Systematic Review of Oncology Nurse Practitioner Navigation Metrics

Frances Johnson, MSN, AOCN®, ANP-BC

**Background:** Nurse practitioners should become more active in patient navigation and its subcomponent, care coordination, because research has shown that these roles are influential in improving patient care at all levels of an organization. Well-defined process and outcome measures, as well as educational initiatives, are critical to these programs because they serve as the structure for program evaluation.

**Objectives:** This article aims to assess and define metrics that nurse practitioners in the oncology setting can use to evaluate navigation programs, which is essential for the evolution of research pertaining to the navigation field.

**Methods:** The current article is a systematic review that describes oncology nurse practitioner navigation metrics using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) format for the systematic literature review process. These metrics are then compared to current standards of care.

**Findings:** Seven studies met the criteria for this review. Research is emerging that shows benefit in using an oncology nurse practitioner navigator for ensuring timely care and patient and staff satisfaction. These metrics are in line with expert consensus recommendations. The need for more research identifying sound research tools that have been rigorously tested has been identified.

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The American Nurses Association (ANA) has petitioned for the nurse practitioner (NP) to become more involved in patient navigation because research has shown favorable outcomes (Naylor et al., 2004; Robles et al., 2011). The ANA (2012) has recognized the care coordination role, a component of patient navigation, as highly influential in improving patient care at every level of an organization. Well-defined process and outcome measures are critical to navigation programs because they serve as the structure for program evaluation. NPs that serve as patient navigators for patients with cancer are ethically responsible for ensuring quality patient care by virtue of their education and training. Defining the metrics that NPs use in caring for patients with cancer is the initial step toward achieving standardized outcome measures. Standardized outcome measures facilitate multi-institutional research, which expediates the ongoing evolution of cancer care research. In the current study, an NP is defined as a nurse with a state license and certification to practice as an advanced nurse.

**Navigation process** is a series of actions taken to achieve a particular end. **NP navigators** are defined as NPs that use the navigation process to care for patients at any point along the cancer care continuum. **Oncology nurse navigation** is defined as “individualized assistance offered to patients, families, and caregivers to help overcome healthcare system barriers and facilitate timely access to quality health and psychosocial care” (C-Change, 2009, p. 1). The purpose of this systematic review is to review the metrics used to assess oncology NP navigation programs.

**Methods**

**Eligibility Criteria, Study Selection, and Information Sources**

Eligibility criteria for the literature synthesis included that the article be quantitative research published in a peer-reviewed journal and written from 2004–2014. Eligible articles also must include an NP as a study participant, and the study sample must include patients with cancer. Using these criteria ensures current,
professional, state-of-the-art findings that can serve as rationale for designing future studies that generate new knowledge pertaining to methods of measuring NP navigation for patients with cancer.

Information Sources and Search

Information sources included Academic Search Complete, Business Source Complete, Literary Reference Center, PsycARTICLES®, PsycINFO®, MEDLINE®, CINAHL®, and Health Source: Nursing/Academic Edition. Search terms used were nurse practitioner and navigation, and that search was completed on July 1, 2014. A second search was completed on May 27, 2014, with PubMed. The search terms used were continuity of patient care and (nursing or nurses) and (neoplasms or medical oncology). A third search was completed in April 2014, using those same search terms, in PubMed. Ancestry searching and journal hand searching were also used. Unpublished manuscripts and dissertations were not used. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flowchart for the processing of the articles is shown in Figure 1.

Data Collection Process and Data Items

A methodologic matrix was created. The matrix consists of a summary of the dependent variables, independent variables, study design, sample size, sampling methods, and data collection methods (Polit & Beck, 2012) (see Table 1).

Results

Seven studies met the inclusion criteria for this sample. Study designs included one randomized, controlled trial (RCT), one retrospective cohort, and five descriptive studies.

