including initials, collection date, and HbA1c results recorded during Phases 1 and 3. In November 2023 (phase 1), the clinic intern administered the pre-questionnaire. These questionnaires were then collected on paper and securely stored within the clinic until retrieved by the researcher. In early January 2024, the researcher collected the pre-questionnaires and cross-checked participant information with EPIC records to ensure accuracy. This process was repeated for phase 3 in early March, where the researcher and content expert once again

confirmed the consistency between participant details and questionnaire responses, including HbA1c data.

The handling of participant data adhered to HIPAA regulations to ensure confidentiality and privacy. Verbal consent was obtained from participants by the clinic intern, who expressed willingness to participate in the study. The questionnaires were collected directly from the clinic intern, who stored the paper questionnaires securely at the clinic in a designated and locked location. Access to EPIC records was strictly limited to the clinic environment for confidentiality and was accessed solely for study purposes. Additionally, participant information was minimized in the Excel spreadsheet used for data analysis, with only initials used to correlate responses with participant numbers. This limited the exposure of identifiable information and reduced the risk of data breaches. The spreadsheet was stored securely on a personal computer, with access restricted to authorized personnel involved in the study. After completion of the study, the paper questionnaires were collected by the researcher and taken directly home for review. Once the data had been extracted and recorded, the paper questionnaires were securely shredded to maintain confidentiality and data integrity. These measures were implemented to comply with HIPAA regulations and safeguard participant privacy throughout the study.

Analysis

Two separate tables were created for the pre-and post-questionnaire data to facilitate comparison and analysis (See Table I and II). The questionnaire data was subsequently compiled into an Excel spreadsheet for analysis. The spreadsheet was structured with columns representing the six questions, while each row was dedicated to an individual participant. An additional column was added to reflect the corresponding HbA1c for each participant. This organization facilitated the systematic arrangement of participant responses, allowing for efficient data

processing and analysis. Subsequently, the data from each question was averaged individually, another average was computed from the collective averages of all six questions, and a final average of the HbA1c was computed. This method gave a comprehensive understanding of participants' overall responses across all aspects assessed by the Likert scale questions and a snapshot of average HbA1c results.

After individually averaging the responses to each question, the calculated averages were compiled into another table to compare the pre-and post-questionnaire results (See Table IV). This new table allowed for a side-by-side comparison of participant responses before and after the intervention. Each row in the table represented each question's pre- and post-questionnaire average scores. At the same time, columns were designated for the corresponding question and category in both the pre and post-questionnaires. This comparative analysis provided valuable insights into the effectiveness of the intervention by highlighting any changes or trends in participant responses over time.

A separate table was also generated for the HbA1c results (See Table V). The columns in this table represented the pre-implementation HbA1c results for phase 1 and the post-implementation results for phase 3. An additional column noted whether the HbA1c decreased or increased. Each row in the table correlated with an individual participant, providing a clear overview of their HbA1c levels before and after the intervention.

Results

Seven participants were involved in the data collection process. This sample size was selected based on the established patient pool at PCCH-W, individuals who met eligibility criteria and could complete the study between November 2023 and March 2024.

Responses from the participants' pre- and post-questionnaires were tabulated into a structured table format for ease of analysis. Each row represented an individual participant, while columns corresponded to the Likert scale responses for each question.

Averages were computed for each Likert scale question across all participants. These averages provided a quantitative measure of perception toward the assessed aspects of knowledge, comfortability, and adherence to treatment. Furthermore, the averages obtained from the pre-and post-questionnaire responses were compared to determine any changes or trends over time as seen in Figure I.

