Assessing the Efficacy of Chemotherapy Education

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Introduction

Receiving a cancer diagnosis can be overwhelming and can result in unprecedented vulnerability for many patients (Jabeley et al., 2020). Making the decision to receive treatment can also be difficult, and recommendations often include intravenous chemotherapy. Education regarding these medications and their possible side effects, or how to manage them appropriately, is vital to ensure the best possible patient outcomes (Coolbrandt et al., 2013). This DNP quality improvement scholarly project addressed the timing of chemotherapy education for patients beginning a new IV chemotherapy regimen and its effect on patients' knowledge and preparedness.

Problem

- The problem was identified, in an outpatient hematology/oncology practice serving patients in East Tennessee, through observation of patients experiencing difficulty managing side effects appropriately and taking medications as prescribed as well as through discussion with colleagues at other cancer centers.
- Chemotherapy education is currently only offered immediately prior to the first dose of treatment which can result in preventable issues and is not equitable with chemotherapy education practices at other cancer centers.
- There is a need to:
  - Improve the patient experience of care
  - Improve the health of this patient population
  - Reduce costs of health care

PICOT Question

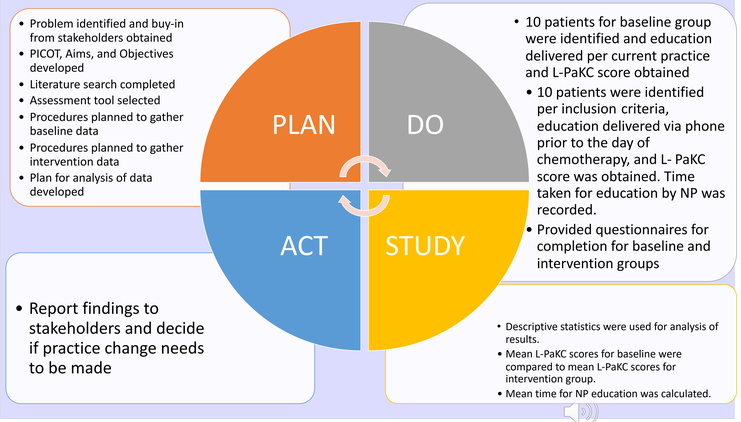
Will patients who are starting a new IV chemotherapy regimen who received chemotherapy education prior to the day of 1st infusion (via phone) have an improvement of their L-PaKC scores compared to the baseline L-PaKC scores of the patients who received chemotherapy education the day of the 1st infusion?

Aims

- Improved preparedness to receive IV chemotherapy as measured by an increase in the Leuven Questionnaire on Patient Knowledge of Chemotherapy (L-PaKC) score from baseline (Coolbrandt et al., 2013).
- Determine feasibility of NP implementing chemotherapy education via phone prior to day of new chemotherapy start.

Objectives

The objective of this quality improvement project was to provide chemotherapy education for patients beginning a new treatment regimen prior to the first day of treatment to assess for improvement in patient knowledge and preparedness when compared to the current method of chemotherapy education which is provided on the first day of treatment. The feasibility of the change in timing and method of chemotherapy education was analyzed.



Methods

Project Design

This is a quality improvement project intended to improve the process through which chemotherapy education is provided to patients who are beginning new IV chemotherapy treatment regimens as an outpatient.

Setting

Outpatient hematology/oncology practice housed in an academic medical center and, more specifically, within the outpatient chemotherapy infusion center

Participants

Patients receiving new IV chemotherapy treatment regimens as an outpatient. Participants must meet inclusion criteria. Please scan QR code for inclusion and exclusion criteria. See Table 1 for demographic data.

Intervention

- Patients beginning new chemotherapy treatment regimens were selected from the patient tracking dashboard until 10 were selected for the baseline group. They received chemotherapy education using current practice and was then provided with a L-PaKC questionnaire to complete.
- The first 10 patients who met the inclusion criteria for the intervention group were selected and a phone call was scheduled. They received printed materials prior to the phone call. NP provided chemotherapy education via phone as scheduled. The patient was provided with a L-PaKC questionnaire upon return to begin new chemotherapy regimen.
- Existing printed chemotherapy education materials that are currently being used to provide chemotherapy education on the first day of a new treatment regimen were used by the NP to provide education prior to the first day of treatment via phone.
- Demographic data was recorded for baseline and intervention groups. See Table 1.

