Evaluation of Patient Navigation in a Community Radiation Oncology Center Involved in Disparities Studies: A Time-to-Completion-of-Treatment Study

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Abstract

Purpose: To evaluate whether data on length of time from patient referral to treatment completion, collected routinely as part of a quality improvement program, can be used to measure the effectiveness of a patient navigator program.

Patients and Methods: During a calendar year, 72 disparities patients, 38 of whom received navigator services, and a group of 157 nondisparate, un-navigated patients received external beam radiation therapy at a community center. Data from referral time through completion of treatment, which had been collected routinely under an existing continuous quality improvement program, were compared retrospectively, as well as missed treatments and the percentage of planned treatments completed, for three patient groups.

Results: The average number of days from referral to consult and from consult to start of treatment were lower for the navigated disparate group (6.66 and 14.56 days, respectively) than un-navigated groups (disparate: 7.37 and 15.97 days; nondisparate: 8.97 and 16.24 days, respectively). The percentage of patients completing treatment was lower for the navigated group (85%) than the un-navigated groups (95% and 97%), despite equivalent treatment percentage completion rates for all groups (97.0% to 98.8%). The navigated group missed more treatment days (1.86 days/patient) than the un-navigated disparate group (0.47 days/patient) or the non-disparate group (0.83 days/patient.)

Conclusion: Some statistically insignificant differences were noted in favor of patient navigation (PN) but the significance is unclear because of the large data spread and the small numbers of patients. Given that the study was retrospective, it is also unclear whether these differences were influenced by the patient navigator. Repeat studies using the same data elements will provide a better platform for assessing whether such data can provide a measure of the effectiveness of PN in the radiation oncology setting. Given that the patients were not observed routinely by the navigator after the start of treatment unless a particular barrier was identified, there is an opportunity to assess whether interventions by the navigator could improve treatment completion rates and reduce the number of missed treatments.

Introduction

Cancer afflicts more than a million Americans annually and about half of them will die as a result of it.[1] Despite significant improvements in treatment and survival during the last decade,[2,3] racial and ethnic minorities have benefited significantly less than others due to disparities in cancer screening and treatment, reduced access to medical care, and the later stage of disease at diagnosis, resulting in earlier and higher recurrence rates for ethnic and or economically deprived subpopulations compared with the general population.[4-7]

Despite the abundant evidence of documented health disparities in racial and ethnic groups, successful interventions that address health disparities remain sparse.[8-10]

In January 2000, the National Institutes of Health instituted a plan to eliminate persistent health disparities through research training, medical research, and education. In response to this plan, the National Cancer Institute's (NCI's) Cooperative Planning Grant For Cancer Disparities Research Partnership Program partnered with the Radiation Research Program. They issued requests for proposals to support the planning, development, and conduct of radiation oncology clinical trials in community cancer centers, which care for a disproportionate number of medically underserved populations but traditionally have not been involved in NCI-sponsored research.[11]

A consortium of five community radiation oncology centers belonging to the Radiation Oncology Community Outreach Group (ROCOG) in Western Pennsylvania was awarded funds for a disparities grant program. One of these centers, Jameson Memorial Hospital in New Castle, PA, serves a disproportionately large socioeconomically deprived (12.1%) and senior subpopulations (19.5%) compared with the state averages (11%) and (15.6%), respectively.

A useful initiative to level the playing field is Patient Navigation (PN), a program Harold P. Freeman, MD, originally developed in the 1990s based on a vision of quality, timely health care for all regardless of a patient's socioeconomic status or race. Since the initial program, the concept of PN has spread throughout the country. There were more than 200 navigator programs across the country in 2003,[12] and with legislative support from the Patient Navigator Outreach and Chronic Disease Prevention Act of 2005, the number has increased.[13]

PN provides a wide variety of resources and removes barriers to patients who may otherwise fall through the health care cracks

of an increasingly confusing and disjointed health care system, allowing more timely and potentially superior care to cancer patients. The barriers that typically plague the poor and lower socioeconomic echelon are high out-of-pocket payments, a lack of insurance and transportation, limited insight into cancer, ignorance of available resources, and poor social support. Providing resources to overcome these barriers is the key to increasing treatment compliance and survival rates among those underserved populations.

