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Implementing Pain Screening in a Parkinson's Disease Clinic: A Quality Improvement Initiative

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Abstract

Background: Pain is a multifaceted, non-motor symptom often unnoticed and undertreated in Parkinson's disease (PD). PD pain is associated with decreased quality of life (QOL) and is found in 30-85% of PD patients. The effective diagnosis and treatment of PD pain could improve patient QOL. Barriers to appropriate diagnosis and treatment include a valid and reliable PD pain assessment tool. There was an opportunity to improve the assessment of PD-related pain at the movement disorder clinic in this suburban clinic of a tertiary safety net hospital. The local movement disorder clinic did not have a standardized PD-specific tool to assess PD pain. Additionally, the PD patient may not feel the pain related to PD and, therefore, not report pain which may result in unnecessary patient suffering.

Methods: A PRISMA-guided literature review was undertaken to determine the most effective pain scales to assess pain in individuals with PD. The King's Parkinson's Pain Questionnaire (KPPQ) was identified as a reliable and valid self-rated screening tool. The aim was to implement and evaluate KPPQ, a self-screening tool to serve as a streamlined process to trigger discussion for assessing Parkinson's disease-specific pain.

Intervention: The KPPQ, a self-screening tool, was implemented for PD patients in the outpatient movement disorder clinic. PD patients were asked to complete the tool and providers reviewed the pain screening tool to assess pain further. If any discussion of pain occurred between the patient and provider, it was to be noted in the chart. Later, a chart audit evaluated if the patients with pain had a pain discussion documented in the chart. Analysis of the assessment of PD pain was informed by those who completed the self-screening KPPQ tool for pain and those with pain who discussed it with the clinician. Completed screening tools identified this population's most often to least reported PD-specific type of pain. Huddles that took place throughout the project provided qualitative data vis-à-vis the clinic team's observations and opinions regarding the project and process. The clinic staff's post-implementation survey identified the project's satisfaction, feasibility, and added value.

Results: Most of the PD patients who completed the self-reported screening conveyed pain in this outpatient movement disorder clinic. Musculoskeletal pain was reported most often, followed by painful muscle cramps, and pain related to turning in bed during the night. Pain assessment improved, with most PD pain patients engaged in discussions as compared to prior to the implementation of the tool.

Conclusions: This project established a process flow utilizing the KPPQ screening tool to identify PD-related pain. The overwhelming prevalence of pain in this population highlights the importance of self-report of pain in PD patients. Clinic staff recognized that further assessment of PD-specific pain allows for an opportunity to improve patient care.

Implementing Pain Screening in a Parkinson's Disease Clinic: A Quality Improvement Initiative

Introduction

Problem Description

Pain is a complex, non-motor symptom, often overlooked and undertreated in Parkinson's disease ("PD") (Antonini et al., 2018; Buhmann et al., 2020; Ford, 2010; Sin et al., 2020). A review by Valkovic and colleagues (2015) reported that the prevalence of pain in patients with Parkinson's disease ranges from 30% to as high as 85% (Silverdale et al., 2018; Buhmann et al., 2020; Valkovic et al., 2015). Studies reveal that 50% of PD patients report moderate to severe pain intensity, with musculoskeletal pain reported most often (Tai et al., 2020; Buhmann et al., 2020). PD pain is associated with worsened disability, decreased quality of life ("QOL"), depression, and sleep disturbances for the individual (Agrawal, 2021; Martinez-Marti, 2018; Rana, 2016). Sin and colleagues (2020) conclude that the effective diagnosis and treatment of PD pain would address factors affecting patient QOL. Barriers to appropriate diagnosis and treatment include a valid and reliable PD pain assessment tool (Gao, 2022). In addition, patient barriers include uncertainty that the pain is related to PD or is treatable and acceptance of pain as part of life (Hurt, 2019). Untreated pain influences the patient's QOL and healthcare costs (Deslauriers, 2021).

While there is a lack of evidence regarding costs specifically related to PD pain, Yang, and colleagues (2022) report that the United States's approximate healthcare costs for PD care, including direct costs, medical care, and indirect costs, such as lost productivity in work, were close to $52 billion in 2017 and based on these figures project $79 billion in costs in 2037. PD pain may be considered chronic, with chronic pain defined as being present for a period of at least three months. Looking at direct healthcare costs relating to medical care and indirect costs

in terms of lost work hours, the Pain Foundation (2021) reports that costs of up to $635 billion dollars per year are associated with chronic pain. The actual and projected cost of pain and PD underscores another critical reason to assess PD pain effectively.

Local Problem

In a large tertiary safety net hospital's suburban movement disorder clinic, clinicians often use scales and tools in research but lack a valid and reliable tool to assess PD pain. Current practice in this clinic includes each patient encounter asking the patient if they have pain; if the patient states "yes," then they are asked the location of the pain and to rate the severity with a numeric rating scale (NRS) 0-10 where 0 equals none, and 10 is the worst pain. This is documented in the chart and the provider can view this assessment in the chart during the visit. In this clinic, the scales are not PD-specific and there remains a gap in attention to PD pain.

The local movement disorder clinic does not have a standardized PD-specific tool to assess PD pain. Patients come to the clinic for movement problems and may or may not feel their pain is related to PD, so they do not report it (C. Thomas, personal communication, September 22, 2023). There was an opportunity to improve attention to pain and staff were interested in processes or strategies to elevate pain assessment. The electronic health record was reviewed for baseline assessment of pain for PD patients evaluated in this clinic. This review demonstrated that of 30 random charts reviewed, one had a pain assessment score and location documented in the chart, three patients reported pain, and three patients were asked about their pain. Medical record notes indicated some pain discussion occurred in eleven charts. Nineteen charts out of 30, or 63%, had no record of clinicians asking, documenting, or discussing pain. Analysis of this data revealed an opportunity to improve attention to pain in this clinic.

Best practices include pain assessment at each encounter with appropriate tools for screening and assessment (U.S. Department of Health and Human Services, 2019). Implementing a PD-specific self-screening tool for pain may improve the assessment of PD pain. Clinicians in this clinic would like to improve attention to pain and identify a more organized and efficient process to assess pain. Identifying a PD-specific pain assessment and standardizing an assessment process prompted this investigation into the most effective strategies to assess pain in PD patients.

Available Knowledge

A PRISMA-guided literature review was undertaken in October 2022 to determine the most effective pain scales to assess pain in individuals with PD. A search of three databases, CINAHL, Medline, and PubMed, was carried out with inclusion criteria including English language, peer-reviewed journals, and literature within five years. Key search terms included "*pain assessment*," "*Parkinson's disease*," and "*pain measurement*." This yielded 106 results; 14 were removed due to duplication, and 78 articles were additionally excluded as unrelated to pain assessment tools, resulting in 14 articles. Of the remaining 14 articles, six studies were excluded as they examined other topics, including non-motor symptoms other than pain and pain treatments, resulting in eight quantitative articles for review. An additional search of the literature for practice guidelines revealed three additional resources. The Johns Hopkins evidence-based rating scale was used to evaluate each of the eight quantitative studies for strength and quality of evidence (Poe & White, 2010).

Of the studies selected, all were determined to have level III strength of evidence, with four having high quality, an A rating (Chaudhuri et al., 2015; Mehdizadeh et al., 2020; Taghizadeh et al., 2021), the remaining four were rated B, good quality (Agrawal et al., 2021;

Martinez-Martin et al., 2018; DiMarzio et al., 2018; Gao et al, 2022). A lack of randomized controlled studies highlights the pressing need for more scholarship regarding PD pain. The additional references included The Joint Commission (TJC) 2022 care standards on pain assessment and a systematic review of PD pain scales (Geroin, 2016), both rated level V, with an A quality, along with the U.S. Department of Health and Human Services (2019) best practice for pain guideline level IV, A.

A summary (Appendix A) of the studies arranged by intervention, highlights each study's significant outcomes and quality. The literature identified three valid and reliable tools for assessing pain in PD. Mehdizadeh and colleagues (2020) demonstrated adequate validity and reliability of the Short-form McGill Pain Questionnaire- 2 (SF-MPQ-2) to measure pain in Iranian PD patients who presented to a movement disorder center. The SF-MPQ -2, the short form of the MPQ, is a reliable and valid tool to assess pain characteristics with attention to sensory and affective qualities. This valid and reliable tool has been used to assess neuropathic and non-neuropathic pain (Lovejoy, 2012). Although the psychometric properties of the SF-MPQ-2 were valid and reliable, neuropathic or non-neuropathic pain assessment would limit the type of pain assessed in PD patients. Taghizadeh et al. (2021) studied pain assessment with subjects completing the Brief Pain Inventory (BPI) scale. The BPI is a self-rating tool to assess pain severity and its effect on activities of daily living (Stanhope, 2016). The BPI demonstrated acceptable psychometric properties and is valid for use in PD patients. It was studied in both the "on" and "off" states, with "on" being when the medicine is working and the patient is moving, to "off" when medications are wearing off and PD symptoms are returning, to assess neuropathic pain severity and interference with activities of daily living (ADL). The BPI is a valid and reliable tool, but the focus on neuropathic pain in these studies limits its use to capture all types

of PD pain. However, its ability to measure pain and its effect on ADLs provides more information on how pain impacts QOL.

The remaining studies focused on the King's Pain Parkinson's Disease scale (KPPS) and demonstrated it as a reliable and valid tool to assess pain in PD (Chaudhuri et al., 2015; Gao et al., 2022; Martinez-Martin et al., 2018; Taghizadeh et al., 2020). The studies demonstrated varied implementation strategies of this scale, including with patients in the off state, administering the scales by movement disorder specialists who conducted face-to-face interviews with patients, and finally, using self-rating screening tools, the King's Parkinson's Pain Questionnaire (KPPQ) to assess the patient's experience of their pain (Gao et al., 2022; Taghizadeh et al., 2020; Martinez-Martin et al., 2018). The KPPQ, a questionnaire, parallels the KPPS, a scale, and is a reliable and valid screening tool (Martinez-Martin, 2018). DiMarzio et al., 2018) studied the application of the KPPS in a pilot study before and after deep brain stimulation (DBS), demonstrating the use of this scale to assess pain. All the studies assessed pain in patients from movement disorder clinics with movement disorder specialists as providers.

There is a critical gap in knowledge regarding assessing pain in PD. Searching guidelines and systematic reviews for evidence of PD pain guidelines, the American Academy of Neurology has updated its Parkinson's Disease Quality Measurement Set with no mention of PD pain (Chou, 2021). The Joint Commission has general pain assessment guidelines for outpatient ambulatory clinics, which serve as a standard of care. The Health and Human Services also noted “Best Practices” for pain assessment and management but were not specific regarding PD pain. In the initial phase of this project, a plan to examine the implementation of the King's Parkinson’s Pain Questionnaire (self-rater tool) and King's Pain Parkinson's scale (provider rater tool) together to bring attention to pain assessment and treatment among community-dwelling

adults receiving care in a tertiary clinic and safety net hospital was proposed. However, during the planning phase of this project, the pathway for pain assessment was presented to the stakeholders who agreed that both tools would not be feasible in their clinic due to time constraints. Additionally, the stakeholders felt the suburban clinic was better suited for the project with a smaller staff of one physician, one nurse, one medical assistant, and one administrative assistant. It was decided to implement only the KPPQ patient screening tool, which would be a realistic scope for the project in the suburban clinic location. This project examined if implementing the KPPQ, a self-screening questionnaire, served as a streamlined method to trigger a discussion for Parkinson's disease-specific pain in an outpatient setting. PD pain must be adequately assessed and managed to improve the care of patients with PD.

Rationale

While no underlying or conceptual theory emerged from the literature review, the Chronic Care Model (CCM) (Wagner, 1998) served as the theoretical framework for this project. The CCM links best practices and guidelines to real-world care practices. The elements of this model focus on providing care based on evidence. It uses information technology to collaborate across the health system and among providers, involving and promoting patient engagement in care and utilizing resources in the community for patients. This model has demonstrated better quality patient care and reduced healthcare utilization and costs (Kadu & Stolee, 2015; Wagner, 1998). This framework was well suited as the conceptual underpinnings for this project involving PD care, which is interdisciplinary, and the patients are knowledgeable and motivated. Additionally, the clinic nurse reported that the chronic care model is the framework of this movement disorder clinic (C. T., personal communication, March 3, 2023).

John Kotter's eight-step change theory was utilized to inform the implementation of this project. This theory consists of creating importance, developing an alliance, a visualization for change, conveying that vision, addressing barriers to change, identifying and celebrating short-term successes, identifying what worked well and what could improve, and securing the change in the organization (Kotter, 2012).

Aims

This project aimed to assist the healthcare clinician with a preliminary assessment to identify PD-specific pain. The overarching aim was to implement a pain self-screening tool to serve as a streamlined method to trigger a discussion for Parkinson's disease-specific pain in an outpatient setting. Five specific aims guided this project:

Specific Aims

1. Convene stakeholders from the clinic to co-create the plan to integrate this process into the care of PD patients in an outpatient suburban movement disorder clinic.
2. 85% of the stakeholders, healthcare providers (HCP), nurses, medical assistants, and administrative secretaries will attend and participate in an education session about the process and the KPPQ screening tool.
3. 85% of PD patients will complete the self-screening KPPQ tool for pain in an outpatient suburban movement disorder clinic.
4. 85% of those patients with PD pain identified will have a reference to any pain discussion in the electronic health record.
5. 85% of the team, health care providers, nurses, and staff will identify that implementing this tool, KPPQ, was feasible and added value.

Methods

The Plan-Do-Study-Act (PDSA) model served as the structure for the planning, implementation, and evaluation of this project. John Kotter's eight-step change theory was used to inform this project's implementation.