Data Collection

- L-PaKC questionnaire scores were calculated upon completion and return to NP.
- The time spent making phone calls by the NP was recorded.

Analysis

- Descriptive statistics were used to analyze the collected data.
- The mean L-PaKC questionnaire scores were calculated for the baseline and intervention groups and then were compared.
- The mean length of time spent making phone calls by the NP was calculated.

Age	Baseline N(%)	Intervention N(%)
20-30 years	1(10%)	1(10%)
31-40 years	0	0
41-50 years	1(10%)	0
51-60 years	0	2(20%)
61-70 years	3(30%)	1(10%)
71-80 years	3(30%)	5(50%)
81-90 years	2(20%)	1(10%)
Gender		
Male	5(50%)	4(40%)
Female	5(50%)	6(60%)
Race		
White	9(90%)	8(80%)
African American	1(10%)	1(10%)
Hispanic	0	1(10%)
Education level		
High school	7(70%)	2(20%)
Some college	0	3(30%)
Undergraduate	2(20%)	5(50%)
Graduate	1(10%)	0
Cancer type		
Hematologic	6(60%)	5(50%)
Lung	2(20%)	1(10%)
Breast	1(10%)	1(10%)
Kidney	0	1(10%)
Pancreatic/Gastric	0	2(20%)
Previous chemo		
Yes	6(60%)	4(40%)
No	4(40%)	6(60%)

Table 1. Demographic Data

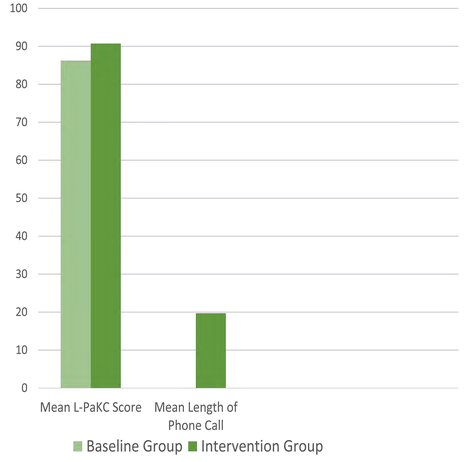


Table 2. Mean Percentage L-PaKC Scores; Mean time for Phone Call

Results

- The mean L-PaKC questionnaire score for the baseline group was 86.2% compared to 90.7% for the intervention group.
- The aim of this quality improvement project was ultimately met with an improvement in the mean L-PaKC questionnaire score of the intervention group, however by a lower percentage than expected at approximately 5%.
- It was expected that there would be a greater difference between the two groups, however with analysis of the demographic data, it is notable that in the baseline group, 60% of the patients had previously had IV chemotherapy, whereas only 40% of the patients in the intervention group had previously had IV chemotherapy. This could represent a confounding factor by which experience with IV chemotherapy in the past influenced the baseline group to score higher on the L-PaKC questionnaire. Thereby, making the higher score in the intervention group more meaningful because the majority of these patients had not ever had IV chemotherapy.
- All patients in both the baseline and intervention groups had at least a high school education. The majority of the patients in both groups were aged 61-80 and most were white.
- The feasibility of one-on-one education prior to IV chemotherapy is felt to be subjective in nature, and the average time of 20 minutes was burdensome for the NP. Notably, the minimum time spend on an educational phone call was 7 minutes and the maximum time was 34 minutes.
- The timing of phone calls (after hours) as well as the increase in phone calls from patients afterwards were not accounted for and added to the overall time spent. The feasibility of chemotherapy education via phone by the NP prior to the first day of a new treatment regimen may be minimal in a busy practice.
- A strength of this project was the noticeable improvement in patient satisfaction among the intervention group. One patient stated, "It means so much to me that someone would take the time to call, and I feel so much more at ease now."
- A weakness of this project was the small sample size which could be increased with a greater amount of time allotted for intervention.