One of the NCI-ROCOG–funded initiatives, a PN program based in the Jameson Radiation Oncology Center, was established in January 2005.

PN has been an appealing model for many patients and providers of health care because patients are happier with their health care experience, and physicians believe that patient access is enhanced and they proceed through the health care system much quicker.[12] However, a 2004 survey of the use of navigator programs to improve care of the underserved noted that there has been little PN evaluation.[14] One such evaluation at The Harold P. Freeman Patient Navigation Institute showed that it took patients who received navigator services less time to obtain follow-up services compared with those who did not receive navigator services.[15] A later study at the same institution found significant improvements in diagnosis and 5-year survival rates among patients with breast cancer.[8,15] The percentage of patients diagnosed at stages 3 and 4 dropped from 50% to 21%, and the 5-year survival rate rose from 39% to 70% for two cohorts of patients with low socioeconomic status, of whom 50% had no medical insurance between 1972 and 1986, and between 1995 and 2000. Though PN may have played the major role in the improvement, other factors, including initiation of a low-cost mammogram screening program and improved cancer education and outreach were also probably important. Therefore, the relative contributions of each initiative remain unknown.

As a result of this and other studies, Dohan[14] has questioned the degree of scientific rigor applied to studies designed to measure the effectiveness of PN. The variation in the roles assigned to navigators and the sheer number and variety of potential gaps in the support systems they tackle from one patient to another do not allow for either easy or global evaluation of these programs. A more realistic albeit modest approach would be to analyze a single aspect of PN activity. Accordingly, we chose to use existing data, obtained routinely as a result of a Jameson Radiation Oncology Continuous Quality Improvement (CQI) initiative, on the time taken for patients to complete treatment after initial referral.

These data were analyzed retrospectively for a period of 1 year to determine if there were differences among patient subpopulations who either received help from the navigator or not, and whether this approach would shed any light on the effectiveness of PN.

Patients and Methods

The PN program based in the Radiation Oncology Center works with the medical staff, the Department of Pathology, and the tumor registry system identifying patients soon after diagnosis who are at potential risk for experiencing significant barriers to receiving timely cancer care, defined by underinsurance (defined as Medicaid or Medicare without supplemental insurance) or uninsured status, age, race other than white, and having a subsidized housing address (disparities group). These patients were approached by the patient navigator and invited to join the study. Those who accepted received navigator services (navigated group) until the start of treatment, but not during their subsequent radiation therapy course unless a particular need was identified and conveyed to the patient navigator.

As part of a CQI project, a log already existed containing times of consultation, simulation, completion of planning, physics checks, and the start and completion of treatment of patients referred to the radiation department. In addition, the numbers of missed days during treatment and percentage of planned treatments completed, along with the reasons patients gave for missing treatment days, were recorded.

A total of 302 patients were referred, of whom 296 were consulted and 232 were actually offered radiation therapy. Of the treated group, 72 were disparate patients, 38 of them received navigator services (navigated group), and 34 did not (un-navigated group), leaving a group of 157 nondisparate, un-navigated individuals. Three other patients who did not fit the disparities criteria, yet received PN services, were excluded from the study.

Statistical Analysis

Differences in time from referral to consult and from consult to start of treatment were analyzed for all three groups using the Mann-Whitney non-parametric two-tailed test.

Results

As shown in Table 1, the average time in days, from referral to consult and from consult to start of treatment were shorter for the navigated disparities group (21.22 days; 95% CI, 0 to 41 days) than un-navigated groups (disparate: 23.34 days; 95% CI, 0 to 52 days; nondisparate: 25.21 days; 95% CI, 0 to 47 days). However, Table 2 shows that the percentage of patients who completed treatment was lower in the navigated disparate group (85%) than the un-navigated disparate group (95%) and nondisparate group (97%), despite equivalent completion of planned treatment rates for all groups (97.0% to 98.9%).