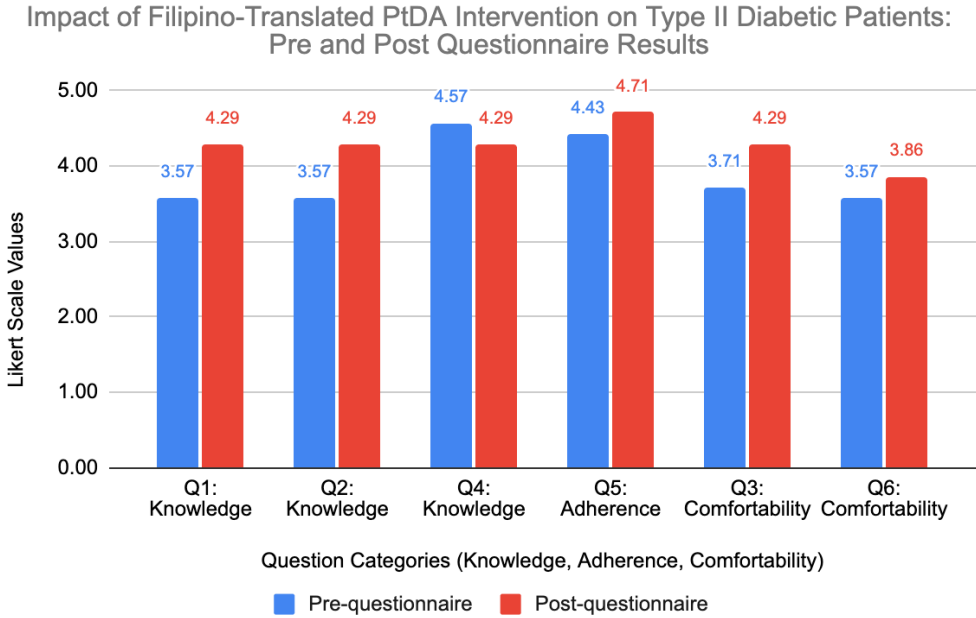


Figure I: Comparison of Pre- and Post-questionnaire results

The study's findings comparing pre- and post-questionnaire responses demonstrate a shift in participant perceptions. Before the intervention, the mean score on the questionnaire was 3.90, while post-intervention, it increased to 4.29. This change represents a 10% improvement across knowledge, comfort, and treatment adherence domains.

Furthermore, all responses in the post-questionnaire indicated a 100% affirmative answer to the query, "Did the patient decision aid provided six months earlier assist you?" (See Table III). The final post-questionnaire query aimed to gather community insight on the effectiveness of the PtDA, asking participants, "What could have been done to improve your experience further?" While the majority deferred from providing feedback, two participants shared their perspectives. One participant suggested "A closer follow-up from the first visit," and the other stated, "My doctor asked me about it or reviewed it with me during my follow-up."

The analysis of HbA1c% scores in Phase 1 and Phase 3 shows distinct outcomes. Before the intervention, the mean HbA1c was 8.14, decreasing substantially to 7.87 post-intervention. This corresponds to a significant 71.4% reduction in HbA1c levels. However, it's important to note that a subset of participants exhibited a 28.6% increase in HbA1c scores post-intervention.

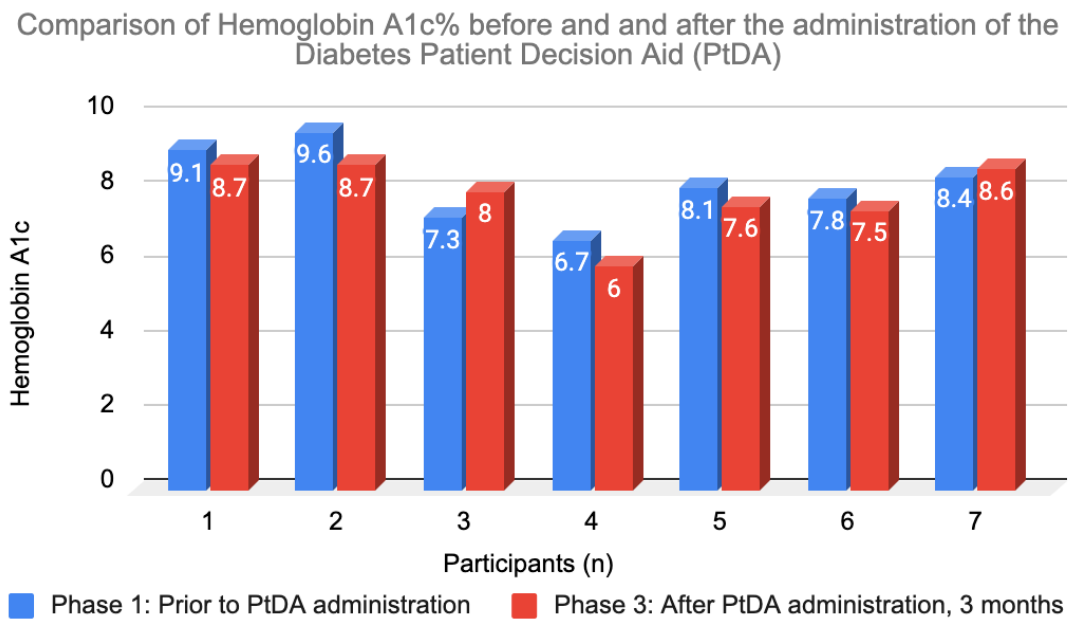


Figure II. Comparison of HbA1c% scores from Phase 1 and Phase 3

Discussion

Examining pre- and post-questionnaire data revealed significant enhancements across various domains after implementing the intervention. A substantial 10% improvement across all three domains of knowledge, comfortability, and adherence to treatment was seen. This progress suggests a favorable impact of the intervention on patient comprehension, engagement, and adherence to treatment protocols. This can be attributed to the PtDA that was given to the patient to help guide them in their diabetes management. However, it may also be due to the providers reinforcing teaching about T2DM and medication management that was further supplemented with the PtDA.

Regarding glycemic control, as assessed by HbA1c levels, participants exhibited promising outcomes. Before the implementation of the intervention, the mean HbA1c level was 8.14%. Post-intervention, this metric decreased to 7.87%, a 3.3% decrease. While this decline indicates enhanced glycemic control within the study cohort, it's notable to acknowledge that a subgroup of participants experienced a 3.5% increase in HbA1c levels post-intervention.