Implications for Practice

- **Adapt the change made and develop a chemotherapy class for patients and their caregivers to attend prior to the first day of a new intravenous chemotherapy regimen. This would allow for more staff and providers to be involved making it more feasible to implement in a busy practice.**
- **Focus on improving patient satisfaction in addition to patient knowledge and preparedness in the future**
- **Recruit colleagues including fellow nurse practitioners to participate in providing in-person or virtual educational sessions**

Conclusion

- Providing education to patients about IV chemotherapy prior to the day of their first chemotherapy can improve patient knowledge and preparedness.
- Although the mean L-PaKC questionnaire score for the intervention group was only 5% higher than that of the baseline group, a greater improvement in patient satisfaction was anecdotally observed.
- Having a history of receiving IV chemotherapy can improve patients' knowledge and preparedness.
- Stronger rapport was established between the provider and the patient in the intervention group which resulted in an increased number of phone calls specifically requesting the provider.
- Improved patient outcomes are expected to result from improvement in the knowledge and preparedness, and further observation can focus on the impact of improved patient satisfaction (Coolbrandt et al., 2013)
- Further study should be done to assess the outcomes of knowledge and preparedness as well as patient satisfaction for a group chemotherapy class for patients and their caregivers to attend prior to the first day of a new IV chemotherapy regimen.

Introduction

- Receiving a cancer diagnosis can be overwhelming along with the decision to receive treatment which often includes chemotherapy (Jabeley et al., 2020).
- Preventable issues like mismanaged side effects or confusion regarding prophylactic medications may occur as a result of inadequate chemotherapy education, or if patients are not allowed enough time to process the information (Coolbrandt et al., 2013).
- Patients, family members, the care team, and the community can be affected by the consequences (Sasaki et al., 2017).

Introduction

- There can be a significant decrease in distress in patients who receive chemotherapy education prior to beginning a new treatment regimen (Wirawan et al., 2020).
- A significant increase in patient self-efficacy and preparedness to begin a new chemotherapy regimen was seen after receiving pre-chemotherapy education (Samoil et al., 2021).
- A significant increase in patient knowledge was noted after receiving chemotherapy education prior to beginning therapy (Jabaley et al., 2020).

Problem

- The problem was identified, in an outpatient hematology/oncology practice serving patients in East Tennessee, through observation of patients experiencing difficulty managing side effects appropriately and taking medications as prescribed as well as through discussion with colleagues at other cancer centers.
- Chemotherapy education is currently only offered immediately prior to the first dose of treatment which can result in preventable issues and is not equitable with chemotherapy education practices at other cancer centers.
- There is a need to:
    1. Improve the patient experience of care
    2. Improve the health of this patient population
    3. Reduce costs of health care

Framework

Setting Aims
The aim should be time-specific and measurable; it should also define the specific population of patients or other system that will be affected.

Establishing Measures
Teams use quantitative measures to determine if a specific change actually leads to an improvement.

Selecting Changes
Ideas for change may come from those who work in the system or from the experience of others who have successfully improved.

Testing Changes
The Plan-Do-Study-Act (PDSA) cycle is shorthand for testing a change in the real work setting — by planning it, trying it, observing the results, and acting on what is learned. This is the scientific method adapted for action-oriented learning.

Aims & Objectives

- Ultimately, the aim is to answer the following PICOT question:

Will patients who are starting a new IV chemotherapy regimen who received chemotherapy education prior to the day of 1st infusion (via phone) have an improvement of their L-PaKC scores compared to the baseline L-PaKC scores of the patients who received IV chemotherapy education the day of the 1st infusion?

Aims

- Improved preparedness for IV chemotherapy treatment as measured by an increase in the Leuven Questionnaire on Patient Knowledge of Chemotherapy (L-PaKC) score from baseline (Coolbrandt et al., 2013).
- Collect the amount of time for education delivery by the nurse practitioner via phone to determine feasibility.
  - Do the phone calls add 2 or less hours to the NP's current workload?