The navigated group averaged more missed days (1.86 days/patient) than the un-navigated disparate group (0.47 days/patient) or the nondisparate group (0.83 days/patient.) The reasons given by patients for missing treatments (Table 3) were

Table 1. Elapsed Days and Ranges Between Stages in Managing Patients for External Beam Radiation Therapy

Stage	All Patients		Disparate Navigated		Disparate, Un-navigated		Nondisparate	
	No. of Days	Range (days)	No. of Days	Range (days)	No. of Days	Range (days)	No. of Days	Range (days)
No. of patients	302		38		34		157	
Referral to consult	8.68	0-32	6.66	0-27	7.37	0-25	8.97	0-22
Consult to treatment	15.89	0-45	14.56	0-34	15.97	1-45	16.24	0-39
Referral to start of treatment	24.57	0-52	21.22	0-41	23.34	0-52	25.21	0-47
Consult to simulation	3.47	0-44	3.39	0-33	2.72	0-14	3.84	0-44
Simulation to start of treatment	5.51	0-44	5.72	0-15	5.96	0-23	6.07	0-44
Simulation to physics	3.92	0-23	3.96	0-20	4.0	0-22	3.84	0-23
Physics to start of treatment	1.90	0-20	1.47	0-5	2.12	0-29	1.83	0-12

NOTE. Statistical analysis: Mann-Whitney two-tailed test.
Referral to consult: disparate navigated versus disparate un-navigated ($P = .736$) versus nondisparate ($P = .736$).
Consult to treatment: disparate navigated versus disparate un-navigated ($P = .791$) versus nondisparate ($P = .338$).

Table 2. Rates and Ranges for Treatment Completion and Missed Treatment Days

Characteristic	All Patients			Disparate Navigated			Disparate, Un-navigated			Nondisparate		
	No.	%	Range	No.	%	Range	No.	%	Range	No.	%	Range
Patients who completed treatment		95			85			95			97	
Planned treatments completed		97.45	28.6-100		98.87	28.6-100		98.78	50-100		97.02	50-100
Average treatments missed	0.97		0-19	1.86		0-16	0.47		0-6	0.83		0-19
Patients who missed treatments		31			39.5			21			29	

Table 3. Reasons Documented in Chart for Patients Missing Treatment (No. of treatments)

Reason for Missing Treatment	All	Navigated	Disparate, Un-navigated	Nondisparate
Snow	7	2	1	4
Conflicting physician appointment	34	9	3	22
Relative's physician appointment	12	3	1	8
Work	2	0	0	2
Personal	26	10	1	15
Adverse effects				
Disease related	24	8	1	15
Radiation related	16	5	0	11
Chemotherapy related	52	16	6	30
Illness not due to treatment	21	8	1	12
Relative's illness	14	3	2	9
Transportation issue	7	2	1	4
Total	215	66	17	132

many. The most common were adverse effects, more often due to chemotherapy than the disease itself or radiation therapy. Health problems in relatives and personal reasons were also cited often. Transportation problems that caused patients to miss treatment times were uncommon.

Given that a wide variety of patients exists within each group, data from the two most common classes of patient, definitive breast and palliative, were analyzed for the number of treatment days missed (Table 4) and the reasons for missing treatments (Table 5).

There is a striking difference in the percentage of patients missing treatments during palliative therapy (16.3%) compared with patients undergoing breast irradiation (46%), but the number treatments in a palliative therapy course (5 to 14 treatments) is approximately one third the number needed for breast irradiation (30 to 33 treatments), and this would account for the difference.

The percentage of incomplete treatments was higher for patients receiving palliative care treatment than for breast cancer treatment, but the figures were similar for all of the groups (3.9% to 4.7% incompletion rate).

Discussion

Though navigator programs are becoming more popular and patients and physicians who use navigators continue to be pleased with the services that navigators can offer, there is little documentation of the effect that navigation has on the clinical outcomes of patients.

Documentation is intrinsically difficult, because of wide variations in individual patients' needs and the available services to fill gaps and so on. Possibly more limited evaluations of a small portion of PN work may be more feasible.

With respect to the limited study reported here of a PN program involved in a Radiation Disparities CQI initiative, we did not have a working hypothesis before analyzing the data. Given the retrospective nature of the study, many of the discussion points are necessarily a matter of conjecture. We propose that in an ideal world, no patient would require PN services and all patients would complete their treatments expeditiously regardless of their age, race, or socioeconomic status. In the imperfect world that exists for cancer care delivery, we also propose that the data for all of the parameters we studied would still be similar for navigated and non-navigated groups if a PN program worked perfectly. For much of the data, these assumptions proved to be correct. The times from referral to the completion of treatment were actually shorter for the navigator group.