In the final question query for the post-questionnaire, one participant suggested "A closer follow-up from the first visit," indicating a desire for more frequent and involved interactions after the initial introduction of the intervention. Another participant wanted direct engagement with their doctor, stating, "My doctor asked me about it or reviewed it with me during my follow-up." This feedback highlights the importance of ongoing communication and interaction with healthcare providers using PtDA for diabetes management. Participants' preferences for more personalized and engaged follow-up underscore the significance of patient-provider communication and collaboration in optimizing the effectiveness of interventions like PtDA. It

also brings to light that these patients are more willing to participate in their care if providers have the time to meet with them more often to fine-tune their diabetes management.

The subgroup that exhibited an HbA1c change can be attributed to multiple factors, including older age, decreased comprehension due to health literacy levels, and a history of uncontrolled glycemic levels. Older age may play a factor in glycemic control, which can be attributed to many factors in terms of insulin resistance and changes in metabolism. However, these factors were evaluated during this study and may need to be researched further.

The study heavily relied on participants who were native Tagalog speakers with English proficiency to ensure effective communication and comprehension of the PtDA provided in both languages. By involving native Tagalog speakers with English proficiency, the study aimed to ensure that participants and close members who lived in the same household could fully understand the content of the PtDA in both languages. This approach recognized the importance of language accessibility in facilitating comprehension and engagement with the educational materials. It also acknowledged the linguistic diversity within the Filipino community, catering to individuals who may be more comfortable or proficient in one language over the other.

Furthermore, if the study had included family members, this is a factor to evaluate as we suspect the family members would provide additional support and reinforcement for participants in managing their diabetes. Family members could assist in clarifying any uncertainties, reinforcing key concepts presented in the PtDA, and encouraging adherence to treatment plans. Their involvement was essential for fostering a supportive environment conducive to effective diabetes management.

Overall, the study sought to enhance the accessibility, comprehension, and implementation of the PtDA in both English and Tagalog by leveraging the linguistic abilities of

native Tagalog speakers. This approach aimed to empower participants in their diabetes management journey and improve health outcomes within the Filipino community.

Limitations

Conducting the study encountered several barriers. Initially scheduled to commence in July 2023, the project faced delays and had to be shortened due to clinic logistics, ultimately rolling out in November 2023 and concluding in March 2024, resulting in a five-month pause. The project timeline was also compressed from six months to roughly four months due to time constraints. Furthermore, due to changes in clinic logistics, Dr. Aquino could not personally oversee the project, necessitating the delegation of responsibilities to the clinic interns. Although the interns were briefed on the project implementation protocol, several challenges arose.

The first challenge was participant selection. Clarifying selection criteria was necessary as interns were uncertain about whom to select. After enrolling nine participants, two had to be removed from the study for failing to meet the criteria. Secondly, interns may need to dedicate more time to explaining how to use the PtDA than the original provider. Additionally, patient compliance with PtDA utilization may have been higher if it were a provider meeting with them instead of an intern, given the established rapport. Thirdly, the shortened timeframe may have impacted results. Given more time and PtDA utilization check-ins, patient adherence rates and knowledge could have increased.

The second limitation pertains to provider endorsement of the PtDA. The successful adoption of a PtDA relies heavily on the endorsement and support from the providers. Without provider endorsement, patient trust and utilization of the aid may be compromised. Providers must actively encourage the use of the PtDA, reinforcing its importance for enhancing diabetic management. Furthermore, provider endorsement is contingent upon their understanding of the

PtDA. Providers must possess a comprehensive understanding of the PtDA's content, usage during shared decision-making (SDM), and how to effectively explain its utility to patients. This understanding is essential for facilitating clear communication and patient comprehension. Inadequate provider understanding may hinder the successful implementation of the PtDA.

The third limitation revolves around patients' varying reading abilities and literacy levels, which can impact the effectiveness of the PtDA. Elderly individuals and those with vision challenges are particularly susceptible to these limitations. Addressing diverse literacy levels requires employing tailored approaches. For instance, while some patients may struggle with both Tagalog and English literacy, others may understand spoken Tagalog but face challenges with reading. In Tagalog-speaking settings, assessing patients' Tagalog reading proficiency becomes imperative to ensure the PtDA's accessibility and efficacy among different linguistic groups. Additionally, vision impairments pose further obstacles, affecting patients' ability to read text or interpret images within the PtDA. Consequently, the PtDA's utility may be compromised in such instances.

The fourth limitation involves considering patients' speaking versus reading abilities. Some patients may prefer receiving information verbally from their healthcare provider rather than relying on written materials. In such cases, patients prioritize verbal explanations over reading materials. Therefore, it's crucial to take into account patients' preferences for verbal communication versus reading materials to ensure effective implementation of the PtDA.

Pairing with English-Speaking Family Members:

Patients with limited English proficiency may benefit from pairing with family members proficient in English to enhance comprehension and decision-making.