Met Objectives

- Developed process to evaluate chemotherapy education and patient preparedness and knowledge: February 2022
- Selected data collection tool (revised L-PaKC): March 2022
- Informed practice manager and chemotherapy infusion nurses of process change for chemotherapy education: 6/14/2022
- Began obtaining baseline data to evaluate current chemotherapy education practice: 6/14/2022
- Implemented chemotherapy education via phone prior to new treatment initiation: 6/27/2022

Met Objectives

- Compared questionnaire responses and percent correct of patients from baseline group who received chemotherapy education on the 1st day of a new treatment regimen with those of patients who received chemotherapy education via phone prior to the 1st day a new treatment regimen: 8/8/2022
- Analyzed time spent providing chemotherapy education phone calls to determine feasibility for NPs to implement change: 8/8/2022

PDSA Cycle

- Problem identified and buy-in from stakeholders obtained
- PICOT, Aims, and Objectives developed
- Literature search completed
- Assessment tool selected
- Procedures planned to gather baseline data
- Procedures planned to gather intervention data
- Plan for analysis of data developed

- 10 patients for baseline group were identified and education delivered per current practice and L-PaKC score obtained
  - 10 patients were identified per inclusion criteria, education delivered via phone prior to the day of chemotherapy, and L- PaKC score was obtained. Time taken for education by NP was recorded.
- Provided questionnaires for completion for baseline and intervention groups

- Report findings to stakeholders and decide if practice change needs to be made

- Descriptive statistics were used for analysis of results.
- Mean L-PaKC scores for baseline were compared to mean L-PaKC scores for intervention group.
- Mean time for NP education was calculated.

Participants

Inclusion criteria

- At least 18 years of age
- Alert and oriented to person, place, and time
- English speaking
- Beginning a new IV chemotherapy regimen as outpatient within 3 weeks
- Consent to participate
- At least 5th grade literacy level
- Able to write

Exclusion criteria

- Less than 18 years of age
- Non-English speaking
- Receiving chemotherapy as inpatient
- Altered mental status
- Refusal to participate
- Less than 5th grade literacy level
- Unable to write

Methods

- **Project Design**
  - This is a quality improvement project intended to improve the process through which chemotherapy education is provided to patients who are beginning new IV chemotherapy treatment regimens as an outpatient
- **Setting**
  - Outpatient hematology/oncology practice housed in an academic medical center and, more specifically, within the outpatient chemotherapy infusion center
- **Participants**
  - Patients receiving new IV chemotherapy treatment regimens as an outpatient. Participants must meet inclusion criteria. See Table 1 for demographic data.

Intervention

- Existing printed chemotherapy education materials that are currently being used to provide chemotherapy education on the first day of a new treatment regimen were used by the NP to provide education prior to the first day of treatment via phone.
- These materials were developed using information from chemocare.com and were last revised in 2017. They are considered to be at a 2nd grade reading level. See example by scanning QR code.
- The assessment tool used was developed by a researcher in Belgium and is a validated assessment tool for evaluating patient knowledge and preparedness (Coolbrandt et al., 2013).

L-PaKC Questionnaire

- The Leuven Questionnaire on Patient Knowledge of Chemotherapy (L-PaKC) is an instrument that was developed by Coolbrandt et al. (2012) to assess patients' knowledge on chemotherapy
- The content validity was found to be excellent (CVI=0.78-1.00) with themes and topics reviewed by an expert panel using a Delphi procedure (Coolbrandt et al., 2012)
- Psychometric evaluation demonstrated acceptable item validity and internal consistency (Coolbrandt et al., 2012)
- It "can be used to evaluate practice regarding patient education on chemotherapy and can provide insight into the effectiveness of different educational interventions" (Coolbrandt et al., 2012, p. 472)
- It "can provide feedback to encourage targeted quality improvement strategies" (Coolbrandt et al., 2012, p. 472)

Procedures

Baseline Group

- 1. Patients scheduled to receive a new IV chemotherapy regimen were chosen from the chemotherapy infusion center schedule over a 3 week period of time until 10 were collected.
- 2. NP provided a copy of previously provided printed education materials, pencil, and clipboard with L-PaKC questionnaire attached for the patient to complete while receiving chemotherapy infusion.

Intervention Group

- 1. The first 10 patients who were scheduled within a set 3 week period of time who met the inclusion criteria were asked to participate.
- 2. NP chose and provided the appropriate printed education materials for the recommended chemotherapy agents planned for the patient to take home to review. This is current practice for all patients.
- 3. NP scheduled a time for a phone call with the patient and recorded planned date and time, patient's name, medical record number (MRN), and type of education needed on Excel sheet.