Context

The Parkinson's Disease and Movement Disorder Center is an outpatient satellite clinic as part of an urban tertiary hospital, a 514-bed academic medical center serving infants to adults in metro Boston and surrounding communities. The hospital is considered a safety net institution where all patients receive care regardless of their ability to pay for services. This project occurred at the satellite clinic in Weymouth, Massachusetts, 15 miles south of the Boston location. The center meets the needs of PD patients who live south of the city and who prefer not to travel to Boston. It is staffed by two movement disorder specialists (neurologists), one clinical nurse specialist, a medical assistant, and an office administrator. The microsystem of a PD patient is detailed in the microsystem map (Appendix B). Weymouth is in the southern corner of Norfolk County and borders Plymouth County. The population of the satellite clinic differs significantly from the city's primary location. Norfolk County encompasses 27 towns with a population of over 720,000 residents, 75% of whom are White, 13% Asian, 9% Black or African American, and 6% Hispanic or Latino (Norfolk County, 2022). An opportunity to bring attention to PD-specific pain is apparent and providers in this clinic are interested in improving the assessment of PD pain and pain-related treatment.

Inadequate pain assessment is influenced by many factors, which can be visually depicted by a fishbone diagram, including people, processes, equipment, environment, and management (Appendix C). Often individuals do not report their pain, believing the provider is already doing

everything they can for their pain. Cultural influences and beliefs by the provider and patient can impact pain assessment. Givler et al. (2022) reported that many cultures express pain differently, and understanding individuals' cultures and beliefs is another factor in pain assessment. For example, false beliefs by the patient or clinician that pain is a normal part of the aging process can impact the assessment of pain in older patients (Ong & Thiam, 2022). The prevalence of PD increases with age, especially in those 65 years and older, which highlights the need to recognize and manage pain and its possible negative impact on the quality of life in this population (Parkinson's Foundation, 2023). Time constraints are an additional factor related to a healthcare visit. The patient with PD has multiple motor and non-motor symptoms; focusing on the motor symptoms or inability to move often dominates the visit. Other non-motor symptoms of depression, anxiety, and sleep difficulties are more prevalent than pain complaints. Not only do time constraints affect pain assessment, but pain may not be a priority until it becomes so severe that it can no longer be ignored. The lack of awareness of effective pain assessment tools for Parkinson’s disease is evident in the literature and implementation of these tools is lacking.

Two areas that can help or hinder pain assessment involve processes and regulators. Clinical decision support systems or pop-ups in electronic health records (EHR) can help the provider remember to assess pain. However, they may have varied use due to provider differences and workflows (Apathy et al., 2022). Regulators such as the Joint Commission (TJC) and leadership support contribute to pain assessment. TJC standards can impact hospital accreditation and are a driving force in implementing pain standards. Lack of adherence to pain assessment standards results in inadequate pain assessment, under-treatment, and suffering by the patient. For these reasons, improvement of pain assessment in this clinic was undertaken.

A force field analysis was completed to assess the forces for and against change, which will enhance strategies to support change and develop ways to mitigate contrary forces (Appendix D). Factors for change included improving patient pain, healthcare provider engagement, and improved knowledge. Two critical forces for change involved aligning with a valued and credible nursing clinician and utilizing TJC pain standards. Baloh et al. (2019) describe the second step in Kotter's change theory, developing a leading alliance. The valued nurse clinician and the pain standards by TJC served as a solid coalition to implement this change. This project met three TJC criteria, including promoting evidence-based practice, involving patients in pain management, and referring patients for pain treatment as needed (The Joint Commission, 2022). Identified forces against the change included time constraints for providers to assess pain, the project lead being an unknown clinician to this group of providers, lack of a PD pain tool in this clinic, poor engagement by staff with the implementation, and finally, staff complacency and resistance to change. Time constraints and complacency were the most significant challenges of these negative forces. Weekly huddles that encouraged the process served to mitigate the negative forces of complacency. Additionally, the strong engagement of the valued nurse clinician provided a catalyst for change. Time constraints diminished as the providers became more accustomed to discussing the scale, a 14-item tool, with their patients.

Intervention

This QI project addressed improving the pain assessment process by utilizing the KPPQ self-screening tool to trigger the assessment and treatment of pain in PD patients in the outpatient movement disorder clinic. The flow map highlights the three focus areas, including the pre-implementation phase, the intervention, patient self-screening for pain, and post-implementation or the evaluation of the process. This intervention is a QI project as the KPPQ tool is used at

visits to assess pain and progress toward the goal of improved attention to pain assessment and treatment.

The implementation of the process of screening for PD pain with the KPPQ, a self-screening tool is diagrammed in the intervention flow map (Figure 1). The PD patient presenting to the outpatient clinic checked in with the office administrator at the front desk and was given a paper copy of the KPPQ tool on a clipboard with a pen. The PD patient, who was often accompanied by their care partner, completed the self-screening questionnaire independently or with the assistance of the care partner, nurse, or medical assistant. The KPPQ screening tool is a 14-item questionnaire to assess pain in the last 30 days due to PD or related medication. The self-rater tool allows patients to respond "yes" or "no" to questions related to types of PD-specific pain, for example, musculoskeletal, dystonia, and radicular pain and is a valid and reliable screening tool (Martinez-Martin, 2018). The components of the KPPQ are illustrated in Figure 2.

Figure 1: Screening for Parkinson's Disease Pain

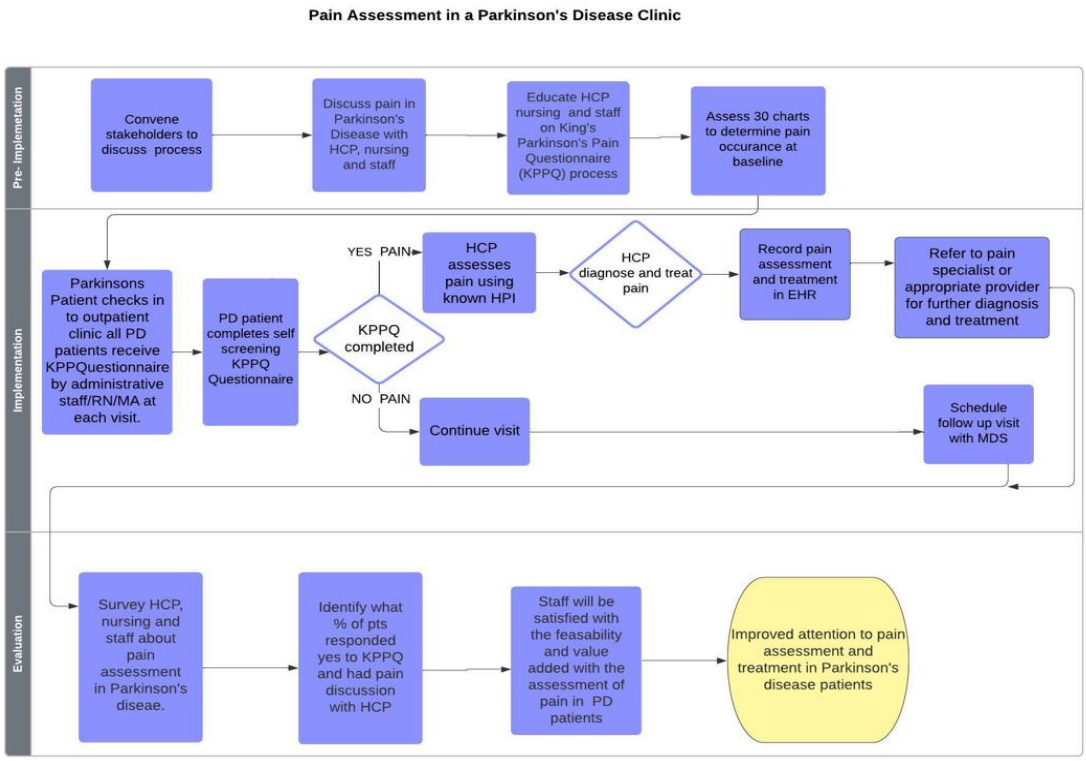
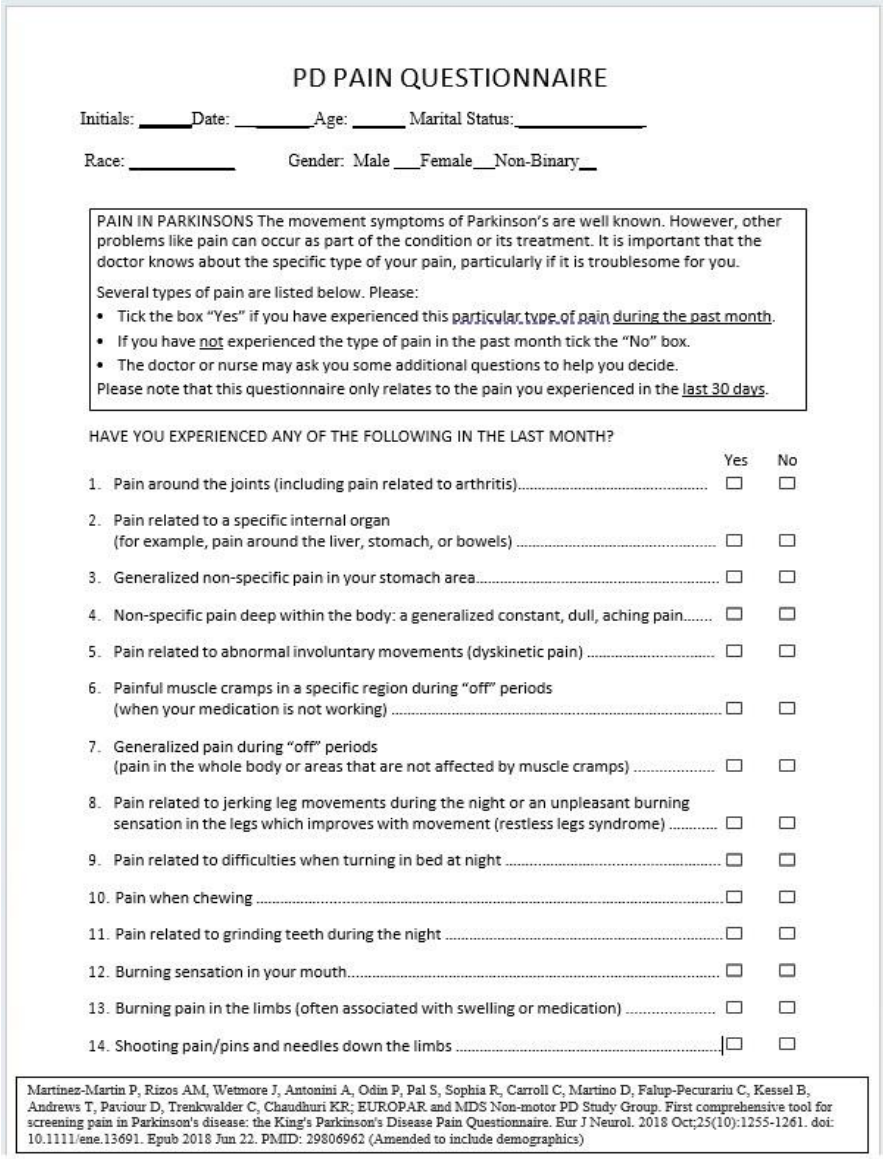


Figure 2 KPPQ Tool



PD PAIN QUESTIONNAIRE

Initials: _____Date: _____Age: _____ Marital Status:_____

Race: _____ Gender: Male ___Female__Non-Binary__

PAIN IN PARKINSONS The movement symptoms of Parkinson's are well known. However, other problems like pain can occur as part of the condition or its treatment. It is important that the doctor knows about the specific type of your pain, particularly if it is troublesome for you.

Several types of pain are listed below. Please:

- Tick the box "Yes" if you have experienced this particular type of pain during the past month.
- If you have not experienced the type of pain in the past month tick the "No" box.
- The doctor or nurse may ask you some additional questions to help you decide.

Please note that this questionnaire only relates to the pain you experienced in the last 30 days.

HAVE YOU EXPERIENCED ANY OF THE FOLLOWING IN THE LAST MONTH?

	Yes	No
1. Pain around the joints (including pain related to arthritis)	☐	☐
2. Pain related to a specific internal organ (for example, pain around the liver, stomach, or bowels)	☐	☐
3. Generalized non-specific pain in your stomach area	☐	☐
4. Non-specific pain deep within the body: a generalized constant, dull, aching pain	☐	☐
5. Pain related to abnormal involuntary movements (dyskinetic pain)	☐	☐
6. Painful muscle cramps in a specific region during "off" periods (when your medication is not working)	☐	☐
7. Generalized pain during "off" periods (pain in the whole body or areas that are not affected by muscle cramps)	☐	☐
8. Pain related to jerking leg movements during the night or an unpleasant burning sensation in the legs which improves with movement (restless legs syndrome)	☐	☐
9. Pain related to difficulties when turning in bed at night	☐	☐
10. Pain when chewing	☐	☐
11. Pain related to grinding teeth during the night	☐	☐
12. Burning sensation in your mouth	☐	☐
13. Burning pain in the limbs (often associated with swelling or medication)	☐	☐
14. Shooting pain/pins and needles down the limbs	☐	☐

Martinez-Martin P, Rizos AM, Wetmore J, Antonini A, Odin P, Pal S, Sophia R, Carroll C, Martino D, Falup-Pecurariu C, Kessel B, Andrews T, Paviour D, Trenkwalder C, Chaudhuri KR; EUROPAR and MDS Non-motor PD Study Group. First comprehensive tool for screening pain in Parkinson's disease: the King's Parkinson's Disease Pain Questionnaire. Eur J Neurol. 2018 Oct;25(10):1255-1261. doi: 10.1111/ene.13691. Epub 2018 Jun 22. PMID: 29806962 (Amended to include demographics)

The patient took the paper tool into their visit and handed the completed KPPQ to the physician. The physician reviewed the tool to determine if the patient had responded yes or no to any of the 14 items on the KPPQ. If the patient indicated no pain by checking the "no" responses on the KPPQ tool for pain, the provider noted that they had no pain. If the patient reported pain by a check box "yes" to any of the questions on the KPPQ, the physician discussed the patient's pain by reviewing the item on the scale. Specifically, the physician assessed the pain utilizing the history of the present illness. Questions that were asked included: Where is the pain located and when did it begin? Additional questions asked the patient to describe in their own words the quality of the pain, for example, electrical or cramping, when the pain occurred, and what made it worse or better. The provider documented the discussion by recording any

reference to pain assessment and/or treatment in the electronic health record patient notes. When sufficient assessment occurred to determine the etiology of the pain, the physician could initiate treatment for the patient. If the physician could not diagnose the pain, the HCP could refer the patient to another provider, including a pain specialist, orthopedist, primary care provider, or physical therapist.