The fifth limitation concerns the exclusion of family or household members as a contributing factor. Ideally, involving English-speaking family or household members could enhance the effectiveness of the PtDA by providing valuable support and reinforcement for participants in managing their diabetes. Patients with limited English proficiency could particularly benefit from pairing with family members proficient in English to improve comprehension of the PtDA. These family members could serve as secondary sources of reinforcement and offer additional support in diabetic management. However, their participation was limited due to time constraints and work schedules, potentially impacting the intervention's effectiveness.

Implications

Several implications stem from this study. Firstly, the development of a recorded training video can serve as a valuable resource for providers to effectively utilize the PtDA. Such resources are instrumental in educating healthcare professionals, including Advanced Practice Registered Nurses (APRNs), on seamlessly integrating the PtDA into their practice. This ensures the proper dissemination of the PtDA's intended use.

Moreover, incorporating the PtDA training video and PtDA into clinic orientation resources is essential. Integrating PtDA training into clinic orientation materials enables new providers to acquaint themselves with the PtDA and its implementation processes. Dr. Aquino can serve as the content expert and point of contact, offering additional guidance and support to new providers as necessary.

Another implication involves translating the decision aid into various languages to accommodate the linguistic needs of diverse cultural groups. The PtDA can be adapted to cater to different cultural groups of patients, such as Chinese, Japanese, Vietnamese, Hawaiian, and

more. This adaptation ensures the PtDA's relevance and accessibility across diverse patient populations. Given Hawaii's diverse population, expanding the PtDA's reach to cover other cultural groups is particularly beneficial.

Lastly, sharing the concept of the decision aid with healthcare providers beyond clinic settings is vital. The PtDA can find utility in various healthcare settings, including community health programs led by Public Health Nurses (PHNs). Disseminating the PtDA concept to other providers encourages its widespread adoption and utilization in promoting informed decision-making among patients across different healthcare settings.

Conclusion

In conclusion, it's imperative to note that while the intervention demonstrated overall positive outcomes, a 28.6% increase in HbA1c% in some cases highlights the necessity for further investigation into contributing factors. These findings underscore the importance of thorough examination and personalized approaches to address individual patient needs in diabetes management.

Moreover, the results clearly illustrate the significant role of PtDA in enhancing patient education, empowerment, and health outcomes in diabetes management. By providing patients with comprehensive information and involving them in decision-making processes, PtDA facilitates better understanding and engagement, ultimately leading to improved outcomes.

The study faced several barriers, including delays in project commencement and a shortened timeline due to clinic logistics. Additionally, changes in clinic logistics led to the delegation of responsibilities to clinic interns, which may have impacted participant selection and PtDA utilization. Furthermore, the study did not include family members, potentially limiting the support and reinforcement available to participants in managing their diabetes.

Future studies should explore the impact of family engagement and support, especially for bilingual speakers, in managing T2DM. Incorporating family members into intervention strategies could provide valuable assistance and reinforcement for patients, particularly in culturally diverse communities where familial involvement plays a significant role in healthcare decision-making. Investigating the influence of family dynamics on treatment adherence, lifestyle modifications, and overall health outcomes could offer valuable insights for developing more comprehensive and holistic approaches to diabetes management.

Continued refinement and customization of PtDA based on patient feedback and clinical insights are crucial for sustaining positive outcomes and promoting patient-centered care in diabetes management practices. By continuously adapting PtDA to meet patients' evolving needs and incorporating their perspectives into clinical decision-making, healthcare providers can ensure the delivery of effective and tailored care that maximizes patient well-being and satisfaction.

The implications of this study are significant for advancing patient-centered care and promoting informed decision-making in healthcare practice. The development of recorded training videos for PtDA utilization, integration into clinic orientation materials, and translation into multiple languages serve to enhance accessibility and effectiveness across diverse patient populations. Furthermore, sharing the PtDA concept with healthcare providers beyond clinic settings, including community health programs, facilitates its widespread adoption and utilization. These implications underscore the importance of continued efforts to implement PtDAs in clinical practice, ultimately improving patient outcomes and satisfaction.

Appendix A:

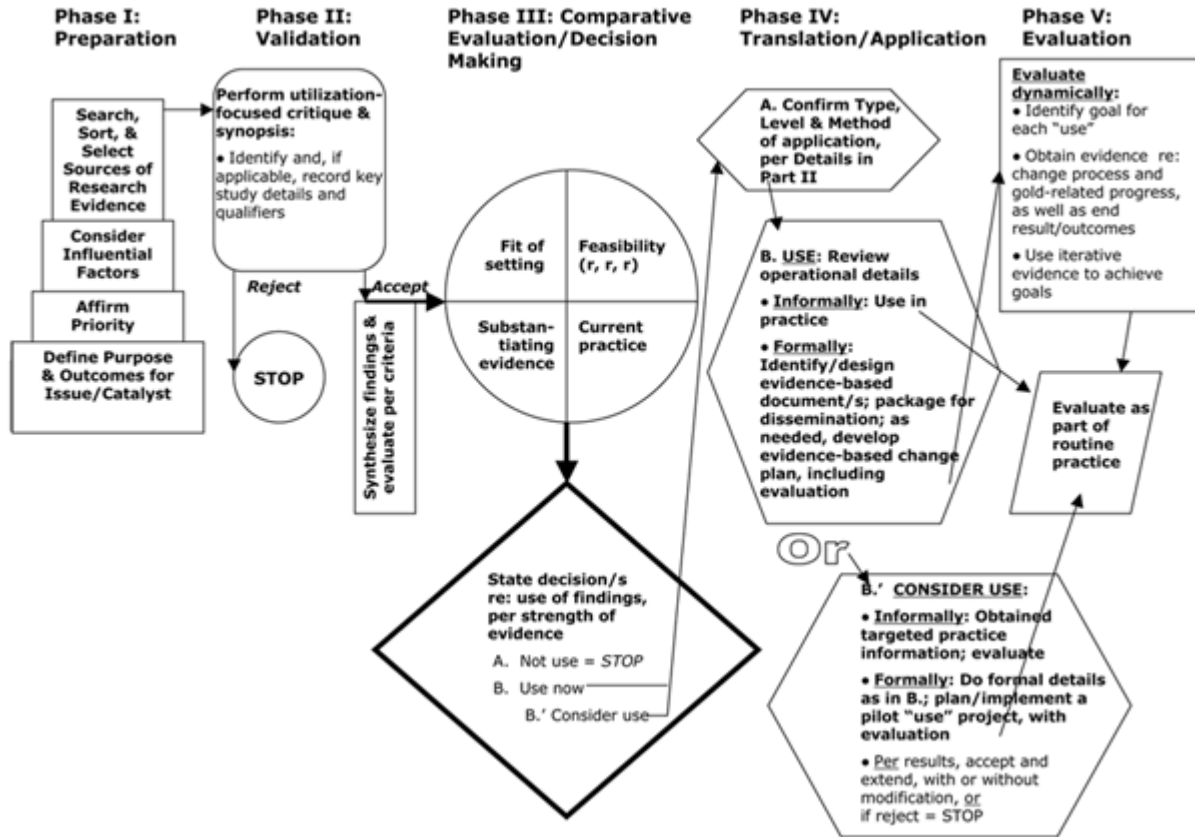
Mosby's Level of Evidence Chart

Level of Evidence (LOE)	Description
Level I	Evidence from a systematic review or meta-analysis of all relevant RCTs (randomized controlled trial) or evidence-based clinical practice guidelines based on systematic reviews of RCTs or three or more RCTs of good quality that have similar results.
Level II	Evidence obtained from at least one well-designed RCT (e.g. large multi-site RCT).
Level III	Evidence obtained from well-designed controlled trials without randomization (i.e. quasi-experimental).
Level IV	Evidence from well-designed case-control or cohort studies.
Level V	Evidence from systematic reviews of descriptive and qualitative studies (meta-synthesis).
Level VI	Evidence from a single descriptive or qualitative study.
Level VII	Evidence from the opinion of authorities and/or reports of expert committees.
Other	Evidence from performance improvements, case reports, and literature reviews.

This level of evidence rating scheme is based on the following: Ackley, B. J., Swan, B. A., Ladwig, G., & Tucker, S. (2008). *Evidence-based nursing care guidelines: Medical-surgical interventions*. (p. 7). St. Louis, MO: Mosby Elsevier.

Appendix B:

Stetler Model of Research Utilization



Appendix C

Literature Synthesis

Author & Date	Focus/Purpose	Stated Method	Sample Description	Main Findings
Anna Angelica Macalalad-Josue, Lia Aileen Palileo-Villanueva, Mark Anthony Sandoval, and Jose Paolo Panuda, 2019	Develop a patient decision aid to help Filipino patients with type 2 diabetes mellitus make informed choices about their diabetes medication.	Qualitative	Focus group discussions (FGDs) and key informant interviews (KIIs)	Successful creation of a patient decision aid tailored for Filipino patients with type 2 diabetes mellitus, potentially improving their treatment decision-making process.
Chirk Jenn Ng, Nigel Mathers, Alastair Bradley & Brigitte Colwell, 2014	Introduces the PANDAs model, which is a combined framework approach to developing patient decision aids.	Mixed methods	10-member expert panel	Likely emphasize the efficacy and versatility of the PANDAs model in developing patient decision aids for various healthcare contexts.
Deborah Taira Juarez, Candace Tan, James Davis, Marjorie Mau, 2013	The study investigated medication adherence among adult diabetes patients in Hawaii over four years and its impact on healthcare utilization.	Retrospective analysis	Administrative data from adult patients with diabetes enrolled in health plan in Hawaii for four years (n= 23,450 patients)	Adherence to medications, especially anti-diabetic and lipid-lowering ones, significantly lowered hospitalization and emergency department visits. Patients adherent to all three medication types for four years had a substantial 53% reduction in healthcare utilization
Rachel Lee, Deborah A Taira, 2005	The study aimed to assess adherence to oral hypoglycemic agents, highlighting differences related to ethnicity and age. It found that adherence was lowest	Retrospective analysis	Administrative data analysis included prescription refill claims for oral hypoglycemic agents from	Adherence to medications increased with age, peaking at 74 years, then declined after 85 years. Japanese patients showed the highest adherence,