However, with respect to the percentage of patients completing treatment and the number of treatments missed, the navigated patients fared worse than un-navigated disparate or nondisparate patients. Given that the spread of data were too great, and the amount of data too small, these differences were not statistically significant. Despite this, there seems to be a theoretical possibility that the data for the parameters analyzed might reflect the success, or lack of it, of the PN program. Could nondisparate patients benefit from PN? More saliently, can a PN program reduce the number of missed treatments or increase treatment completion rates? Until now, because of time constraints, the PN program has not routinely followed with the patient after the start of treatment unless there was a special need. Though it would be naïve to believe that they could ameliorate adverse effects from treatment or influence missed treatments due to the weather, PN programs could possibly help with rearranging visits to other treatment centers, or help with relatives' healthcare visits and transportation issues.

It would have been of potential significance to carry out similar evaluations at other PN sites within the ROCOG system to see whether the same discrepancies exist for navigated patients. Unfortunately, none of the other programs collect treatment time data as part of their CQI programs, and the existing institutional review board approval for the PN program did not allow for collection of data on any other class of patient than navigated patients, nor did it allow a record to be kept of patients who refused PN services. Attempts are being made to submit a revised study plan to the institutional review board, which would allow for such an analysis of future patients.

In addition it would be possible to randomly assign navigated patients to receive services, or not, during the treatment course, and to analyze whether the navigation services reduced the number of missed treatment days and/or increased the treatment completion rate. If this proved to be the case, it is theoretically possible that the results of treatment could be improved and the economic impact could also be calculated. In the mean time, an attempt will be made to validate the data from Jameson by duplicating the current study. Repeated analyses might provide a bench mark for the success of PN in radiation oncology centers. We looked at subset analyses for the most common treatment programs (palliative and definitive breast) to reduce the effects of some of the variables. For the current study this was unrewarding. The variation in patient mix for stage, site, histopathology, and treatment course did not allow for a sensible comparison of any other patient groups. Though a larger number of patients might provide for a statistical analysis of data, it should be stressed that to be practicable, evaluation of navigator services can only accommodate relatively limited sets of data, since it would need to be performed at least annually and must be reasonably easy to accomplish.

In conclusion, this assessment of a limited patient population revealed some discrepancies between navigated and un-navigated patients, but their significance can only be approximated at and the study poses more questions than answers. Similar repeat studies using the same type of data, particularly at other sites within the ROCOG community, will provide a better platform for assessing whether such data can provide a measure

Table 4. Treatment Completion Rates for Patients Receiving Palliative Care Therapy

Group	No. of Patients	No. of Planned Treatments	No. of Completed Treatments	Incomplete Treatments (%)	No. of Treatments Missed	Missed Treatments (%)	Patients Missing Treatments (%)	Patients in Group (%)
Total	97	882	841	4.6	31	3.5	16.3	43
Navigated, disparate	17	160	153	4.4	7	4.1	37	47
Un-navigated, disparate	14	170	162	4.7	6	3.7	19.5	41
Nondisparate	66	552	536	3.9	44	3.4	15	42

Table 5. Treatment Completion Rates for Patients Undergoing Definitive Breast Radiation Therapy

Group	No. of Patients	No. of Planned Treatments	No. of Completed Treatments	Incomplete Treatments (%)	No. of Missed Treatments	Missed Treatments (%)	Patients Missing Treatments (%)	Patients in Group (%)
Total	45	1,697	1,697	0	31	1.8	46	20
Navigated, disparate	8	264	264	0	8	3	56	24
Un-navigated, disparate	3	311	311	0	1	0.3	33	8
Nondisparate	34	1,122	1,122	0	22	2	44	22

of the effectiveness of PN in the radiation oncology setting. There is an opportunity to extend services to include the period during treatment and possibly to test the effect of PN in a randomized setting. On an anecdotal basis, the patients and their community physicians believe that the program at Jameson is of great benefit to the community.

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