Implementation of the Intervention

Project implementation occurred over 12 weeks from November 2023 to February 2024. Pre-planning efforts for this intervention included a baseline chart review of 30 patient records to determine pre-implementation pain assessments of patients with PD pain. This evaluation identified an opportunity to improve pain assessment. Next, the stakeholders were convened and asked to provide input regarding the project and process flow. The intended process flow was discussed with each stakeholder, who shared insights to guide the implementation of the process. For example, the medical assistant and office administrator were asked how they would provide the KPPQ to the patient, and they suggested placing the form on a clipboard to provide to each PD patient. They indicated this would work as patients had a few moments in the waiting area to complete a tool. All stakeholders agreed that the patient bring the paper into the visit and hand it to the physician.

A color-coded folder with the KPPQ tool was placed in a convenient location determined by the medical assistant and office administrator, along with another color-coded folder to place completed screening tools. All team members agreed on where to place the completed tools and agreed that was feasible. The nurse and medical assistant agreed to help patients complete the tool if needed. The physician agreed to review the tool and discuss any types of pain that the patient had endorsed with a “yes” checkmark.

Acknowledging that time might constrain the ability to assess the pain comprehensively, the stakeholders agreed that any reference to reviewing the screening tool with the patient and discussion of the pain and treatment would be minimal criteria for having assessed the pain. Documentation of any discussion and reference to pain was recorded in the chart as evidence that this occurred. The implementation phase began with a lunchtime discussion presenting the process and review of the KPPQ tool. The project lead reviewed the requirements of the respective roles of each stakeholder and a survey of their understanding was completed after the meeting. Survey data indicated that all individuals understood the project and their roles.

The process began with the office administrator presenting the tool to the patients when they checked in for their appointment. The patients were agreeable to completing the tool. The office administrator remarked that the patients would "do anything for their physician" (B.H., personal communication, November 10, 2023).

The patients presented the tool to the physician who reviewed the items that were checked as "yes" to pain. The physician would record any reference to pain in the patient encounter visit note. If the provider had adequate information to diagnose the pain and treat, she did. If there was insufficient information or additional consultation was needed, the physician could refer the patient to another provider, for example, a pain specialist, orthopedist, primary care provider, or physical therapist for further investigation and/or treatment of the pain.

Weekly huddles occurred during the 12-week project to problem-solve challenges and promote success. Huddles included asking each team member what was working well, what could be improved, and any other information they felt was important to convey related to the project. Feedback was also provided during the one-to-one huddle, which allowed the project lead to gather insights about the process and share these with all team members. Conveying

preliminary data about pain screening findings at weeks four and eight helped identify improvements and motivated the stakeholders to continue the project. Langley and colleagues (2009) report that a leading principle of improvement is feedback, to inform stakeholders that improvement is occurring. The study portion of the plan-do-study-act (PDSA) process allowed stakeholders to reflect on the process. It became apparent that the patient often identified certain types of pain. For example, patients endorsed pain when turning in bed, allowing the physician to engage in further discussion to identify if the patient could not turn in bed due to freezing, inability to move, or due to pain. Clarifying this item helped guide the physician regarding which medicine to adjust to address this issue. The screening tool served as a trigger for a more involved discussion related to the pain.

Patients were observed writing the location of their pain in the margins of the paper KPPQ tool. Based on this observation, additional lines were added to accommodate more writing areas for the patient and to determine whether this change would yield more patients commenting on their location of pain. The additional lines did not encourage more writing. Discussing this process improvement with the clinic site mentor, she noted that writing can be impaired in PD due to tremors and micrographia, where handwriting becomes increasingly smaller.

The project took place in New England during the winter and holiday seasons. Clinic closures and the unexpected surgery of one of the team members extended the study over an additional month, for a total of four months. At the conclusion of data collection, all team members were surveyed to determine the project's satisfaction, feasibility, and added value.

To identify the associations between the resources, the planned activities, and the expected outcomes of this project, a logic model (Appendix E) was developed. This model

depicts if the resources are available, in this case, stakeholders, KPPQ, supplies, and time, then identifies the planned activities of developing education for the KPPQ tool, convening the stakeholders to provide feedback on the tool, and developing the process flow. These activities resulted in outputs such as deployed education and a process flow map. Short-term outcomes included weekly huddle feedback where staff verbalized understanding of the tool and the pain process. Intermediate goals included patients receiving and completing the tool, and patients who reported pain being assessed by the physician. Finally, long-term goals revealed those who reported pain and had a discussion of pain noted in the chart. The overall expected outcome was to improve the assessment and treatment of pain in PD patients.

Evaluation of the Intervention

To evaluate the intervention, the PDSA cycle was employed. John Kotter's eight-step change theory was utilized to inform the implementation of this project. This theory consists of creating importance, developing an alliance, a visualization for change, conveying that vision, addressing barriers to change, identifying and celebrating short-term successes, identifying what worked well and what could improve, and securing the change in the organization (Kotter, 2012).

The “plan” phase included the pre-implementation training of the stakeholders and meetings to gather input and create an environment for change. This relates to Kotter’s change theory and his first three stages: creating importance, developing an alliance, and visualization for change (Kotter, 2012). The second phase, “do,” is the implementation of the intervention. In this stage screening patients for pain with the KPPQ was the intervention. Kotter’s theory supports this process segment through engagement and supporting the movement disorder clinic. Specifically, addressing barriers to change, identifying, and celebrating short-term successes, and

identifying what worked well and what could improve was demonstrated through weekly huddles. Additionally, responses were logged to track reoccurring themes of success or challenges, document the mitigation of challenges, and discuss in person with the stakeholders weekly for feedback. The "study" phase focused on observing the results and the "act" phase acted on the information learned. This project sought to determine whether the KPPQ screening questionnaire served as a streamlined method to trigger a discussion for PD-specific pain in this movement disorder clinic. Finally, Kotter's last two steps in his theory, to build on the change and to secure the change in the organization, were evaluated by the survey results from the stakeholders.

Measures and Analysis

The measures and analysis are guided by the objectives shown in Table 1. The complete table of measures and analysis plan are presented in Appendix F. The first objective was *to convene stakeholders from the clinic to co-create how to integrate this process into the care of PD patients in an outpatient suburban movement disorder clinic.* The expected outcome was to develop and implement a process flow for a PD pain assessment pathway. These outcomes were measured by educating the stakeholders, specifically providing the PD pain assessment flow map and QI project overview. This overview was a discussion with team members showing a proposed flow map and the KPPQ screening tool. The stakeholders, physician, nurse, medical assistant, and office administrator attended the meeting, shared ideas, commented on the project flow map, and provided input about the process. Meeting minutes recorded the staff attendance, inputs, and comments. There was no comparison and the analysis was interpreted by qualitative data from the meeting minutes. Data tracking was supported by the attendance sheet as the tool to identify who attended the meeting (Appendix G).

The second objective was that a threshold of *eighty-five percent of the stakeholders, health care providers, nurses, medical assistants, and administrative secretaries would attend and participate in an education session about the KPPQ screening tool.* The expected outcome was that eighty-five percent of the staff would be educated in the process and the KPPQ tool. The attendance record for the session served to measure the outcome (Appendix H). The session included a slide presentation of the agreed-upon process flow and information on the KPPQ tool's background, dimensions, reliability, validity, and how patients would use the self-rater tool by checking yes or no. Weekly huddles allowed continuous input and feedback to problem-solve challenges and celebrate successes. Data tracking was supported by the attendance sheet as the tool indicating who attended the session and comments recorded on the sheet. The qualitative data for analysis of the huddles came from a weekly journal of comments by staff recorded by the project lead.

The third objective was that e*ighty-five percent of Parkinson's disease patients would complete the self-screening KPPQ tool for pain*. The expected outcome was that eighty-five percent of patients who received the KPPQ tool would complete the tool. This outcome was measured by the number of patients completing all 14 items of the KPPQ tool. The tool is a dichotomous scale requiring a check mark to either yes or no to a question about pain. A "yes" response to any of the items indicates pain. When checking in to the clinic, the administrative secretary provided a paper copy of the tool to all PD patients. This objective was analyzed by frequency and proportion. The proportion of PD patients who got the paper KPPQ and those who completed it was analyzed for the proportion analysis. Finally, those who got the paper and reported pain were analyzed. There was no comparison group. The data tracking tool for the

analysis of this objective was the KPPQ tracking tool (Appendix I).

The fourth objective was that *eighty-five percent of those patients with PD pain identified had any discussion of pain assessment and treatment in the chart.* The expected outcome of this aim was that eighty-five percent of patients with PD pain would have any reference or discussion of pain assessment and treatment in the chart. This outcome was operationalized with a documented note in the medical record indicating the patient reported pain, and any note indicating assessment and treatment for pain was documented as an indication of completion. The information was obtained via chart review (Appendix J).

Table 1: Aims and Measures

Aim or Objectives	How to operationalize/ measure
To convene stakeholders from the clinic to co-create how to integrate this process into the care of PD patients in an outpatient suburban movement disorder clinic.	• Provide a flowchart and QI project overview to the team. • Stakeholders (physician, nurse, medical assistant, and administrator) attended the meeting, shared ideas, commented on the project flow map, and provided input about the process.
85% of the stakeholders, health care providers, nurses, medical assistants, and administrative secretaries attended and participated in an education session about the flow map process and the KPPQ screening tool.	• Attendance at the slide presentation and . information on the KPPQ tool's background, dimensions, reliability, validity, and how patients would use the self-rater tool. • A post-education survey to determine if team members understood their roles and the process flow. • Weekly huddles to problem-solve challenges and acknowledge successes recorded by project lead in a weekly log.
85% of Parkinson's disease patients completed the self-screening KPPQ tool.	• Completion of all 14 items of the dichotomous KPPQ tool. • Scoring the KPPQ - A check mark "yes" to any of the items indicated pain.
85 % of those patients who had PD pain identified had a reference to the pain or discussion noted in the chart.	• The medical record note indicated the patient reported pain. • The medical record note indicated a discussion of the pain.
85 % of the team, health care providers, nurses, and staff identified that implementing the KPPQ tool was satisfactory, feasible, and added value.	• Stakeholders would be satisfied with using the KPPQ tool and the process flow. • A post-implementation survey with a 5-point Likert scale was used To determine if stakeholders felt the project was satisfactory, feasible, and added value.

The fifth objective was that eighty-five percent of the stakeholders identified whether implementing the KPPQ tool was feasible and added value. The overarching aim was to improve pain assessment and treatment for patients with PD receiving care in a suburban outpatient movement disorder clinic. A post-

implementation satisfaction survey was deployed in week 12 which measured this outcome. Integration of two dimensions of Kotter's' change theory served as the framework for this survey, "don't let up" and "making it stick" (Kotter, 2012). The survey assessed if the stakeholders felt the KPPQ tool and the process of utilizing this tool were feasible, satisfactory, and added value. The survey determined if the stakeholders felt this improvement should continue or, as Kotter's theory calls it, "make it stick." To assess feasibility and satisfaction, the questions, "Was reviewing the PD pain screening tool practical to use? " and "Were you satisfied with the PD pain project?" were surveyed. To determine if stakeholders felt this project added value and should continue, team members were asked, "Did this project bring added value to PD pain?" and "Did this project bring your attention to the PD patient's pain? The survey, a 5-point Likert scale of strongly agree to strongly disagree was administered at week 12. Analysis of this outcome focused on frequency, proportion, and mean. There was no comparison data. The data tracking tool (Appendix K) supports this analysis. The analysis examined a positive or negative survey result. A positive response for satisfaction was a Likert score greater than or equal to, four, agree, and five, strongly agree. A negative response or not satisfied was reflected in a Likert response score of less than four, including neutral, disagree, and strongly disagree. Descriptive data on age, sex, race, and marital status identified the participant's demographics.

Ethical Considerations

The movement disorder clinic conducts a great deal of research and quality improvement; however, before engaging in discussions about the project the team wanted to ensure that this project did not need to be approved by the Institutional Review Board (IRB). The clinical improvement checklist was provided by the University of Massachusetts Boston (UMB) for review by the IRB to ensure that it would not need approval, and it did not; it was exempt

(Appendix L). This project implements a screening tool for clinical reasons only ensuring it is quality improvement. Furthermore, it looks at how many participants complete the tool and how many HCPs discuss the pain and document the pain discussion in the record. Finally, developing a flow pathway for pain assessment is a process, for the purposes of quality improvement. The proposed project is quality improvement and does not meet the definition of human subject research because it is not designed to generate generalizable findings but rather to provide immediate and continuous improvement feedback in the local setting in which the project is carried out. The UMB IRB has determined that quality improvement projects do not need to be reviewed by the IRB.

