Cognitive Screening
Using the clock-drawing test to assess for preexisting deficits in older women diagnosed with breast cancer

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BACKGROUND: Older women diagnosed with breast cancer may also have preexisting cognitive deficits.

OBJECTIVES: The aim of the current study is to describe errors on the clock-drawing test (CDT), which is used to screen for preexisting cognitive deficits in older women diagnosed with breast cancer.

METHODS: This descriptive study included a convenience sample of women aged 69 years or older with a diagnosis of breast cancer. The CDT was used to screen for cognitive deficits, such as size of the clock, graphic difficulties, stimulus-bound response, conceptual deficit, spatial and/or planning deficit, and perseveration. Data were analyzed by the Rouleau qualitative error analysis.

FINDINGS: Many older adult patients exhibit some abnormality on the CDT. Most abnormalities were spatial/planning difficulties. Cognitive screening should be included in the comprehensive assessment of older adults diagnosed with breast cancer to screen for preexisting cognitive limitations.

MANY OLDER WOMEN WITH BREAST CANCER are also diagnosed with the comorbidity of dementia (Mandelblatt et al., 2014). Breast cancer most often affects women aged 55–64 years, and the median age of diagnosis in the United States is 61 years (National Cancer Institute [NCI], 2014). About 46% of older adult patients with a solid tumor screen positive for cognitive deficits prior to initiating any treatments (Libert et al., 2016). About 33% of older adult patients with breast cancer who were also diagnosed with dementia will die within six months of a malignancy (Raji, Kuo, Freeman, & Goodwin, 2008). In terms of two-year survival, patients with cancer who were also diagnosed with dementia are as many as six times more likely to die as compared to those who were not diagnosed with dementia (Libert et al., 2016). The purpose of this research was to screen for preexisting cognitive deficits in older women diagnosed with breast cancer as evidenced by errors detected on the clock-drawing test (CDT) using Rouleau qualitative error analysis (Rouleau, Salmon, Butters, Kennedy, & McGuire, 1992). Because of the incidence of breast cancer, as well as the incidence of dementia in older adult patients (NCI, 2014; World Health Organization [WHO], 2016), highlighting the coexistence of dementia or cognitive deficits is important in older adult patients with breast cancer. Early detection can help with planning and managing cognitive decline and with decisions regarding cancer treatment.

Objectives
The specific aims of the current study are the following:

- Describe the demographic characteristics of older adult women diagnosed with breast cancer who underwent cognitive screening using the CDT.
- Describe the errors detected on the CDT in older adult patients with breast cancer.
- Characterize cognitive deficits by using Rouleau qualitative error analysis on the CDT.

Dementia
The Centers for Disease Control and Prevention ([CDC], 2015) defines dementia as a group of cognitive disorders that consist of memory deficits, behavioral disabilities, and disturbance of executive function. The National Institute on Aging (2016a) defines dementia as a loss of cognitive functions regarding thinking, remembering, and reasoning. Dementia serves as a general term relating to the chronic, irreversible damage caused to cognitive...
functioning and memory deficits (Jablonski, 2013). Dementia is a nonreversible disease affecting cognitive ability and is considered a leading health problem in the United States (Iadecola, 2013).

To diagnose dementia, a patient must show signs of decline in cognitive ability (American Psychological Association, 2011). The American Psychiatric Association, the National Institute of Neurological Disorders and Stroke, and the Alzheimer’s Disease and Related Disorders Association suggest that diagnostic procedures include a comprehensive history and physical examination and specialized tests to determine memory and cognitive function limitation. Diagnosis includes extent of cognitive deficits and memory disorder and may accompany depression and anxiety disorders (American Psychological Association, 2011). A diagnosis of dementia considers early warning signs, risk factors, and appropriate screening tools for assessing behavior changes, habits, and depression (Galvin & Sadowsky, 2012). Risk factors for dementia include lower levels of education (Sharp & Gatz, 2011), advancing age (Iadecola, 2013), the presence of rosacea (Egeberg, Hansen, Gislason, & Thyssen, 2016), robust alcohol consumption, heavy smoking, and diabetes (Yang et al., 2016).

Recognizing early dementia is important to facilitate a diagnosis, establish treatment, and foster behavioral modifications that can support the patient and family (Sadowsky & Galvin, 2012). Early detection allows for planning to help support independence for as long as possible and arrange quality geriatric psychological care (Bradford, Kunik, Schulz, Williams, & Singh, 2009). Treatment with antidementia drugs, such as cholinesterase inhibitors, are more often used in patients with early dementia as compared to late disease (Koller, Hua, & Bynum, 2016). Other interventions are physical and cognitive rehabilitation (Tay, Lim, Chan, Ali, & Chong, 2016), medication-related treatments (Ströhle et al., 2013), and mind–body movement exercises (Hariprasad et al., 2013).