	among younger and Filipino patients.		January 1, 1999, through June 30, 2003	while Filipino patients had the lowest. Gender did not affect adherence.
Melissa L. Finucane, PhD; Carmit K. McMullen, PhD, 2008	Making Diabetes Self-management Education Culturally Relevant for Filipino Americans in Hawaii	Qualitative	Study had two rounds of semi-structured focus groups and interviews involving 15 patients with type 2 diabetes and 7 healthcare and cultural experts from Hawaii.	Underscored cultural influences on Filipino Americans' participation in diabetes self-management education (DSME). Recommendations were provided to enhance DSME cultural relevance, potentially improving teaching methods, materials, and recruitment strategies for this community.
Phyllis Aira Sheer H. Raquinio; Gertraud Maskarinec; Rica Dela Cruz; Veronica W. Setiawan; Bruce S. Kristal; Lynne R. Wilkens; Loïc Le Marchand, 2021	Investigate the determinants of type 2 diabetes among Filipino American adults in the Multiethnic Cohort Study	Cross-sectional	Participants from Hawaii and Los Angeles filled out questionnaire. Type 2 diabetes status was using self-reported data and medication information.	First-generation immigrants had lower type 2 diabetes prevalence than subsequent generations, with a significant increase in the second generation compared to the first. Suggests that lifestyle factors adopted by Filipino migrants and changes in risk factor patterns across generations contribute to higher type 2 diabetes rates.
William C. Hsu, Edward J. Boyko, Wilfred Y. Fujimoto, Alka Kanaya, Wahida Karmally, Andrew Karter, George L. King, Mele Look, Gertraud Maskarinec,	Explore pathophysiologic differences among Asians, Native Hawaiians, and other Pacific Islanders, and to discuss the implications	Expert opinions, case reports, or descriptive studies without	N/a	Findings of the symposium emphasized the urgent need to address diabetes among Asian Americans, Native

Ranjita Misra, Fahina Tavake-Pasi, Richard Arakaki, 2012	of these differences for treatment strategies.	control groups		Hawaiians, and Pacific Islanders (AANHPI) populations. Implementing community-based interventions tailored to specific AANHPI communities, as one-size-fits-all approaches may not be effective.
Olivia Uchima, MA; Yan Yan Wu, Colette Browne, Kathryn L. Braun, 2019	Investigate diabetes prevalence across racial/ethnic groups in Hawai'i and to assess how socioeconomic status and lifestyle behaviors influence prevalence among different populations, particularly Japanese, Filipino, Chinese, Native Hawaiian/Other Pacific Islander (NHOPi), and white populations.	Cross-sectional	18,200 subjects from Hawai'i Behavioral Risk Factor Surveillance System. Poisson regression analyses used to examine the prevalence of diabetes	Disparities in diabetes prevalence were observed among respondents aged 35 to 44, with disparities increasing with age. NHOPi and Filipinos had the highest prevalence of diabetes,
Andrew J. Karter; Dean Schillinger, MD; Alyce S. Adams, PHD; Howard H. Moffet, MPH; Jennifer Liu, MPH; Nancy E. Adler, PHD; Alka M. Kanaya, MD, 2013	Estimate the prevalence and incidence of diabetes among specific subgroups of Asians and Pacific Islanders (APIs) within a multiethnic U.S. population with uniform access to care.	Prospective cohort analysis	II	Prevalence: Pacific Islanders, South Asians, and Filipinos had the highest prevalence rates, with 18.3%, 15.9%, and 16.1% respectively. APIs exhibited considerable variation in diabetes rates, with some subgroups facing higher risks than traditionally considered high-risk minorities like

				African Americans and Latinos.
Christian Sandor B. Ydirin, 2021	Study aimed to examine the disparities in health literacy and behaviors among adults based on their diabetes risks and explore the relationship between these variables.	Descriptive cross-sectional design	IV	Health literacy was positively correlated with health behaviors, particularly in the high-risk group. These findings highlight the importance of promoting health literacy, especially among high-risk individuals, to encourage healthy behaviors and raise awareness of diabetes risks.
Tetine Sentell , Kay Kromer Baker, Alvin Onaka & Kathryn Braun, 2021	Investigate the association between health literacy and health outcomes among Asian Americans/Pacific Islanders (AA/PI) compared to Whites in Hawai'i	Cross-sectional	Population-based sample including Japanese, Filipino, Native Hawaiians, Other Asian Americans/Pacific Islanders (AA/PI), and Whites.	Significant variations in low health literacy across ethnic groups, with the highest prevalence among Filipinos and lowest among Whites. Emphasizes the importance of culturally tailored health literacy interventions.
Urmimala Sarkar MD, MPH, Andrew J. Karter PhD, Jennifer Y. Liu MPH, Howard H. Moffet MPH, Nancy E. Adler PhD & Dean Schillinger MD, 2010	Aimed to determine the proportion of ambulatory, pharmacologically-treated patients with type 2 diabetes reporting significant hypoglycemic events in the prior 12 months and to assess the association between health literacy (HL) and hypoglycemia risk.	Cross-sectional analysis in an observational cohort, the Diabetes Study of Northern California (DISTANCE).	Cross-sectional analysis within the Diabetes Study of Northern California (DISTANCE) cohort, comprised 14,357 adults with type 2 diabetes from Kaiser Permanente	Limited health literacy was common, with many patients reporting problems learning about health, needing help reading health materials, and lacking confidence in filling out medical form