Risk of Bias and Level of Evidence Hierarchy

Campbell, Craig, Eggert, and Bailey-Dorton (2010) evaluated navigation services from patient and staff perspectives in an RCT. Two five-point Likert-type scale surveys were used (one for patients, one for staff). The navigator sample was randomly selected from the navigator’s records, and the control (non-navigator) was selected from a cancer registry. Fifty-six percent of the navigator sample and 40% of the non-navigator sample returned the surveys. Mean responses for “adequate preparedness for treatment”; “educational preparation for treatment side effects”; “patient responsibilities for management of treatment side effects”; “information pertaining to community resources”; “timely patient information (within two months of diagnosis) pertaining to community resources”; “availability of someone to address financial issues pertaining to diagnosis”; and, after meeting with the financial resources department, “patient knowledge of eligible financial assistance and assistance in gaining access to financial assistance” were higher in the navigator group. Statistically significant differences were calculated for “information pertaining to community resources” (p = 0.0001), “timely access to patient information (within two months of diagnosis)” (p = 0.0011), “knowledge of financial assistance” (p = 0.0336), and “use of financial assistance, if qualified” (p = 0.0075). Sixty-five percent of the staff surveys were returned. On the staff survey statement related to role, “distinguishing patients who have received navigation services from those not exposed to navigation services, barriers, preparedness, and satisfaction” was the only category receiving a rating of disagreement, but it was minimal. Limitations included the lack of reliability and validity testing of the tools, small sample size, and lack of power analysis. Selection bias was addressed because of the randomization of the participants. Performance and detection bias were not addressed because of lack of mention of blinding the participants, personnel, or outcome measures. Attrition bias and selective reporting bias were addressed because of exclusions from attrition. This study’s design can be analyzed and refined for future well-designed RCTs.

Alsamarai et al. (2013) used a retrospective cohort analysis. The sample included patients diagnosed with non-small cell lung cancer from 2005–2010. Four variables (earlier stage, p < 0.0001; lack of cancer-related symptoms, p < 0.001; presence of more than one medical comorbidity, p = 0.0002; and depression, p = 0.029) were associated with a longer span of time from the initial abnormal image to therapy initiation. This study lacked randomization and a control group; therefore, causation cannot be inferred. Selection, performance, detection, and attrition bias are limitations. The multivariate analysis model was
formulated to look at the effect of the program on timeliness of care. Statistical control for confounding variables of stage migration, histology, initial image reason, and the presence of a primary care provider were included as potential confounding factors that were found to be statistically significant before and after the cancer care coordinator program. The study design can be used and improved to design RCTs. This study emphasized the care coordinator NP role as a means of achieving statistically significant outcomes in improving timely access to care.

Hunnibell et al. (2012), Rosales et al. (2014), and Seek and Hogle (2007) used descriptive analysis of data collected from chart reviews to determine the success of their navigation programs. The end points of measurement of the Hunnibell et al. (2012) study were timeliness of care and staff satisfaction of role. The study described how process improvements were used to demonstrate measurable improvements from 2003–2010 in timeliness of cancer care during specific points during the diagnostic process of patients with lung cancer. This study emphasized the care coordinator NP role as a means of achieving statistically significant outcomes in improving timely access to care.

Rosales et al. (2014) looked at an NP and social worker survivorship program through the use of a chart review. A Likert-type scale was used to record patient satisfaction and results with high response rates. The percentage of patients working on wellness goals was high. Data were collected on reimbursement rates for services. This study documented numerical return investment for the survivorship program, as well as survivorship needs from the patient’s perspective.

Seek and Hogle (2007) used percentages in measuring timeliness of care and patient satisfaction for a breast cancer program. The descriptive study documents the process of achieving the goal of a two-week turnaround from diagnosis to the initiation of therapy. The prior turnaround time was one to three months. Patient satisfaction surveys showed that 50% of patients were completely satisfied, which is a significant process improvement finding pertaining to timely access to care. Additional information that defines the navigation process used would serve useful as a basis for designing RCTs. A qualitative interview may be useful in defining this process.

Patient navigation was studied by two descriptive studies conducted in the Netherlands from the patient and provider perspectives. Van Hezewijk, Ranke, et al. (2011) looked at the effect of the introduction of NPs on patients’ information needs, preferences, and attitudes toward follow-up. Patients with early-stage breast cancer were recruited from a follow-up program post-curative treatment. A cross-sectional survey was performed.