Results

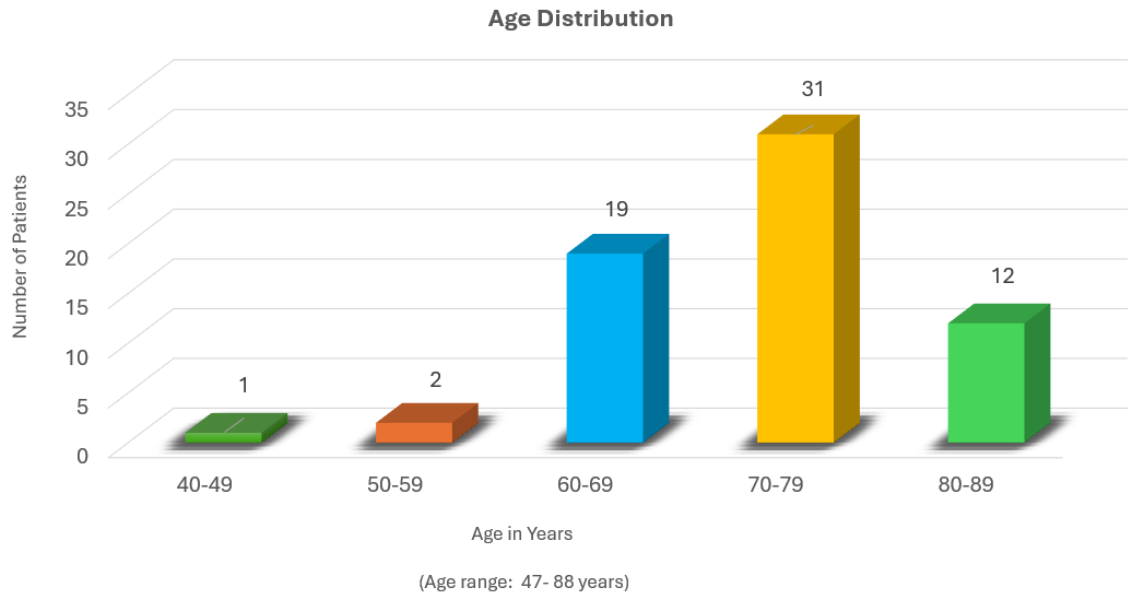
Over four months, from November 2023 until February 2024, 64 patients were seen in the movement disorder clinic for evaluation of Parkinson's Disease. Table 2 describes the demographic characteristics of the participants. The participants included a total of 64 patients, 61% were male and 39% were female. Most of the participants were White, 92% (n=59), and married, 83% (n=53). The remaining five participants included two participants who reported their race as Hispanic, two participants who reported unknown race (0.03%), and one patient who reported Asian (0.015%). This clinic was representative of the PD population,

Table 2: Demographic Characteristics of Participants

Characteristics	N = number	% = percent
Gender		
Male	39	61%
Female	25	39%
Race		
White	59	92%
Hispanic/ Latino	2	0.03%
Asian	1	0.01%
Unknown	2	0.03%
Marital Status		
Married	53	83%
Single	4	6%
Widowed	5	8%
Divorced	0	0
Unknown	2	0.03%
Age		
Average 72 years		
Range 47-88 years		

with many participants married, the remaining 8% widowed, 6 % single, 0.03 % unknown, and no participants reporting they were divorced. Participants' ages ranged from 47 to 88 years, with an average age of 72. Figure 3 demonstrates the range of ages, showing that the most significant number of participants were in the 70 to 79-year-old age category.

Figure 3: Age Distribution



The first objective was *to convene stakeholders from the clinic to co-create how to integrate this process into the care of PD patients in an outpatient suburban movement disorder clinic.* The stakeholders, which included a physician, nurse, medical assistant, and office administrator, met with the project lead to share ideas, comment on the project flow map, and provide input about the process. All of the stakeholders 100% attended the meeting, and an attendance sheet was used to record their presence (Appendix G).

The second objective was that a threshold of *eighty-five percent of the stakeholders, health care providers, nurses, medical assistants, and administrative secretaries would attend and participate in an education session about the KPPQ screening tool*. The stakeholders attended an education session that reviewed the steps of the finalized PD flow process and a

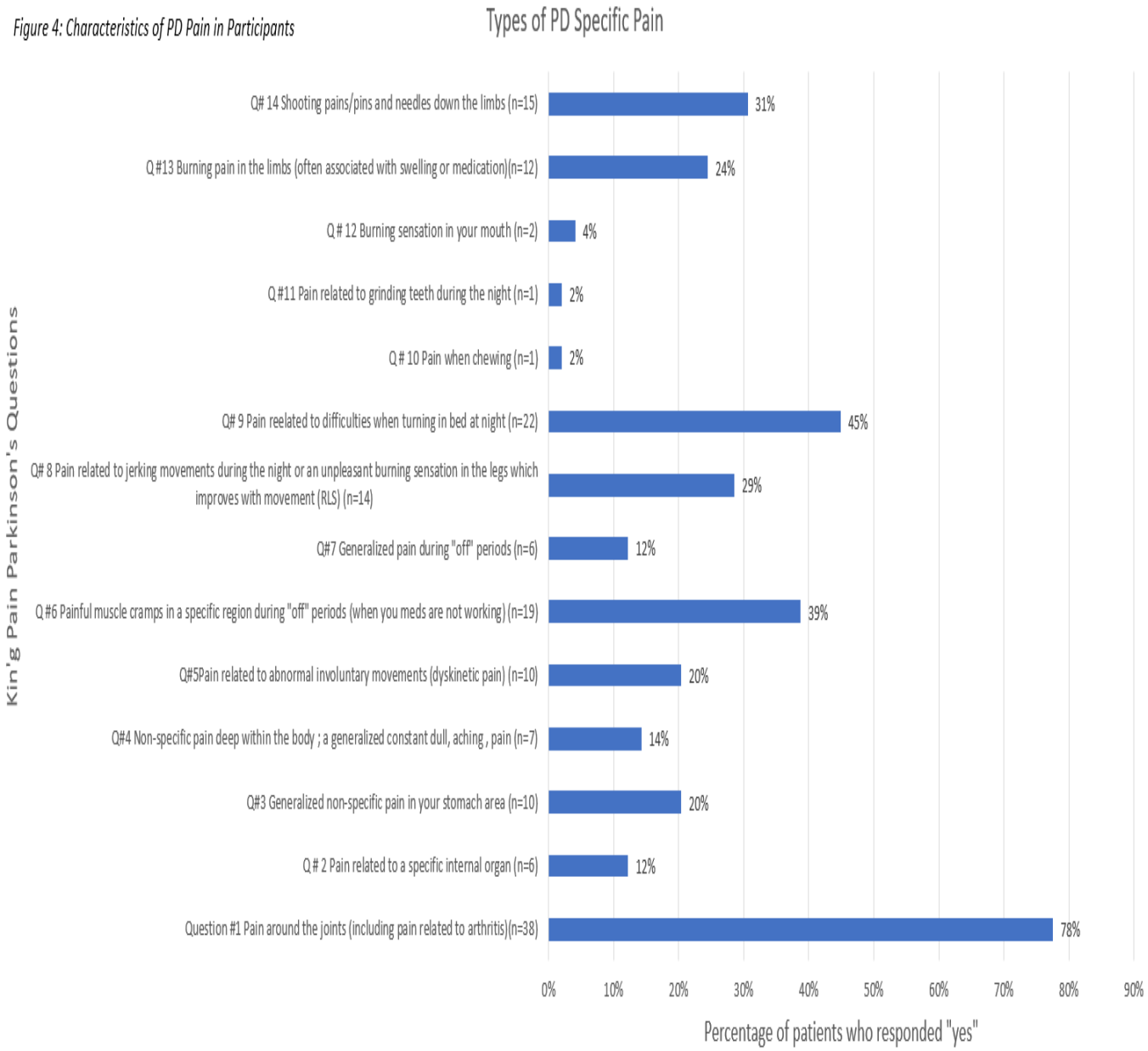
review of the KPPQ screening tool, including a review of each question to ensure staff understood what was being asked. One hundred percent of the stakeholders were educated in the process flow and the KPPQ tool, exceeding the goal of the second outcome, which was that 85% of stakeholders would be educated about the process and the KPPQ tool. A two-question survey evaluated whether team members understood their role and felt confident to participate in the project. All team members endorsed "yes." They understood their role in the project, and three out of four felt very confident in their ability to participate in the project, with one responding confidently.

The third objective was that e*ighty-five percent of Parkinson's disease patients would complete the self-screening KPPQ tool for pain*. The expected outcome was exceeded as 100% of respondents who received the tool completed it. The KPPQ tool is a dichotomous scale requiring a check mark of either "yes" or "no" to a question about pain. A "yes" response to any of the items indicates pain. The tool was completed if check marks were ticked off for the 14 items. Only one screening tool had one unanswered question and the author could not determine if the patient left the tool blank intentionally or missed the question. Therefore, all the tools were completed. Two tools were given to non-PD patients; one had a diagnosis of essential tremor, and the other had Lyme disease; they were excluded from the data.

The KPPQ tool yielded specific data regarding the most common type of pain reported by the participants in this suburban clinic. Figure 4 characterizes the PD-specific pain types. The most often reported pain, 78 %, was pain around the joints, followed by 45 % of the patients reporting that they had pain related to turning in bed at night, and finally, 39% reported painful muscle cramps in a specific region during "off "periods (when medications are not working). Of the possible 14 items of the KPPQ scale correlating with 14 different types of pain, participants

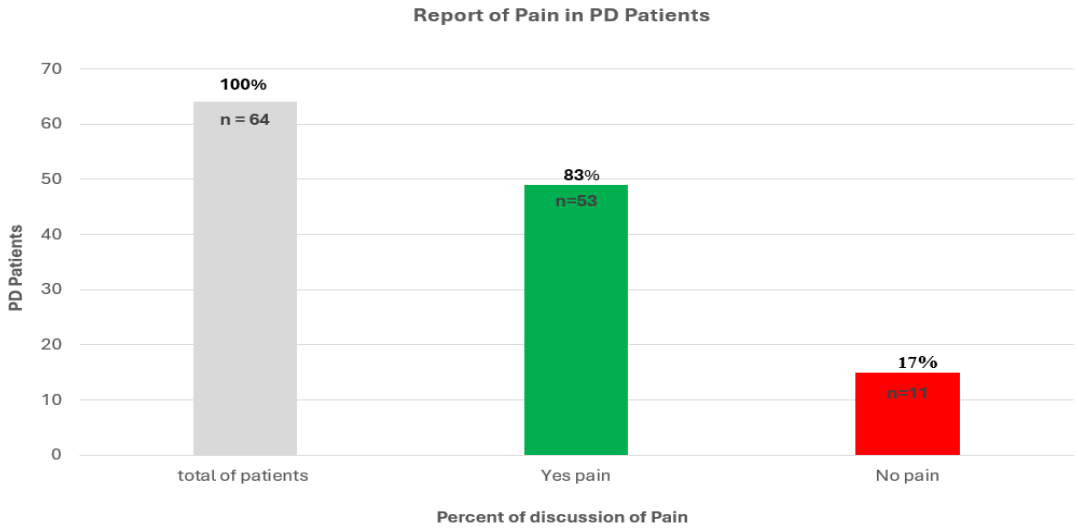
experienced a range from zero to 13 types of pain identified by one patient.

Figure 4: Characteristics of PD Pain in Participants



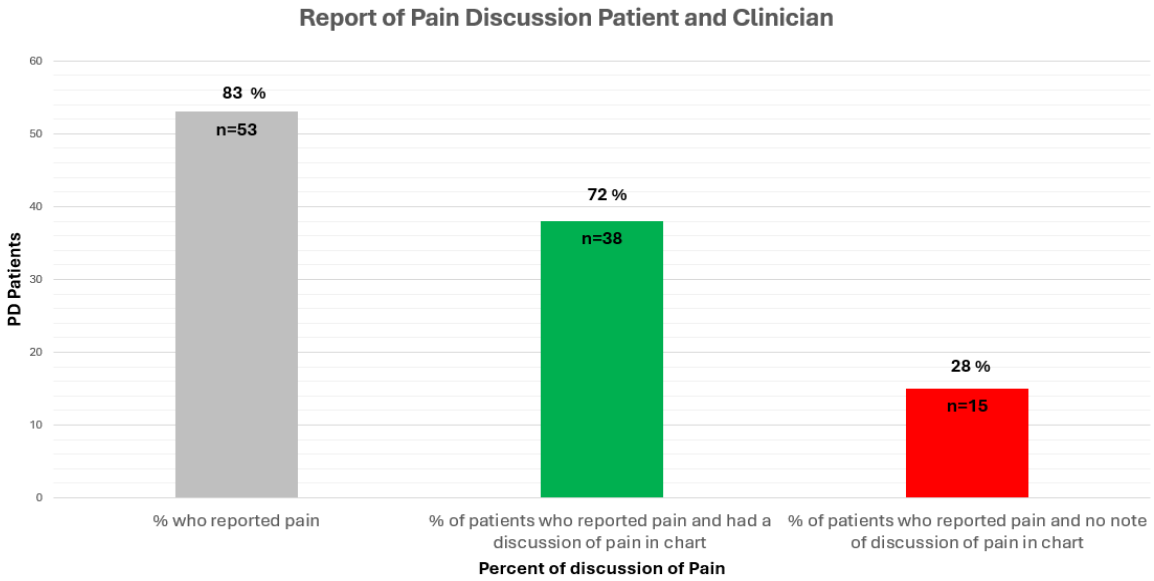
The expected fourth outcome of this project was that *85% of patients with PD pain had any reference or discussion of pain assessment and treatment in the chart*. Sixty-four participants completed the KPPQ screening tool; 53 participants, or 83%, reported pain, and 11 patients, or 17% of patients did not report pain. Figure 5 illustrates these results.