Procedures

Baseline Group

- 3. NP monitored patient tracking dashboard and near the completion of new IV chemotherapy infusion treatment, NP went to infusion area to collect completed L-PaKC questionnaire, pencil, and clipboard from patient. There was also a designated basket intended for completed questionnaires that the chemotherapy infusion nurses were aware of, if needed.
- 4. NP scored the L-PaKC questionnaire and recorded result and patient demographics on the baseline group Excel sheet.

Intervention Group

- 4. NP provided patient with business card with date and time of scheduled phone call.
- 5. Patient was scheduled for outpatient office visit and first day of new IV chemotherapy at check-out. NP recorded this date and time on Excel sheet.
- 6. At the scheduled time, NP called the patient and delivered education with note of start and end times which were recorded on Excel sheet.

Procedures

Intervention Group

- 7. Patient returned on scheduled day to begin new IV chemotherapy. NP provided a copy of previously provided printed education materials and L-PaKC questionnaire during outpatient office visit along with a pencil and clipboard.
- 8. NP monitored patient tracking dashboard and near the completion of new IV chemotherapy infusion treatment, NP went to infusion area to collect completed L-PaKC questionnaire, pencil, and clipboard from patient.
- 9. NP scored the L-PaKC questionnaire and recorded the result and patient demographics on intervention group Excel sheet.
- Baselines group scores and intervention group scores were recorded in separate Excel sheets.

Table 1. Demographic Data

Age	Baseline N(%)	Intervention N(%)
20-30 years	1(10%)	1(10%)
31-40 years	0	0
41-50 years	1(10%)	0
51-60 years	0	2(20%)
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81-90 years	2(20%)	1(10%)
Gender		
Male	5(50%)	4(40%)
Female	5(50%)	6(60%)
Race		
White	9(90%)	8(80%)
African American	1(10%)	1(10%)
Hispanic	0	1(10%)
Education level		
High school	7(70%)	2(20%)
Some college	0	3(30%)
Undergraduate	2(20%)	5(50%)
Graduate	1(10%)	0
Cancer type		
Hematologic	6(60%)	5(50%)
Lung	2(20%)	1(10%)
Breast	1(10%)	1(10%)
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Yes	6(60%)	4(40%)
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Results

- The mean L-PaKC questionnaire score for the baseline group was 86.2% compared to 90.7% for the intervention group.
- The aim of this quality improvement project was ultimately met with an improvement in the mean L-PaKC questionnaire score of the intervention group, however by a lower percentage than expected at approximately 5%.
- Previous experience with IV chemotherapy may have been a confounding factor making the higher mean score of the intervention group more meaningful.
- A strength of this project was the noticeable improvement in patient satisfaction among the intervention group.
- A weakness of this project was the small sample size which could be increased with a greater amount of time allotted for intervention.