### TABLE 1. Methodologic Matrix

<table>
<thead>
<tr>
<th>Study and Location</th>
<th>Dependent Variables</th>
<th>Independent Variables</th>
<th>Design and Sample</th>
<th>Data Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alsamarai et al., 2013 United States</td>
<td>Timeliness of care</td>
<td>Cancer care coordinator</td>
<td>Retrospective cohort analysis using the convenience method (N = 352)</td>
<td>Chart review</td>
</tr>
<tr>
<td>Campbell et al., 2010 United States</td>
<td>Patient and staff perception of patient preparation for treatment; access to care and satisfaction after a cancer diagnosis</td>
<td>Navigation services</td>
<td>Program evaluation using a stratified random sample (N = 48 patients, N = 26 staff)</td>
<td>Provider survey; patient survey</td>
</tr>
<tr>
<td>Hunnibell et al., 2012 United States</td>
<td>Timeliness of care; staff satisfaction with role</td>
<td>Cancer care coordinator</td>
<td>Time series survey using purposeful sampling (N = 34, N = 77)</td>
<td>Chart reviews from January 2007 to December 2010; emailed survey to primary care providers</td>
</tr>
<tr>
<td>Rosales et al., 2014 United States</td>
<td>Patient satisfaction; whether revenue covered costs</td>
<td>Survivorship care plan</td>
<td>Survey program evaluation using purposeful evaluation (N = 118)</td>
<td>Medical chart review; telephone calls</td>
</tr>
<tr>
<td>Seek &amp; Hogle, 2007 United States</td>
<td>Timeliness of care</td>
<td>Advanced practice nurse with an oncology background</td>
<td>Descriptive study using purposeful sampling (N = 118)</td>
<td>Medical record and chart review; telephone calls</td>
</tr>
<tr>
<td>van Hezewijk, Hille, et al., 2011 Netherlands</td>
<td>Healthcare providers’ opinion in reference to breast cancer follow-up</td>
<td>Implementation of new follow-up strategies</td>
<td>Survey using a convenience sample of all members of the Dutch Comprehensive Cancer Center (N = 130)</td>
<td>A structured, web-based questionnaire was developed based on a questionnaire on specialists’ attitudes, and a questionnaire on patients’ attitudes was used.</td>
</tr>
<tr>
<td>van Hezewijk, Ranke, et al., 2011 Netherlands</td>
<td>Patient informational needs; patient preferences and attitudes toward follow-up</td>
<td>Introduction of a nurse practitioner in a breast cancer unit</td>
<td>Cross-sectional survey using a convenience sample (group A, n = 89 patients, before introduction of NP) and a randomized control sample (group B, n = 100, after introduction of NP)</td>
<td>Patients’ attitude toward follow-up was measured using the Dutch version of the PSQ; anxiety and depression was measured using the Dutch version of the HADS; QOL was measured using the VAS.</td>
</tr>
</tbody>
</table>

HADS—Hospital Anxiety and Depression Scale; NP—nurse practitioner; PSQ—Patient Satisfaction Questionnaire III; QOL—quality of life; VAS—visual analog scale
on two groups, those operated on before the introduction of an NP (group A, n = 89) and those operated on after the introduction of an NP for follow-up (group B, n = 100). More patients in group A could be categorized as depressed (p = 0.04). Communication with caregiver was scored higher in group B (p = 0.002), as well as nervous anticipation prior to follow-up (p = 0.04). More patients in group B voiced that the provider took adequate time during the visit (p = 0.02). No significant differences were found between the groups regarding benefits from follow-up. Both groups of patients were satisfied with the interpersonal interaction during care, but significant differences were found between groups, favoring group B (p = 0.03), which was also true with patient satisfaction with the technical aspects of care (p = 0.03). A bivariate analysis revealed that the length of follow-up correlated with frequency, with younger patients preferring greater length and frequency. Patient follow-up expectations and informational needs did not change with the introduction of an NP; however, patient satisfaction and time taken were favored more. NP services are valued by patients and cost savings can be significant with the use of NP-staffed clinics. Other limitations mentioned previously for descriptive studies apply (e.g., selection, performance; detection, attrition bias). Maturation and history can be a limiting factor because data were collected from different points in time.

Van Hezewijk, Hille, et al. (2011) studied providers’ opinions in reference to patient follow-up. Six-hundred and thirty-three Dutch professionals were sent a 29-item questionnaire. Eighty-one percent reported that they follow the current national guidelines and that specialist follow-up varies. NPs were favored for follow-up in 69% of respondents. Longer and lengthier follow-up was favored over recommendations from current guidelines for a large number of clients. Significantly more bias existed toward more frequent follow-up as compared to providers who felt that current guidelines recommended too frequent follow-up visits (17 versus 4 factors; p < 0.001). This study provided important information for program development. The fact that the majority of providers favored NPs for follow-up care furthers the case for NP-staffed clinics in follow-up for early-stage breast cancer. Rec- lification in the United States can be done to determine whether U.S. providers are in agreement with this finding. RCTs can be designed to determine the differences in outcome metrics, such as cost, patient satisfaction, and timely access to care.

In the current sample, the authors used one RCT, one retrospective cohort, and five descriptive studies. Campbell et al.’s (2010) study was level II and the highest rated study according to the evidence hierarchy. The three most widely used outcomes were timeliness of care, patient satisfaction, and staff satisfaction.