Figure 5: Percentage of Pain in PD patients



Evidence of pain assessment was completed via chart review of the visit summary note in the medical record indicating a discussion or reference to pain. Of the 53 patients who reported pain, 72% (n=38) had a discussion or reference to the pain in the chart. The expected outcome was that 85% of patients with PD pain would have a reference or discussion of pain, the goal was not achieved. Figure 6 illustrates these results.

Figure 6: Discussion of Pain



The final objective was to evaluate if *eighty-five percent of the stakeholders would identify whether implementing the KPPQ tool was feasible and added value.* This objective was measured in the post-implementation survey that was deployed at week 12 to measure if the stakeholders felt the KPPQ tool and the process of utilizing this tool were feasible, satisfactory, and added value. The criteria indicating a positive response or satisfaction was a Likert score greater than or equal to four, agree, and five, strongly agree. Criteria for a negative response or not satisfied was a Likert response score of less than four, including neutral, disagree, and strongly disagree. Results of the post-implementation survey of feasibility, satisfaction, and value-added showed that 100% of the clinic staff (n=4) either agreed or strongly agreed that (1) The PD pain screening tool was practical to use (2) The clinic staff were satisfied with the PD pain project (3) The project brought attention to the PD patient's pain and (4) The project brought added value to PD pain assessment.

Discussion

This quality improvement project successfully developed a process flow to assist the healthcare clinician with a preliminary assessment to identify PD-specific pain. Implementing the KPPQ, a self-report screening tool, served as a streamlined method to trigger a discussion for PD-specific pain in this outpatient movement disorder clinic in suburban Massachusetts. All the participants who received a tool completed it, and most of these triggered a discussion with the physician, allowing for further pain assessment.

Kotter's theory of change was evident throughout this project but most profoundly in developing an alliance, addressing barriers to change, and identifying and celebrating short-term successes (Kotter, 2012). A significant reason for the success of this project was alignment with a well-respected expert and credible nurse clinician who was an impactful force in guiding this

project. Kotter's theory of change explains that forming a solid alliance, in this case, the nurse-led alliance, created an urgency to elevate pain assessment in PD patients in this clinic. The alliance was based on the long-term durable professional and personal friendship of the nurse-physician relationship in this clinic, which drove the implementation of this project. The motivation for the change was that these HCPs and all other stakeholders cared deeply for their patients and subscribed to the project as an opportunity to improve the lives of PD patients.

Huddles served as a PDSA strategy, demonstrating Kotter's theory of change to address barriers to change and identify and celebrate short-term successes (Kotter, 2012). These huddles functioned as a force to propel the project forward. The project lead would query each stakeholder, asking, "What is working well with the project?" to identify successes and asking, "What is not working well with the project?" to identify barriers and process problems. Once a barrier was identified, each team member was asked for suggestions to solve the problem, allowing them to engage in the process. This aligns with Kotter's theory to engage team members and empower their actions to implement change (Kotter, 2012).

All team members commented that the process was simple and worked well except when there was a virtual patient, which was a barrier to pain assessment using this current process. Kotter's 5th step, focusing on engaging and enabling by removing barriers that impede the process, was demonstrated in this situation. (Kotter, 2012). Empowering the clinic staff to identify solutions to the barrier demonstrated ownership of the project and solidified the vision to assess PD patients' pain even if patients are presenting for a virtual visit. The team decided the nurse or medical assistant would read the questions to the patient via Zoom, and the patient would answer, all based on the assumption that there was enough time. This resulted in the nurse reading the questions to one patient during this project. Lack of time and competing priorities

made this solution challenging. The task of getting the patient on Zoom in time for the visit with the HCP was often problematic for the patient and did not leave enough time to read the screening tool before the physician was ready to see the patient. This is an area for further process improvement work.

The huddles used during the QI project were effective in motivating the staff to continue the project, identifying opportunities to improve the process flow, and allowing for continuous evaluation and feedback to improve the process. The weekly feedback to each team member effectively addressed problems to solve and commended successes. For example, the project lead shared preliminary data with the team at four and eight weeks into the project that acknowledged successes and further motivated the team to continue the project, aligning with Kotter's 6th step in his theory of change, celebrating short team wins (Kotter, 2012). Sharing the data with the team helped them notice that patients were reporting pain around the joints and muscle cramps, which was not surprising. However, the pain related to difficulty when turning in bed provoked engaging discussions. The team members discussed how this question from the tool triggered the need to engage in further discussion to identify if the patient could not turn in bed due to muscle rigidity, slow movements, or inability to move. Additional assessment of whether pain was related to musculoskeletal conditions such as a frozen shoulder, neuropathic pain in the feet, or dystonic or cramping pain often experienced with low dopamine levels during the night. Clarifying this item helped guide the physician regarding which medicine to adjust to address this issue. The screening tool was serving as a trigger for a more involved discussion related to the pain. Demonstrating this win, a team member commented, “Wow, this really is working “(C. T., personal communication, December 15, 2023).

The participants represented the PD population, often older white males (Parkinson's Foundation, 2023; Ben-Joseph et al., 2020). It is well established that patients with PD and their care partners are both well-informed and invested in the care. This project identified that 83% of participants were married, yet this did not specifically identify if they were the care partners; assessing this is a future project that should be pursued. The engagement of the patient and care partner reflects the essential elements of the chronic care model that served as the framework for this project. This model focuses on providing evidence-based care and promoting patient involvement and engagement in care (Wagner,1998). Patients are informed and active participants in their care. Utilizing this model has demonstrated better quality patient care and reduced healthcare utilization and costs (Kadu & Stolee, 2015; Wagner, 1998).

A strength of this project was that 100% of the participants surveyed completed the KPPQ. As previously noted, one team member reported that the patients would "do anything for their physician" (B.H., personal communication, November 10, 2023). The patient-physician relationship of trust, caring, and shared decision-making can improve the quality of patient care (Honavar, 2019).

The prevalence of PD pain in this clinic was 83%, which is consistent with reports of PD pain ranging from 30% to as high as 85% (Silverdale et al., 2018; Buhmann et al., 2020; Valkovic et al., 2015). Utilizing the KPPQ not only identified the presence of pain but exposed the top three PD-specific types of pain in this clinic, including musculoskeletal, muscle cramps, and pain related to turning in bed. Buhman and colleagues (2020) found that musculoskeletal pain was the most frequently reported pain type in PD. This project demonstrated that utilizing a self-report screening tool effectively prompts HCPs to assess pain. This process flow served to improve PD-specific pain assessment and subsequent treatment for PD patients with pain. The

techniques of self-reporting and then handing a physical tool to the HCP to review in person was an effective process flow intervention to improve pain assessment in PD.

Feedback from the clinic team informed the discussion about the process flow. Team members reported that using the paper tool allowed the participants to complete it easily and hand it to the physician. Handing the tool to the physician allowed the HCP a tangible object to look at it and prompted a discussion about pain. The project lead asked the team if this paper process was sustainable and, if not, how else this process could be updated to increase sustainability. A suggestion recommended sending it to the patient electronically before the visit. However, one team member remarked that she could count on one hand how many patients completed those forms before the visit. Another member felt a nurse navigator asking about pain to ensure it gets completed would be ideal, but it would be challenging to fund this role. This is an area for continued improvement in the future.

Multiple barriers affected this project. For example, the project took place over the holiday season, impacting the ability to implement the process over consecutive weeks due to scheduled clinic closures. This was an example of common cause variation. It is difficult to assess if this impacted the motivation to continue the project. Additionally, one of the team members sustained a medical injury requiring surgery closing the clinic unexpectedly for a few weeks in January. This was a special cause variation and may have affected the momentum for the project as health concerns were a priority.

The post-implementation survey revealed that the team members rated the project four or more, demonstrating that they found it satisfactory, feasible, and added value. This project demonstrated that utilizing a self-report screening tool effectively prompts HCPs to assess pain.

This process flow served to improve PD-specific pain assessment and subsequent treatment for PD patients with pain in this suburban outpatient movement disorder clinic.

Limitations and Recommendations

The project's limitations included only one project lead completing the chart audits, which lent to potential bias. The addition of another auditor would help validate the findings. This study sought to identify whether pain assessment had occurred by noting if there was any discussion in the chart. In this project, it was determined that any reference to pain indicated in the chart would signify a discussion. More rigorous criteria for this pain discussion should be employed in future improvement projects. Additionally, there were instances where the participants noted pain, but it was not noted in the chart as having been discussed. This was a study limitation, as data collection did not involve why the pain had not been discussed. This is an opportunity for further investigation, to question the patient about whether the pain had been discussed. Impact on the QOL of these patients relating to improved pain is an area for future investigations.

Recommendations for future quality improvement should focus on sustainability. Factors that impacted sustainability included the project lead not being a member of the clinic. Another recommendation would be to add a pain assessment category to the visit summary note, which might improve sustainability. One recommendation by a team member included identifying a champion, such as a nurse navigator, to move the project forward and implement the screening into the larger clinic.

Conclusions

This QI project effectively implemented a process to deploy a pain self-screening tool that

served as a streamlined method to trigger the discussion of PD-specific pain in an outpatient movement disorder clinic. This project developed a process flow to screen patients for PD pain, improved screening of patients for PD-specific pain, identified the most common type of PD pain present, and prompted a further discussion about PD pain.

The most outstanding achievement of this process was the team's participation in screening patients for pain. This process revealed that the patients had pain that they were not reporting and that it impacted other aspects of their care. Using this tool aided in identifying self-reports of pain, triggering further discussion and treatment of pain.

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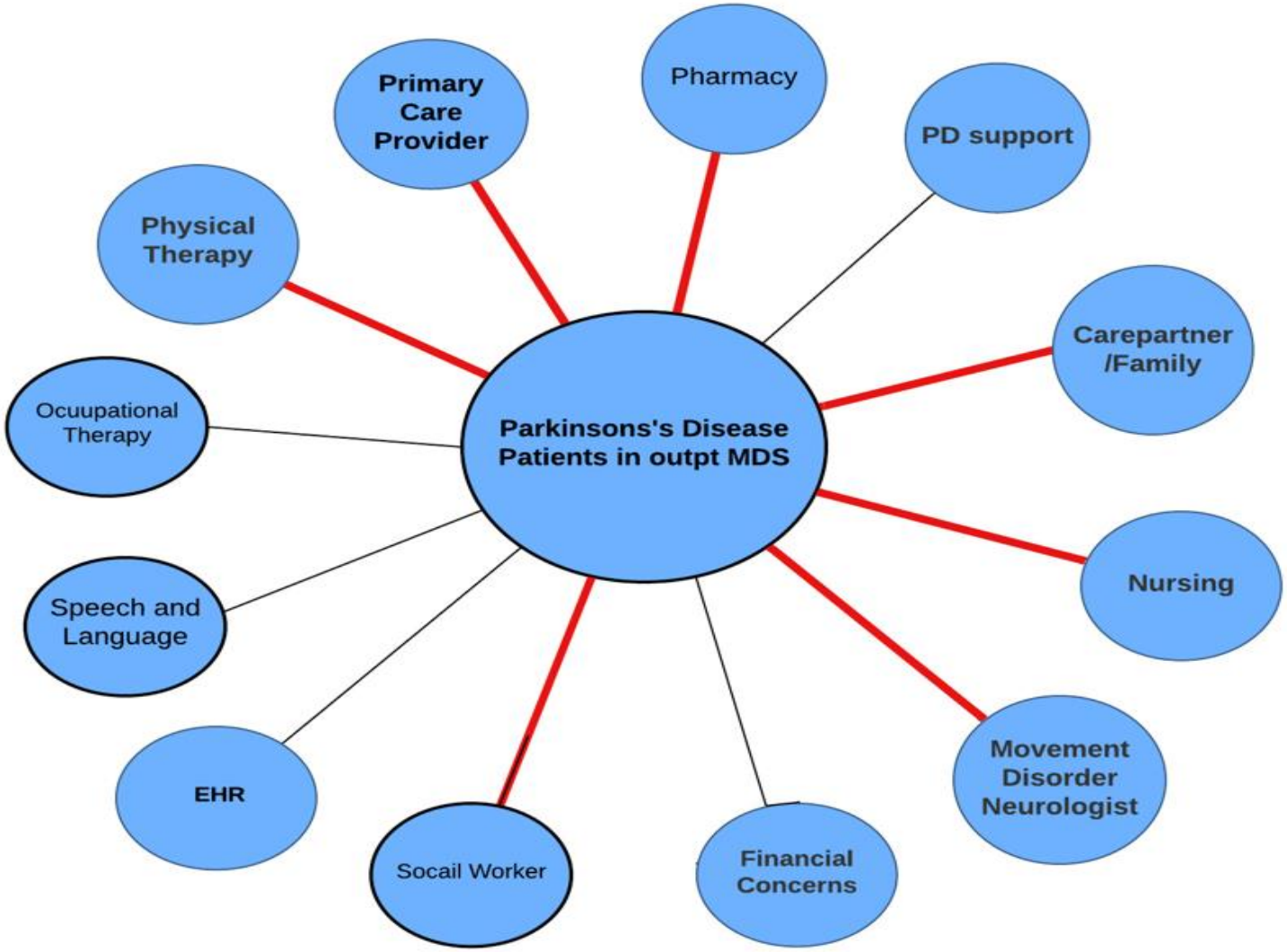
Appendix A Synthesis of Evidence Table Pain Assessment Scales in Parkinson's Disease