Results

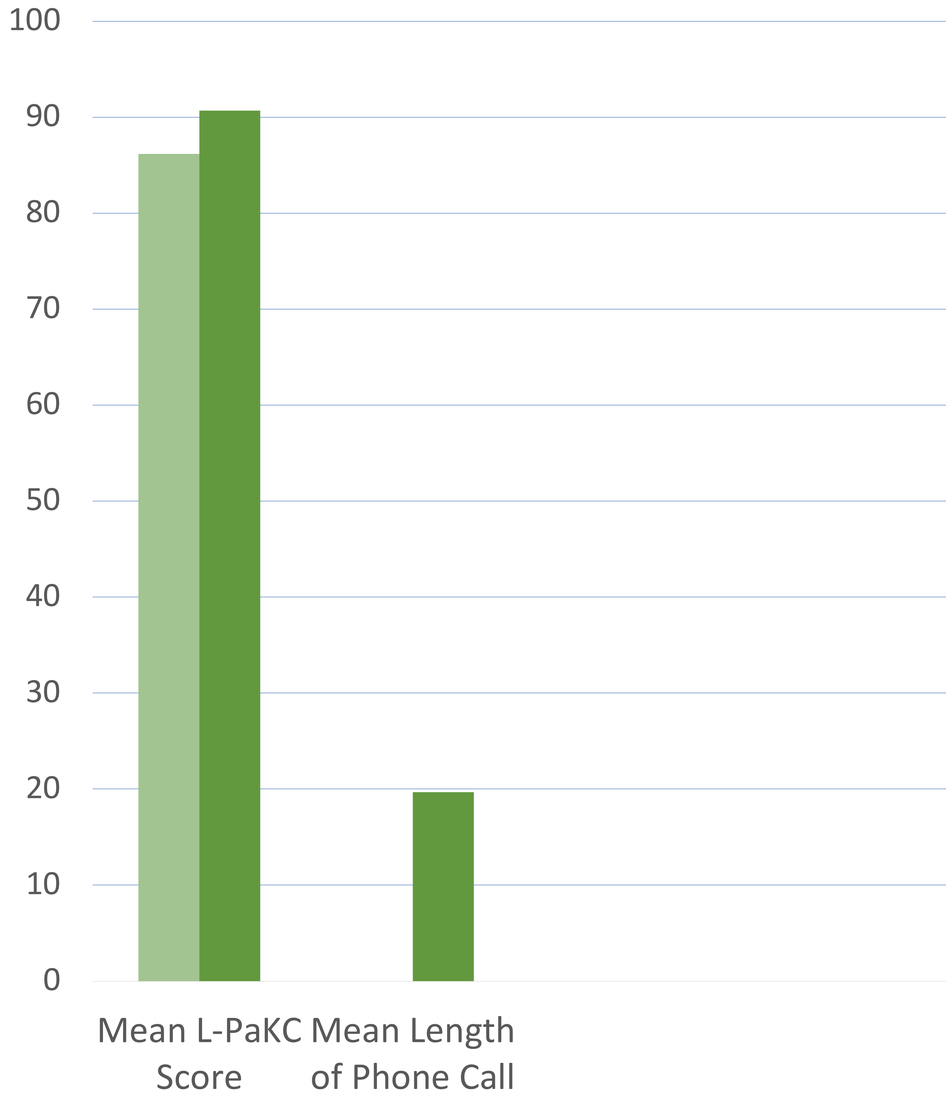
- The feasibility of one-on-one education prior to IV chemotherapy is felt to be subjective in nature, and the average time of 20 minutes was burdensome for the NP. Notably, the minimum time spent on an educational phone call was 7 minutes and the maximum time was 34 minutes.

- The timing of phone calls (after hours) as well as the increase in phone calls from patients afterwards were not accounted for and added to the overall time spent. The feasibility of chemotherapy education via phone by the NP prior to the first day of a new treatment regimen may be minimal in a busy practice.

Table 2. Mean L-PaKC Questionnaire Score Results

Baseline Group Score = 86.2 %

Intervention Group Score = 90.7%



Implications for Practice

- Adapt the change made and develop a group chemotherapy class for patients and their caregivers to attend prior to the first day of a new intravenous chemotherapy regimen. This would allow for more staff and providers to be involved making it more feasible.
- Focus on improving patient satisfaction in addition to patient knowledge and preparedness in the future
- Recruit colleagues including fellow nurse practitioners to participate in providing in-person or virtual educational sessions

Conclusion

- Providing education to patients about IV chemotherapy prior to the day of their first chemotherapy can improve patient knowledge and preparedness.
- Although the mean L-PaKC questionnaire score for the intervention group was only 5% higher than that of the baseline group, a greater improvement in patient satisfaction was anecdotally observed.
- Having a history of receiving IV chemotherapy can improve patients' knowledge and preparedness.
- Stronger rapport was established between the provider and the patient in the intervention group which resulted in an increased number of phone calls specifically requesting the provider
- Improved patient outcomes are expected to result from improvement in the knowledge and preparedness, and further observation can focus on the impact of improved patient satisfaction (Coolbrandt et al., 2013).
- Further study should be done to assess the outcomes of knowledge and preparedness as well as patient satisfaction for a group chemotherapy class for patients and their caregivers to attend prior to the first day of a new IV chemotherapy regimen.

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