**Outcomes and Related Metrics**

**Timeliness of Care**

The most frequent outcome measured in the review articles was timeliness of care (Alsamarai et al., 2013; Hunnibell et al., 2012). Hunnibell et al. (2012) reported that, in 2006, 33% of patients were diagnosed with early-stage lung cancer and that the rate increased to 53% after the initiation of the NP navigation process. Alsamarai et al. (2013) (N = 352) used the mean interval (measured in days) from the time to abnormal image to treatment initiation (X = 105, SD = 104, median = 78, range = 1–757), initial suspicious image to diagnosis (X = 65, SD = 92, median = 37, range = 0–757), and diagnosis to treatment (X = 40, SD = 48, median = 28, range = 0–265) as study metrics. They reported that no evidence-based guidelines exist for timeliness of lung cancer care but that their measurements are in line with the RAND Corporation, which recommends no more than two months from suspicion to diagnosis, and six weeks from diagnosis to treatment (Hermens et al., 2006). After the establishment of the navigation process, the barriers of depression and alcoholism or drugs were not found. A multidisciplinary team was established, which included the hiring of a lung cancer care coordinator to track patients and facilitate process improvements. A mean reduction of 25 days occurred from the initial abnormal image to the initiation of treatment. Hunnibell et al. (2012) used timeliness of care as an outcome. Mean and median time from the suspicion of abnormality to definitive treatment was recorded. Metrics used from 2003–2006 after the initiation of an NP care coordinator position were days from suspicion to treatment. This included mean number of days from suspicion to computed tomography (CT) imaging, positron emission tomography (PET)-CT imaging, and initiation of pulmonary consultation. A detailed navigation protocol, the hiring of the NP care coordinator, and institutional process improvements affected reduction of time to initiation of treatment. In 2003, the mean number of days from suspicion to treatment was 117; the number dropped to 64.5 days in 2007 and to 54.2 days in 2010. In 2007, the mean number of days from suspicion to CT imaging was 11.8, and it dropped to 7.3 days in 2010. The mean number of days from suspicion to PET-CT imaging was 16.4 in 2007 and dropped to 10.8 days in 2010. The mean number of days from suspicion to pulmonary consultation was 20.9 days in 2007 and dropped to 13.4 days in 2010.

**Patient Satisfaction**

Campbell et al. (2010) studied patient satisfaction using a survey with a five-point Likert-type scale. The survey consisted of 10 statements reflecting navigation goals that were derived from the literature. Staff reviewed the tool to establish face and content validity. The review comments were incorporated into the final stages of the instrument development. The goals of “information pertaining to community resources”; “timely patient information (within two months of diagnosis) pertaining to community resources”; “availability of someone to address financial issues pertaining to diagnosis”; and, after meeting with the financial resources department, “patient knowledge of eligible financial assistance and assistance in gaining access to financial assistance” were all statistically significant. The goals of “adequate preparation for treatment,” “educational preparation for treatment side effects,” “patient responsibilities for management of treatment side effects,” and “satisfaction of overall care received at the cancer center” were not statistically significant.

Seek and Hogle (2007) viewed patient satisfaction as a method of program evaluation. The article does not detail the patient satisfaction tool. Six months after the program was launched, favorable patient satisfaction surveys were obtained from 90% of the patients. Rosales et al. (2014) measured patient satisfaction with survivorship care via telephone calls. Fifty of 118 patients...
were asked questions regarding their survivorship care plans. Eighty-six percent strongly agreed or agreed that the survivorship care plan met their needs, and 88% reported that they strongly agreed or agreed that they understood the treatment summary and care plan. The questionnaire and details were not included in the article.

Van Hezewijk, Ranke, et al. (2011) used the Dutch version of the Patient Satisfaction Questionnaire III (PSQ) (Hagedoorn et al., 2003) to measure patient satisfaction. The tool was determined to be an appropriate measure of patient satisfaction for patients with cancer. Response bias was noted to have an effect on satisfaction scores. Various patient groups or care settings were found to have an impact, as determined through factor analysis. The matched-pair method was recommended for detection of response bias. Both groups included in the study were satisfied with the interpersonal aspects.

Rigorous reliability and validity testing is needed to justify the application of new knowledge gained from research that is applicable to practice. Campbell et al. (2010) used a patient satisfaction tool that can be further developed by additional reliability and validity testing. More sharing of information, such as further publication of tools used in the Seek and Hogel (2007) and Rosales et al. (2014) studies, is needed for future research. Van Hezewijk, Ranke, et al. (2011) and van Hezewijk, Hille, et al. (2011) used the Satisfaction with Care Hospitalization Questionnaire (Hendriks, Oort, Vrielink, & Smets, 2002) and PSQ (Hagedoorn et al., 2003). These tools have undergone rigorous reliability and validity testing and are applicable to use in future well-designed RCTs.