Interventions	Studies	Significant Outcomes	Sample size and Descriptors	Evidence & Quality
Assessed pain when patient was in the "off" state.	a. Agrawal et al., 2021	a-Patients with PD had significantly poorer QOL More disability and advanced stages are associated with more pain in PD subjects.	a. N=100 M- n= 73 F- n= 27 Mean Age:62 years Tertiary Movement Disorder Clinic KPPS to assess pain severity, type PDQ-8 assessed QOL.	a. III, B
Assessed pain when patient was in the "on" state and if patient answered "yes" to NMS quest 10 were recruited.	b. Chaudhuri et al., 2015 c.Martinez-Martin et al., 2018	a. KPPS is a valid and reliable scale to assess pain in PD. A high correlation exists between KPPS score and severity of disease and health-related QOL in PD. c. Prevalence of pain and types of pain high level of concordance ICC=0.88 for KPPQ-TS and KPPS. Pts with Pain had higher levels of depression anxiety and worse QOL KPPQ tool self-rated allows each pt to declare their own pain experience.	b. N= 261 n= 178 PD patients n= 83 controls Males n= 122 (62.92%) study Males n= 51 (61.45%) control Subjects from Parkinson's COE clinic at King's 7 UK centers Rater assessed: KPPS-P: is a 14-item PD pain scale Motor scale, Non-Motor Symptoms Scale (NMSS) - Visual analog c. N= 450 adults with PD pain n= 300 patients n= 150 control Mean age: 65 y.o. Male:60 % Subjects were recruited from 9 MD Centers in UK and Romania. Scales: KPPQ (self-administered), KPPS, Non-motor symptom scale (NMSS), Visual analog scale (VAS) pain	b. III, A c. III, B
Assessed pain pre-post Deep Brain Stimulation (DBS)	d. DiMarzio et al., 2018	d. KPPS is useful in the assessment of treatment efficacy for pain in PD. DBS reduces PD-related pain.	d. N= 17 Male n=13 Female n=4 Mean Age: 63.8 yrs. ± 8. Patients were assessed in "on". DBS pt in suburban movement center in NY. Unified Parkinson's disease rating scale-III (UPDRS-III) KPPS, Low back disability index (LBDI), and McGill pain Questionnaire (MPQ)	d. III, B
Pain assessed by Movement disorder specialists using face-to-face interviews.	e. Gao et al., 2022 f.Taghizadeh, G., et al., 2020	e. Validated Chinese version of KPPS scale PD pain assoc with H & Y stage and PSQI Identified severity levels of pain 0 no pain, mild pain – 34, mod 35-70,severe>70 f. Validated Persian version of KPPS-P reliable & valid to assess pain severity and frequency in PD. Distinguish between different levels of pain severity.	e. N= 200 patients from out pt neurology practice and ward M n=108 (54%) F n= 92 (46%) age: 64.61 yrs ±10.16 33–84 Unified Parkinson's Disease Rating Scale (UPDRS) part III – KPPS, and VAS f. N= 480 subjects M- n=292 (61%) F- n=118 (39%) Mean Age yrs: 60.89 (10.98 SD) Scales: KPPS-P, VAS-P, BPI, DN4, SF-MPQ-2	e. III, B f. III A
Self-assessed pain in patients using SF-MPQ-2 when subjects "on "	g.Mehdizadeh, M. et al., 2020	g.SF MPQ-2 demonstrated adequate validity and reliability to measure pain in PD.	g. N= 428 patients w/ PD M- n=264 (62%) F- n=164 (38%) Iranian PD patient presenting to MDC Mean Age yrs: 60.91 SF-MPQ, NPSI-NP, DN-4, BPI. KPPs, VAS, PDQ-8.	g. III, A
Assessed pain with the Brief Pain Inventory BPI scale.	h.Taghizadeh, G., et al., 2021	h. - BPI Brief Pain Inventory (BPI) has acceptable psychometric properties, valid for use in PD pts in both on and off states to assess neuropathic pain in severity and interference in ADL.	h. N= 560 n= 460 PD M=280 ((60 %) F= 180 (40 %)n=100 controls m=60 F=40 Mean Age, years 60.82 study 60.52 control BPI, KPPS, NPSI, SF-MPQ-2, VAS.	h. III, A

Appendix B

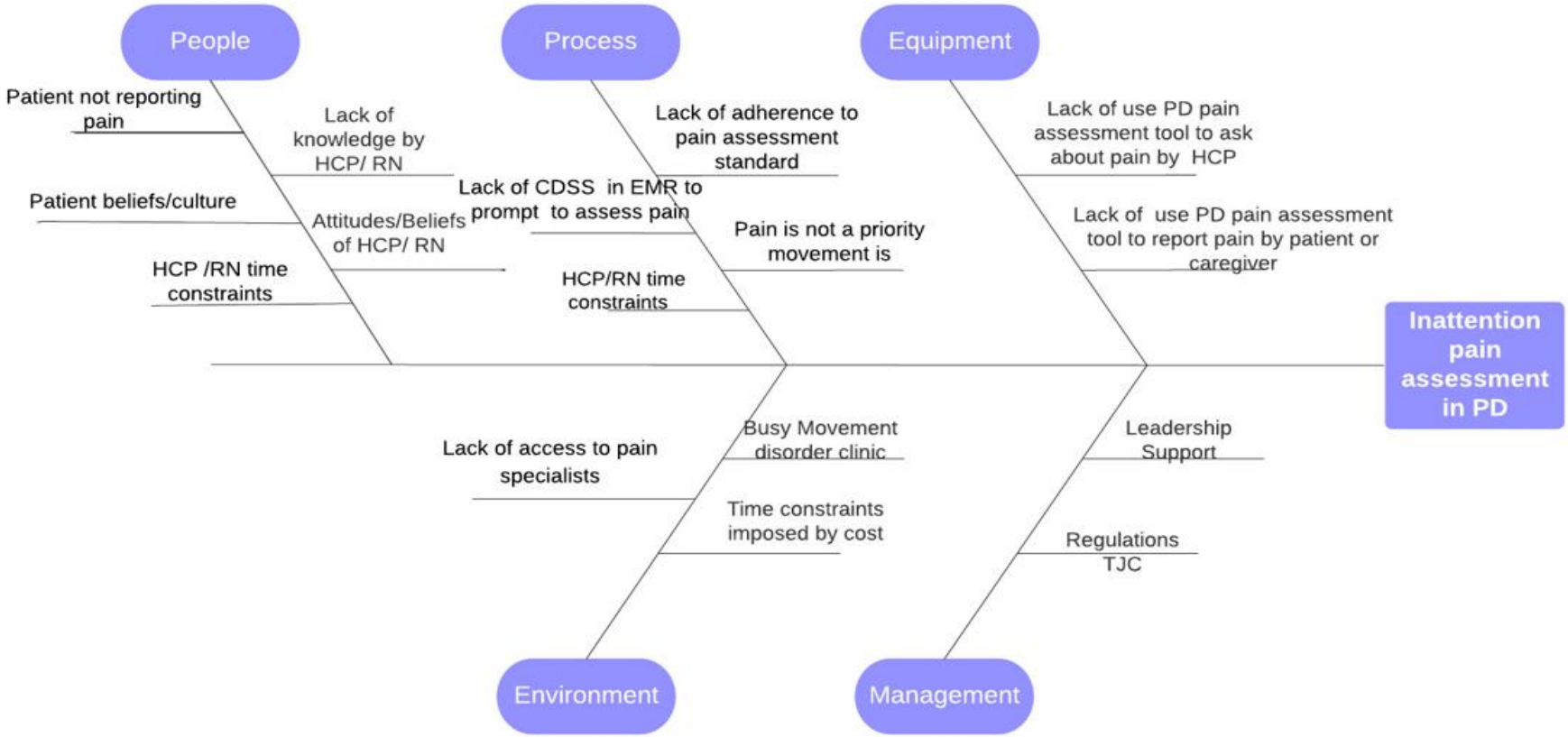
MicroSystem Map

Microsystem: Suburban hospital affiliated outpatient movement disorder clinic
Subpopulation: PD patients in an outpatient movement disorder clinic