			Northern California (KPNC).	
Dale Dagar Maglalang, Grace J. Yoo,2 Rhodora A. Ursua, Carissa Villanueva,4 Catherine A. Chesla, Melinda S. Bender, 2017	To evaluate the acceptability and cultural suitability of the PilAm Go4Health program, a mobile health weight-loss lifestyle intervention tailored for Filipino Americans with type 2 diabetes and featuring virtual social networking.	Qualitative semi-structured post-program interviews	45 Filipino Americans with type 2 diabetes in Northern California. The participants had a mean age of 57.6 years. A total of 67 post-program interviews were conducted.	PilAm Go4Health program, a culturally tailored mobile health weight-loss intervention, was widely accepted among Filipino Americans with type 2 diabetes. Participants reported increased engagement and self-efficacy through the intervention, highlighting its relevance for diverse populations in diabetes management.
Landry L. Fukunaga, Denise L. Uehara, Tammy Tom, 2011	Aimed to provide a comprehensive understanding of the perceptions, barriers, and support needs related to disease management among employed adults with diabetes in Hawaii.	Qualitative	Focus group interviews with 74 employed adults with diabetes	Participants expressed the need for social and psychological support, as well as coordinated healthcare teams to address medication side effects and other barriers to disease management. Integrating diabetes management with work and family responsibilities was a common challenge, emphasizing the need for financial support.

Appendix D

Pre-Test Questionnaire

Administered in Phase 1 with the patient and health care provider.

Good to bad	Very Poor	Poor	Average	Good	Excellent
How much do you know about your condition (Type II Diabetes) ?	1	2	3	4	5
How much do you know about diabetic medications and their side effects?	1	2	3	4	5
How comfortable are you being involved in managing your diabetes?	1	2	3	4	5
Frequency	Never	Rarely	Sometimes	Often	Always
Do you know when to take your medications?	1	2	3	4	5
Do you take your medications as prescribed?	1	2	3	4	5
If taking injectables - how comfortable are you at administering it yourself?	1	2	3	4	5

Post-Test Questionnaire

Administered in Phase 3 with the patient and health care provider.

Good to bad	Very Poor	Poor	Average	Good	Excellent
How much do you know about your condition (Type II Diabetes) ?	1	2	3	4	5
How much do you know about diabetic medications and their side effects?	1	2	3	4	5
How comfortable are you being involved in managing your diabetes?	1	2	3	4	5
Frequency	Never	Rarely	Sometimes	Often	Always
Do you know when to take your medications?	1	2	3	4	5
Do you take your medications as prescribed?	1	2	3	4	5
If taking injectables - how comfortable are you at administering it yourself?	1	2	3	4	5

Did the patient decision aid given six months prior help you? YES or NO (please circle one)

What do you think could have been done to further improve your *experience*?

Appendix E

List of Tables

Pre- and Post-questionnaire results and HbA1c results collected

Table I. Mean Pre-questionnaire results with corresponding HbA1c%

Participants	Q1	Q2	Q3	Q4	Q5	Q6	HbA1c%
1	1	1	3	5	4	3	9.1
2	3	2	1	3	3	4	9.6
3	4	5	4	5	5	4	7.3
4	4	4	4	4	4	4	6.7
5	4	4	4	5	5	5	8.1
6	4	4	5	5	5	1	7.8
7	5	5	5	5	5	4	8.4
Average	3.57	3.57	3.71	4.57	4.43	3.57	8.14

(n= 7)

Table II. Mean Post-questionnaire results with corresponding HbA1c%

Participants	Q1	Q2	Q3	Q4	Q5	Q6	HbA1c%
1	3	3	3	5	4	3	8.7
2	3	3	3	4	4	4	8.7
3	4	5	4	5	5	5	8
4	5	5	5	5	5	5	6
5	5	5	5	5	5	5	7.6
6	5	4	5	5	5	1	7.5
7	5	5	5	5	5	4	8.6
Average	4.29	4.29	4.29	4.86	4.71	3.86	7.87

(n= 7)

Table III. Post-questionnaire results: 2 questions

Participants	Did the patient decision aid given six months prior help you? YES or NO	What could have been done to improve your experience further?
1	Yes	A closer follow up from the first visit
2	Yes	N/A
3	Yes	N/A
4	Yes	My doctor asked me about it or reviewed it with me during my follow-up
5	Yes	N/A
6	Yes	N/A
7	Yes	N/A