**Staff Satisfaction**

Campbell et al. (2010) used a provider survey with a Likert-type scale to measure staff understanding of knowledge and perception of the patient navigator program. Although content and face validity were established, vigorous reliability and validity were not. The study found agreement with all five statements (range = 56%–81%).

Hunnibell et al. (2012) measured satisfaction and knowledge of the nurse navigator role using a five-point Likert-type scale by sending an email to 24 of 77 primary care providers. The response rate was 31%. The majority of responses for the program were that primary care providers were “very satisfied” (46%) or “satisfied” (29%) with the nurse navigator role. Reliability and validity testing was not addressed in the article. From the survey result table footnotes, the tool was determined to have been used in the Fox Chase Virtua Health Cancer Program (2009). More information is needed to determine the reliability and validity of the instrument.

**Discussion**

Battaglia, Burhansstipanov, Murrell, Dwyer, and Caron (2011) reported that the lack of comparable metrics in diverse programs limits the goal of identifying best practices. This challenge must be addressed as navigation becomes assimilated into universal standard care services. A Prevention and Early Detection Workgroup is identifying metrics that are tailored to cancer prevention and detection across that cancer care continuum (Battaglia et al., 2011). According to Guadagnolo, Dohan, and Raich (2011), institution-specific baselines need to be specified to measure metrics, such as timeliness of care. The proposed metrics were gathered from published scientific literature, provider focus groups, patient navigators, and health policy experts who met as part of the National Patient Navigation Leadership Summit sponsored by the American Cancer Society. Timeliness of care in early cancer management is operationalized by intervals from symptom to provider evaluation, screening test to diagnostic resolution, diagnostic confirmation to patient notification, diagnostic confirmation to specialist, diagnosis date to first treatment, and percentage of treatment initiation. Metrics during cancer treatment include consultations with oncology provider to first treatment date, time intervals between treatment modalities, and, if applicable, concordant start dates of radiation therapy and chemotherapy. These metrics were used in the NP studies reviewed in this article alone or in combination (Alsamarai et al., 2013; Hunnibell et al., 2012). In addition, the Centers for Disease Control and Prevention, American Society for Clinical Oncology, and National Comprehensive Cancer Network have standards that address this metric.

During the National Patient Navigation Leadership Summit, the Family and Caregiver Workgroup met (Palos & Hare, 2011). Core functions of a care partnership between healthcare providers and patients and families were identified along the cancer continuum. Two recommended instruments for patient satisfaction were the Patient Satisfaction with Cancer Care (PSCC) and the Patient Satisfaction with Navigation Services (PSN-1). The PSCC measures patient satisfaction for patients receiving diagnostic and therapeutic cancer-related care. Principal component analysis (PCA) was conducted for structural analysis, which showed a one-dimensional measure, the items of which formed a comprehensible group explaining 62% of the variance. Internal consistency reliability ranged from 0.95–0.96. Good face validity and convergent and divergent validity were also demonstrated (Jean-Pierre et al., 2011). The PSN-1 is a measure of patient satisfaction with navigation services. Jean-Pierre et al. (2011) performed PCA on 783 participants in a multi-institutional study for psychometric development and analysis. The items were found to be a comprehensible set because 77% of the variance was accounted for. Internal consistency reliability was high, with Cronbach alpha ranging from 0.95–0.96. Face, convergent, and divergent validities were evident from moderate correlations with the PSCC scores (p < 0.0001 for all). These tools are benchmark standards that can be used for future

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**Implications for Practice**

- Formulate program goals at the initiation of a navigation program, involve the multidisciplinary team in process improvement meetings, and use evidence-based metrics for program analysis.
- Involve other institutions in research to develop shared databases, which will provide a way to improve theory development.
- Create well-defined program objectives using metrics that can be shared between institutions because evolution of nursing knowledge takes time.
research regarding oncology NP navigation. Links for patient education information pertaining to oncology NP navigation are shown in Figure 2.

Conclusion

Seven studies have been reviewed for research soundness and quality of information related to oncology NP navigation. Research is beginning to emerge regarding the benefits of using NPs for navigation with patients with cancer in ensuring timely care and patient and staff satisfaction. One of the studies was an RCT, and suggestions for additional research based on the study were discussed. The remainder of the studies showed statistical significance in the areas of timely care and patient and staff satisfaction, which serve as building blocks for future studies that should be more stringently designed. The metrics used in these studies pertaining to timely access to care are in line with recommendations of expert consensus. Other published standards for timeliness of care and patient and staff satisfaction have been reviewed. The need for more research using identified sound research tools that have been rigorously tested has been identified by this systematic review.

References