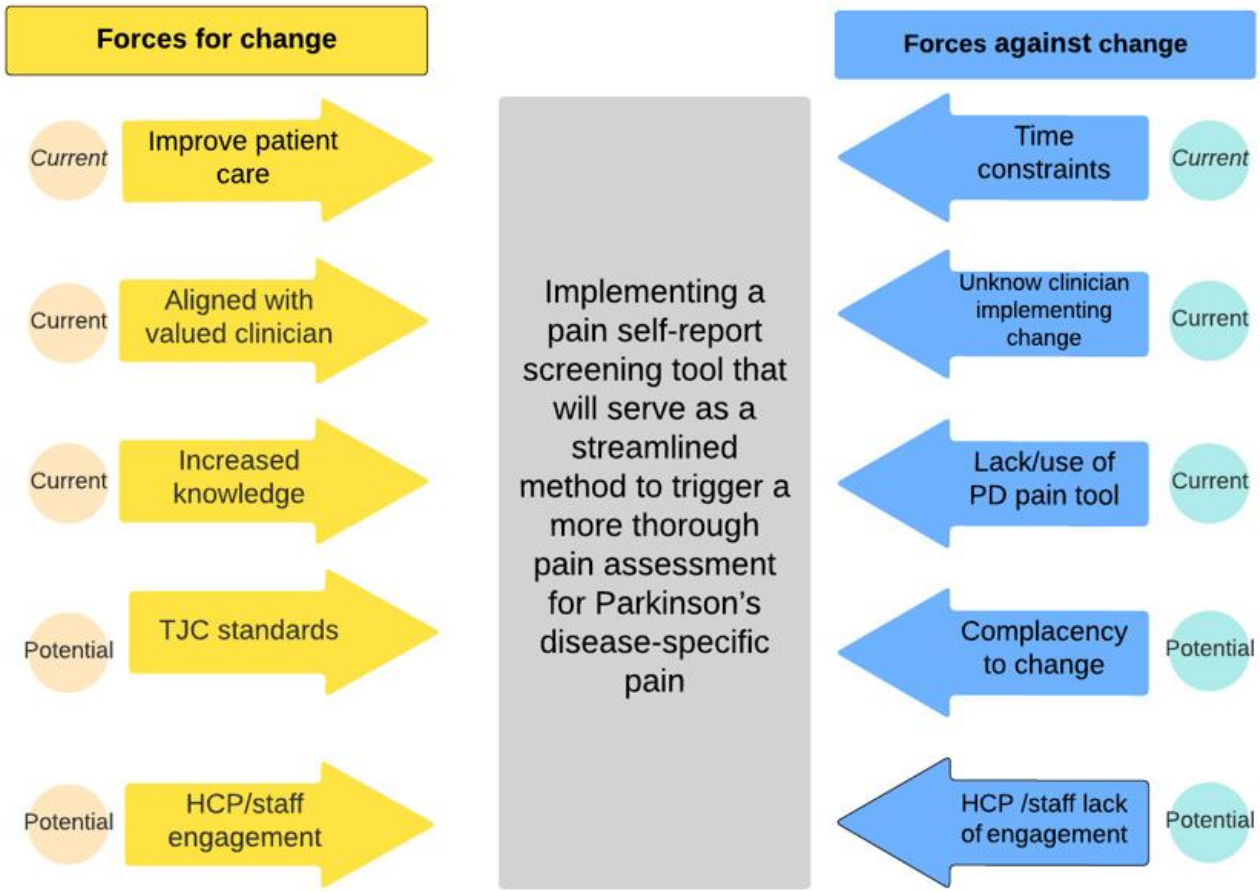


Appendix C

Fishbone Diagram: Inattention to Pain Assessment in PD



Appendix D
Force Field Analysis: Pain Assessment for PD pain

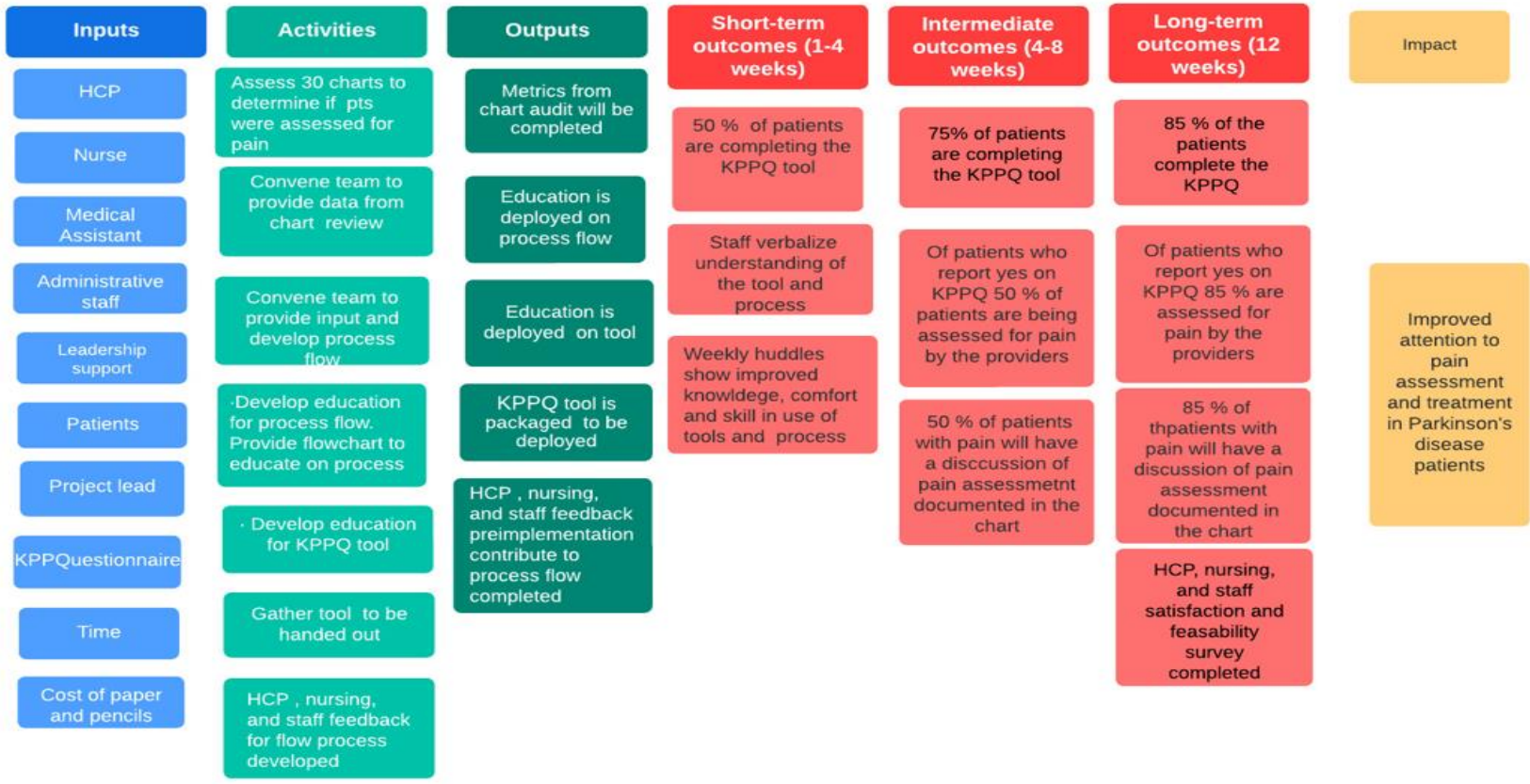


Appendix E

Logic Model

Purpose: The purpose of this project is to assist the healthcare clinician with a preliminary assessment to identify PD-specific pain. To implement a pain self-screening tool to serve as a streamlined method to trigger a discussion for Parkinson's disease-specific pain in an outpatient setting

Problem: Inadequate attention to pain aassessment of PD specific pain in an outpatient movement disorder clinic.



Assumptions: Implementing the KPPQ will iserve as a trigger for a streamlined method to improve attention to pain assessment and treatment among patients with PD.

Contextual Factors: Resistance to change by HCP and staff, time constraints.

Appendix F: Measures and Analysis Plan					
Aim or Objectives	**Outcomes/ outputs**	**Measures: How to operationalize/ measure**	**Where will you get the information**	**Will you comparison**	**Analysis**
To convene stakeholders from the clinic to co-create how to integrate this process into the care of PD patients in an outpatient suburban movement disorder clinic.	Process flow for PD pain assessment and treatment is implemented	• Provide a flowchart and QI project overview to the team. • Stakeholders (physician, nurse, medical assistant, and administrator) will attend the meeting to share ideas, comment on the project flow map, and provide input about the process.	• Participation will be taken from the attendance sheet. • Meeting minutes will include input and comments.	No	Qualitative analysis
85% of the stakeholders, health care providers, nurses, medical assistants, and administrative secretaries will attend and participate in an education session about the flow map process and the KPPQ screening tool.	85 % of staff are educated on the flow map process and the KPPQ tool.	• Attendance at a slide presentation and information on the KPPQ tool's background, dimensions, reliability, validity, and how patients would use the self-report tool. • A post education survey to determine if team members understood their roles and the process flow. • Weekly huddles to problem-solve challenges and acknowledge successes recorded by project lead in a weekly log	• Attendance sheet of who attended sessions. • Post-education survey	No	Quantitative analysis
85% of Parkinson's disease patients will complete the self-report screening tool, KPPQ, for pain.	85 % of patients who get the tool complete the tool.	• Completion of all 14 items of the dichotomous KPPQ tool. • Score of the KPPQ: A checkmark "yes" to any item indicates pain.	• Paper copy of the KPPQ tool	No	Quantitative analysis The proportion of participants who got the paper KPPQ and completed it.
85 % of those patients who had PD pain identified will have a reference to the pain or discussion noted in the chart/EHR.	85 % of patients with PD pain will have a pain discussion	• The medical record note will indicate the patient reports pain. • The medical record note indicates a pain discussion occurred	• Chart review	No	Quantitative analysis The proportion of patients who screened positive for pain on KPPQ (denominator) and had a pain discussion noted in the chart by the clinician(numerator).
85 % of the team, health care providers, nurses, and staff will identify that implementing the KPPQ tool was feasible and added value.	85 % of the clinic team will identify that implementing the KPPQ tool was feasible and value	• Stakeholders satisfaction • Feasibility is determined by asking survey questions if the use of KPPQ tool was practical. • Survey for satisfaction, feasibility, and added value	• Survey	No	Quantitative analysis

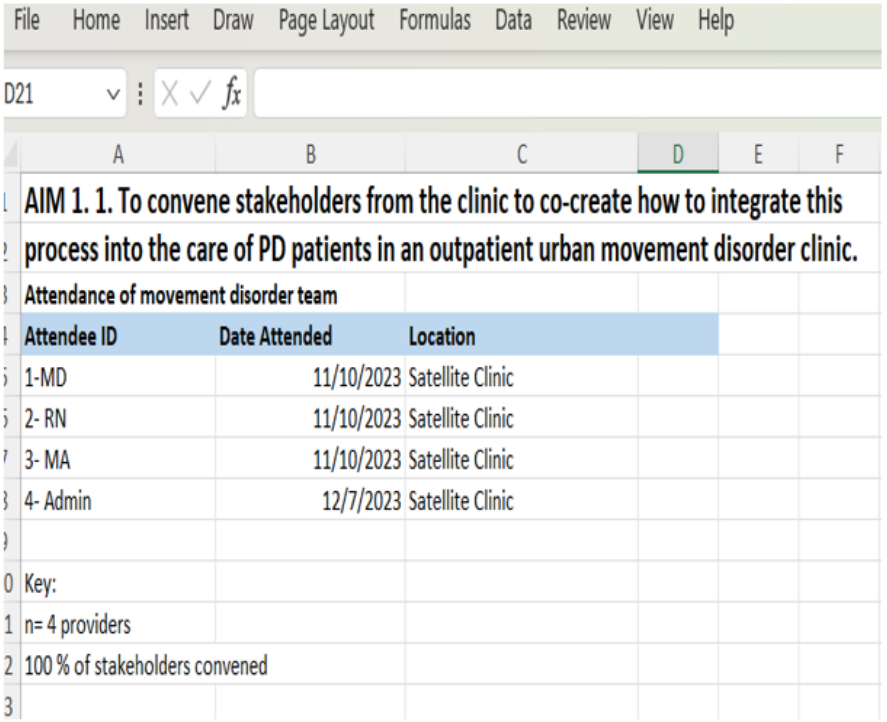
Appendix G

Aim 1: To Convene stakeholders from the clinic to co-create the plan to integrate this process into the care of PD patients in an outpatient suburban movement disorder clinic.

Attendance Sheet

Date	Name of Attendee	Signature	Title

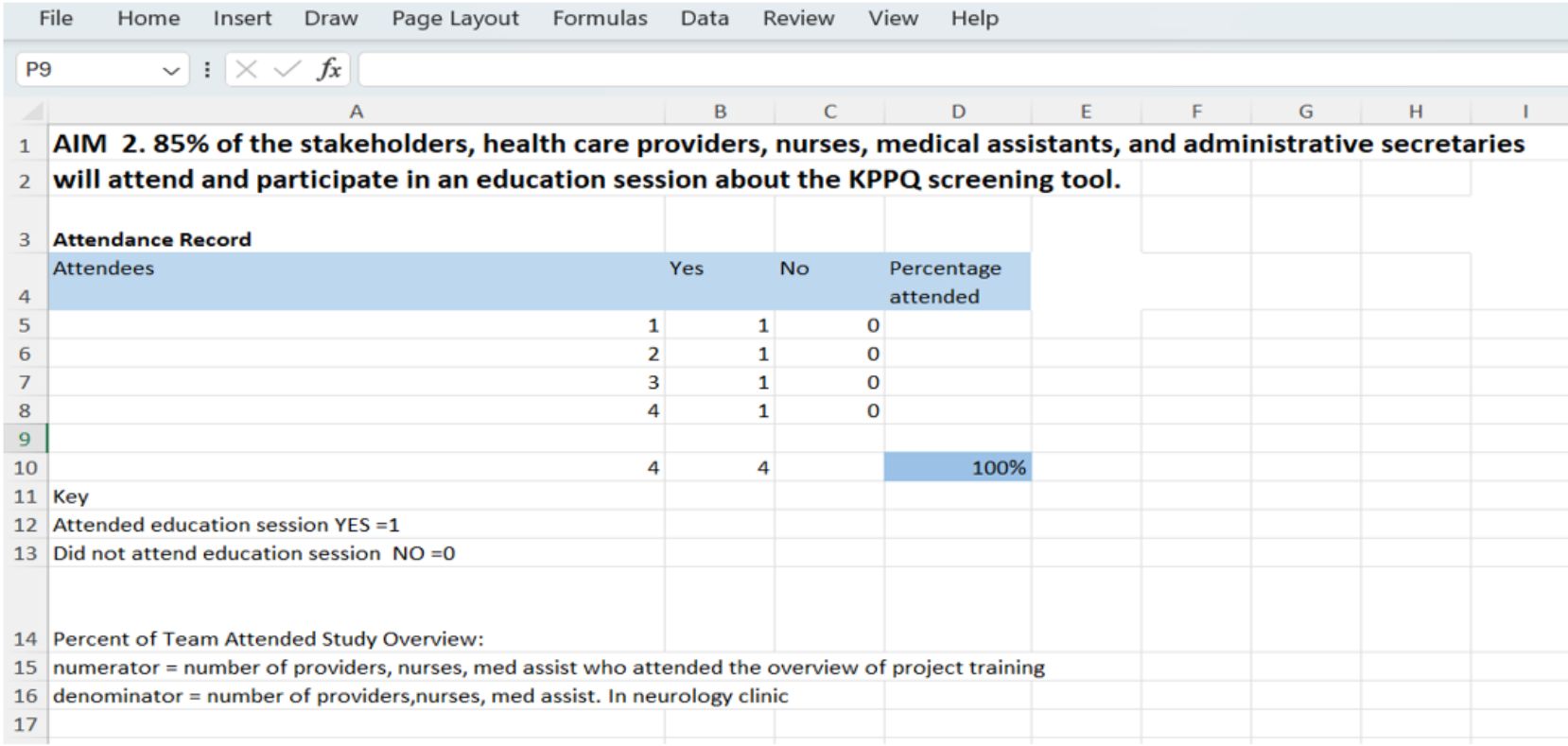
Tracking Tool AIM 1



Comments on the project during the meeting:

Appendix H

AIM 2: 85% of the stakeholders, including the health care provider, nurse, medical assistant, and administrative secretary, will attend and participate in an education session about the KPPQ screening tool.



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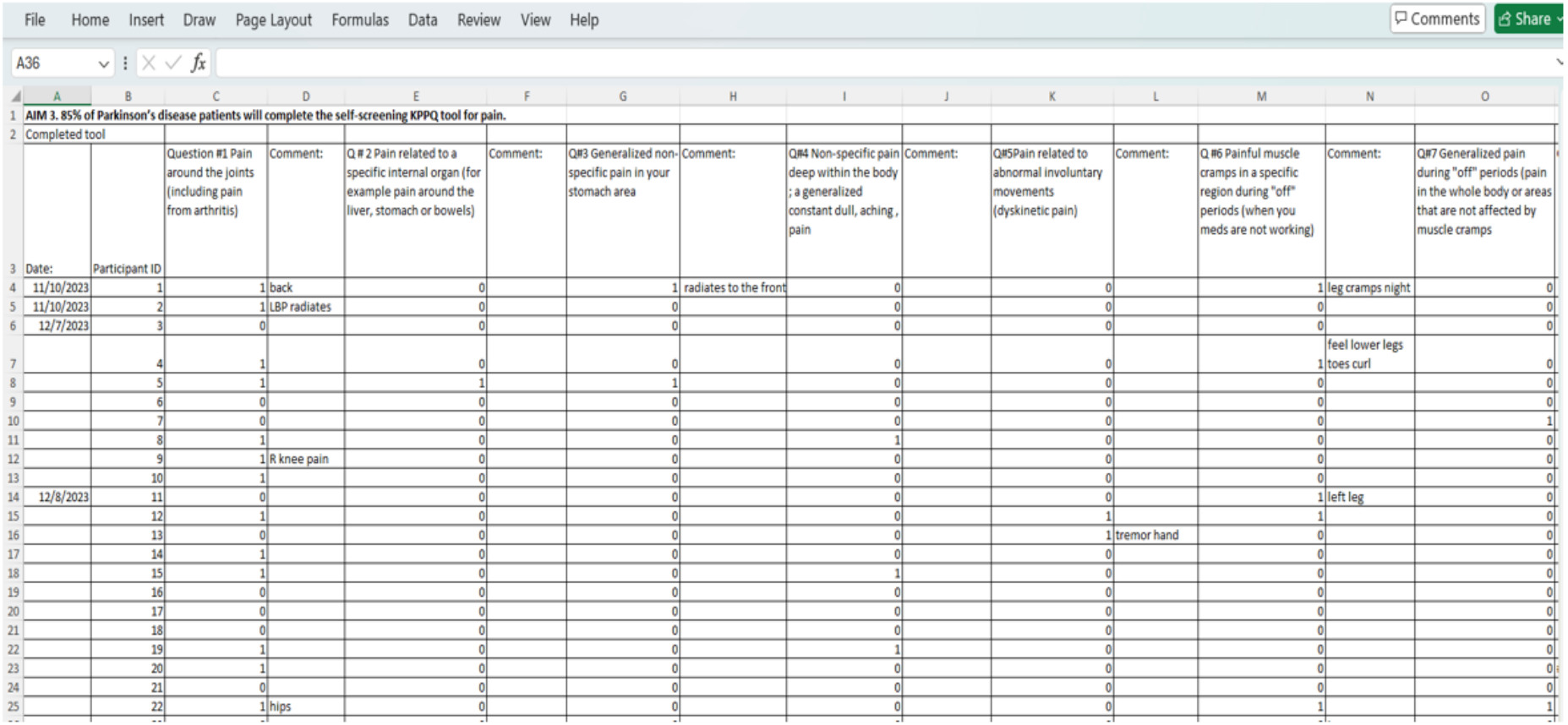
P9