(n= 7)

Table IV. Comparison of Mean Pre-questionnaire and Post-questionnaire results

Question & Category	Pre-questionnaire	Post-questionnaire
Q1: Knowledge	3.57	4.29
Q2: Knowledge	3.57	4.29
Q4: Knowledge	4.57	4.29
Q5: Treatment Adherence	4.43	4.86
Q3: Comfortability	3.71	4.71
Q6: Comfortability	3.57	3.86

Table V. Comparison of HbA1c Scores: Pre vs. Post Implementation of PtDA

Participants	Phase 1: HbA1c	Phase 3: HbA1c	Increase or Decrease
1	9.1	8.7	Decrease
2	9.6	8.7	Decrease
3	7.3	8	Increase
4	6.7	6	Decrease
5	8.1	7.6	Decrease
6	7.8	7.5	Decrease
7	8.4	8.6	Increase

(n= 7)

Appendix F

List of Graphs

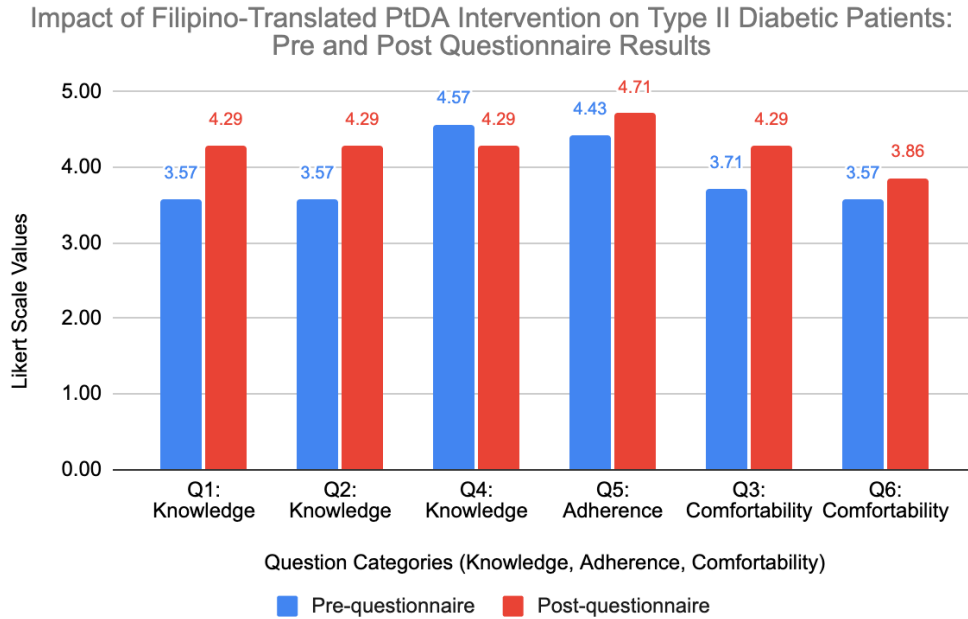


Figure I. Comparison of Pre- and Post-questionnaire results

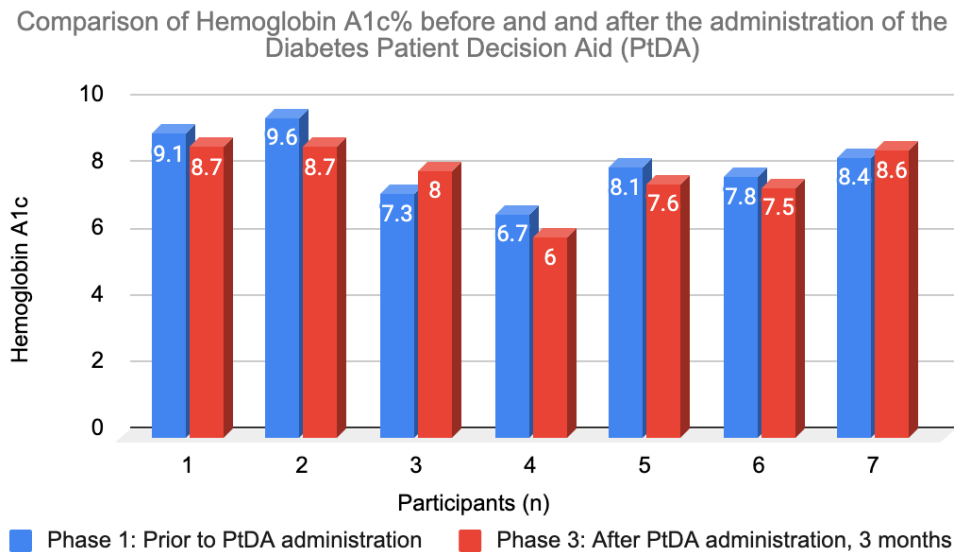


Figure II. Comparison of HbA1c% scores from Phase 1 and Phase 3

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