	A	B	C	D	E	F	G	H	I
1	**AIM 2. 85% of the stakeholders, health care providers, nurses, medical assistants, and administrative secretaries**								
2	**will attend and participate in an education session about the KPPQ screening tool.**								
3	**Attendance Record**								
4	Attendees	Yes	No	Percentage attended					
5	1	1	0						
6	2	1	0						
7	3	1	0						
8	4	1	0						
9									
10	4	4		100%					
11	Key								
12	Attended education session YES =1								
13	Did not attend education session NO =0								
14	Percent of Team Attended Study Overview:								
15	numerator = number of providers, nurses, med assist who attended the overview of project training								
16	denominator = number of providers,nurses, med assist. In neurology clinic								
17									

Appendix I

Aim 3: 85% percent of Parkinson's disease patients would complete the self-screening KPPQ tool for pain.



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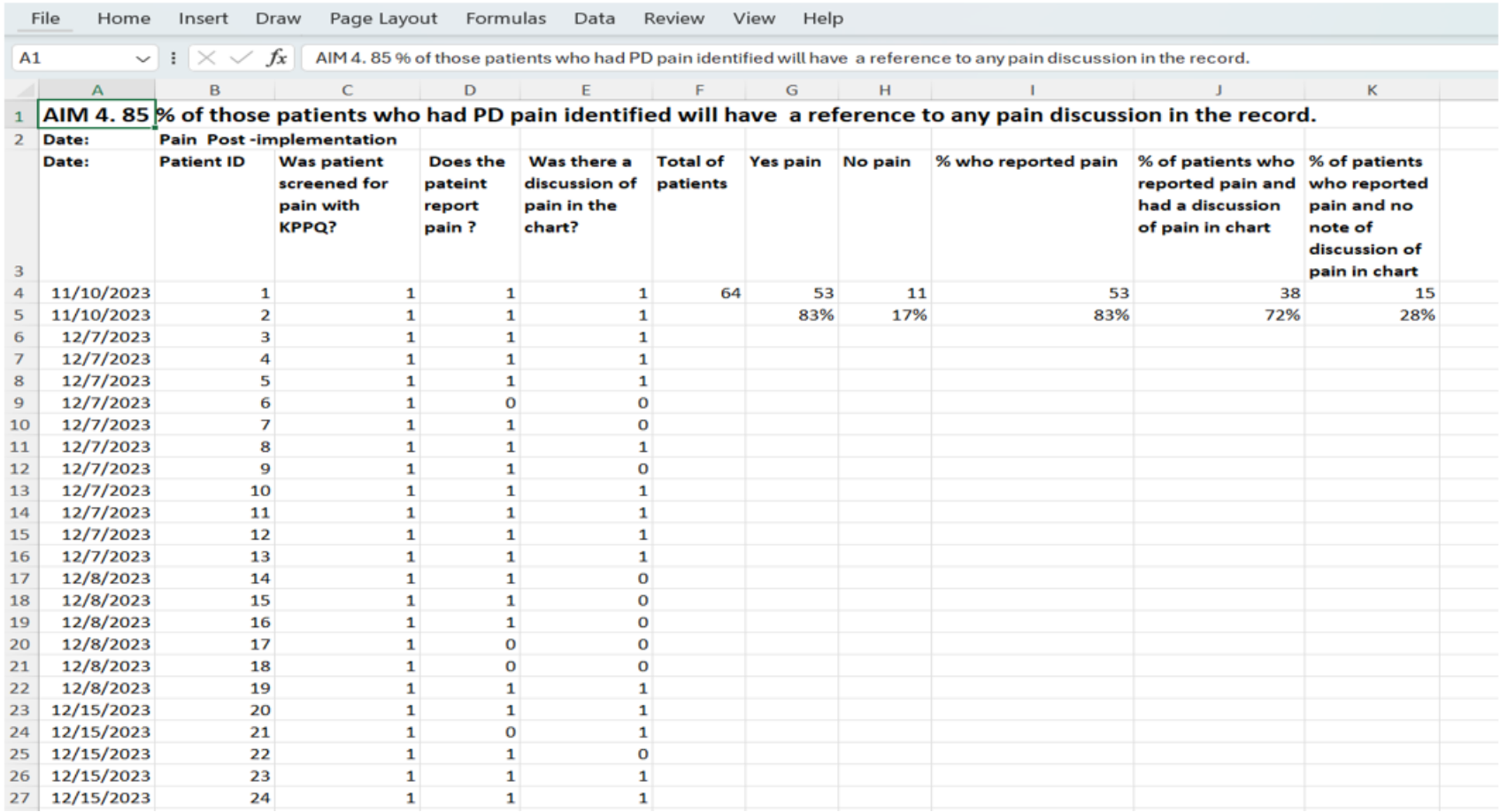
A36

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	**AIM 3. 85% of Parkinson's disease patients will complete the self-screening KPPQ tool for pain.**														
2	Completed tool														
3	Date:	Participant ID	Question #1 Pain around the joints (including pain from arthritis)	Comment:	Q # 2 Pain related to a specific internal organ (for example pain around the liver, stomach or bowels)	Comment:	Q#3 Generalized non-specific pain in your stomach area	Comment:	Q#4 Non-specific pain deep within the body ; a generalized constant dull, aching , pain	Comment:	Q#5Pain related to abnormal involuntary movements (dyskinetic pain)	Comment:	Q #6 Painful muscle cramps in a specific region during "off" periods (when you meds are not working)	Comment:	Q#7 Generalized pain during "off" periods (pain in the whole body or areas that are not affected by muscle cramps
4	11/10/2023	1	1	back	0		1	radiates to the front	0		0		1	leg cramps night	0
5	11/10/2023	2	1	LBP radiates	0		0		0		0		0		0
6	12/7/2023	3	0		0		0		0		0		0		0
7		4	1		0		0		0		0		1	feel lower legs toes curl	0
8		5	1		1		1		0		0		0		0
9		6	0		0		0		0		0		0		0
10		7	0		0		0		0		0		0		1
11		8	1		0		0		1		0		0		0
12		9	1	R knee pain	0		0		0		0		0		0
13		10	1		0		0		0		0		0		0
14	12/8/2023	11	0		0		0		0		0		1	left leg	0
15		12	1		0		0		0		1		1		0
16		13	0		0		0		0		1	tremor hand	0		0
17		14	1		0		0		0		0		0		0
18		15	1		0		0		1		0		0		0
19		16	0		0		0		0		0		0		0
20		17	0		0		0		0		0		0		0
21		18	0		0		0		0		0		0		0
22		19	1		0		0		1		0		0		0
23		20	1		0		0		0		0		0		0
24		21	0		0		0		0		0		0		0
25		22	1	hips	0		0		0		0		1		1

Appendix J

Aim 4: 85% percent of patients who had PD pain identified will have a reference to any pain discussion in the record.



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A1 | AIM 4. 85 % of those patients who had PD pain identified will have a reference to any pain discussion in the record.

	A	B	C	D	E	F	G	H	I	J	K
1	AIM 4. 85 % of those patients who had PD pain identified will have a reference to any pain discussion in the record.										
2	Date:	Pain Post -implementation									
3	Date:	Patient ID	Was patient screened for pain with KPPQ?	Does the pateint report pain ?	Was there a discussion of pain in the chart?	Total of patients	Yes pain	No pain	% who reported pain	% of patients who reported pain and had a discussion of pain in chart	% of patients who reported pain and no note of discussion of pain in chart
4	11/10/2023	1	1	1	1	64	53	11	53	38	15
5	11/10/2023	2	1	1	1		83%	17%	83%	72%	28%
6	12/7/2023	3	1	1	1						
7	12/7/2023	4	1	1	1						
8	12/7/2023	5	1	1	1						
9	12/7/2023	6	1	0	0						
10	12/7/2023	7	1	1	0						
11	12/7/2023	8	1	1	1						
12	12/7/2023	9	1	1	0						
13	12/7/2023	10	1	1	1						
14	12/7/2023	11	1	1	1						
15	12/7/2023	12	1	1	1						
16	12/7/2023	13	1	1	1						
17	12/8/2023	14	1	1	0						
18	12/8/2023	15	1	1	0						
19	12/8/2023	16	1	1	0						
20	12/8/2023	17	1	0	0						
21	12/8/2023	18	1	0	0						
22	12/8/2023	19	1	1	1						
23	12/15/2023	20	1	1	1						
24	12/15/2023	21	1	0	1						
25	12/15/2023	22	1	1	0						
26	12/15/2023	23	1	1	1						
27	12/15/2023	24	1	1	1						

Appendix K

Aim 5: 85% of the team, health care provider, nurse, and staff will identify that implementing the KPPQ tool was feasible and added value.

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A5 | 2/29/2024

	A	B	C	D	E	F	G	H
1	**AIM 5. 85 % of the team, health care providers, nurses, and staff will identify that implementing the KPPQ tool was feasible and added value.**							
2	**Post Implementation survey**							
3								
4	Date:	Participant ID	Quest 1: Was reviewing the PD pain screening tool practical to use?	Quest 2: Were you satisfied with the PD pain project?	Quest 3: Did this project bring your attention to the PD patient's pain?	Quest 4 Did this project bring added value to PD pain?	Comments:	
5	2/29/2024	1	5	5	5	5	This was a very useful project, appreciate the efforts to incrase quality assurance of pain assessment	
6	2/29/2024	2	4	4	5	5	Certainly, a topic that is getting more attention now and a timely project	
7	2/29/2024	3	4	4	4	4		
8	2/29/2024	4	4	4	4	4		
9			Key: Positive response= satisfied (score >=4:agree and strongly agree)					
10			Negative response=not satisfied (score < 3 Neutral, strongly disagree and disagree)					
11			Strongly disagree=1					
12			Disagree=2					
13			Neutral=3					
14			Agree=4					
15			Strongly agree=5					
16								
17			Ques 1					
18	on average	Mean	4.5	4.5	5	5		
19	most frequent	Mode	N/A	N/A	5	5		
20	range	Frequency Dist	range 4-5	range 4-5				
21								

Appendix L

CLINICAL QUALITY IMPROVEMENT CHECKLIST

Date: April 2, 2023	**Project Leader: Anne Marie Desmond NP**

Project Title: To implement the KPPQ, screening questionnaire, and KPPS scale to improve pain assessment and treatment for patients with Parkinson's disease in an urban outpatient movement disorder clinic.

1. **Institution where the project will be conducted: Boston Medical Center Movement Disorder clinic**

Instructions: Answer YES or NO to each of the following statements about QI projects.	**YES**	**NO**
The specific aim is to improve the process or deliver of care with established/ accepted practice standards, or to implement change according to mandates of the health facilities' Quality Improvement programs. There is no intention of using the data for research purposes.	**X**	
The project is **NOT** designed to answer a research question or test a hypothesis and is **NOT** intended to develop or contribute to generalizable knowledge.	**X**	
The project does **NOT** follow a research design (e.g. hypothesis testing or group comparison [randomization, control groups, prospective comparison groups, cross-sectional, case control]). The project does **NOT** follow a protocol that over-rides clinical decision-making.	**X**	
The project involves implementation of established and tested practice standards (evidence based practice) and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does **NOT** develop paradigms or untested methods or new untested standards.	**X**	
The project involves implementation or care practices and interventions that are consensus-based or evidence-based. The project does **NOT** seek to test an intervention that is beyond current science and experience.	**X**	
The project has been discussed with the QA/QI department where the project will be conducted and involves staff who are working at, or patients/clients/individuals who are seen at the facility where the project will be carried out.	**X**	
The project has **NO** funding from federal agencies or research-focused organizations, and is not receiving funding for implementation research**.**	**X**	
The clinical practice unit (hospital, clinic, division, or care group) agrees that this is a QI project that will be implemented to improve the process or delivery of care.	**X**	
The project leader/DNP student has discussed and reviewed the checklist with the project Course Faculty. The project leader/DNP student will **NOT** refer to the project as research in any written or oral presentations or publications.	**X**	

ANSWER KEY: If the answer to **ALL** of these questions is **YES**, the activity can be considered a Clinical Quality Improvement activity that does not meet the definition of human research. **UMB IRB review is not required**. **Keep a dated copy of the checklist in your files.** If the answer to ANY of these questions is NO, the project must be submitted to the IRB for review.