Dementia has many forms, such as vascular dementia, Lewy body dementia, and Alzheimer disease (Alzheimer’s Association, 2017b). According to Medicare, Alzheimer disease is the most prevalent dementia (45%), then vascular dementia (15%), followed by Lewy body dementia (5%) (Goodman et al., 2017). The type of dementia or cognitive limitation may be initially detected based on CDT errors. Types of dementia are germane to oncology nurses in that many patients who require cancer care have a preexisting, undiagnosed dementia or cognitive deficit.

**Types of Dementia**

**Alzheimer Disease**

According to the Alzheimer’s Association (2017b), Alzheimer disease is the most common form of dementia, accounting for about 50%–60% of dementia cases, and is the sixth leading cause of death in the United States (Tejada-Vera, 2013). This age-related, progressive disease causes memory loss, in addition to changes in perception and language and calculation barriers (Noe et al., 2004). Alzheimer disease is diagnosed predominantly in people aged 85 years or older (Tejada-Vera, 2013), and symptoms include memory, language, and visual–spatial changes (Alzheimer’s Association, 2017b).

According to the National Institute of Aging and the Alzheimer’s Association, an Alzheimer disease diagnosis can be made upon two types of presentations: amnestic, which are impairments in learning and recall of recently learned material, and nonamnestic, which consist of language changes, visual–spatial changes, and executive dysfunction (McKhann et al., 2011). Problems with word finding, facial recognition, reasoning, and decision making are associated with a diagnosis of Alzheimer disease. On the CDT, Alzheimer disease can be represented by those who draw an excessively large clock (more than 5 inches in diameter when offering the CDT without a predrawn circle) and those who exhibit perseveration errors and spatial and planning deficits (Eknoyan, Hurley, & Taber, 2012).

**Vascular Dementia**

Vascular dementia is a name for many vascular disorders that are associated with reduced blood flow to the brain. Risk factors for vascular dementia are atrial fibrillation, hypertension, diabetes mellitus, high cholesterol, and advancing age (Gorelick et al., 2011). Vascular dementia accounts for 20% of the population living with dementia (Gorelick et al., 2011). When blood flow is not able to efficiently perfuse the brain, tissue damage can lead to vascular dementia. Onset can be abrupt and can directly follow a myocardial infarction or cerebrovascular accident, and cognitive deterioration can be progressive (Jablonski, 2013). Signs and symptoms of vascular dementia include mental deterioration, gait changes, and executive dysfunction (Davis, Hendrix, & Superville, 2011).

Patients are often aware of their mental status changes in this type of dementia (Jablonski, 2013). Graphical difficulties on the CDT tend to be associated with vascular dementia (Eknoyan et al., 2012). Vascular dementia is associated with stimulus-bound response errors, compared to some people with Alzheimer disease who often make conceptually bound errors (Lee, Kim, Choi, & Sohn, 2009; Tan, Herrmann, Mainland, & Shulman, 2015).
Lewy Body Dementia

Lewy body dementia is a diagnosis that includes Parkinson disease dementia (Lewy Body Dementia Association, 2016). Lewy body dementia develops progressively and can have varying ranges in cognitive deficits (Noe et al., 2004). A diagnosis of Lewy body dementia can include Parkinson motor signs, poor attention, and reduced concentration that may be accompanied by hallucinations (Jablonski, 2013). Extrapyramidal symptoms, such as restless leg syndrome, shuffling gait, facial distortions, and dystonic reactions, are also associated with Lewy body dementia (Davis et al., 2011; Gomperts, 2016). Cerebrospinal biomarkers and amyloid beta markers may have some predictive ability in cognitive decline in Lewy body dementia (Abdelnour et al., 2016). Gait difficulties also can predict Lewy body dementia (Beauchet et al., 2016).

Various differences exist in memory and mental performance between Lewy body dementia and Alzheimer disease (Gomperts, 2016). Patients with Lewy body dementia perform worse on visual memory evaluations as compared to Alzheimer disease (Noe et al., 2004). Nurses’ knowledge of the type of dementia allows for the individual to have a more focused plan of care (Jablonski, 2013). People who have Lewy body dementia tend to have more conceptual errors on the CDT as compared to people with Alzheimer disease or Parkinson disease (Cahn-Weiner et al., 2003).

Dementia Associated With a Diagnosis of Breast Cancer

Cognitive deficits recognized in women diagnosed with breast cancer may be related to cancer treatment (Joly et al., 2015) and may not be a comorbidity of dementia. In women receiving chemotherapy with a mean age of 53 years, 46% reported self-perceived cognitive changes (Mehnert et al., 2007). Survivors aged 21–65 years report memory and executive function impairment associated with chemotherapy/radiation treatment and depressive symptoms (Ganz et al., 2013). Cognitive deficits associated with cancer treatment may be linked to tumor necrosis factor, which refers to cytokines associated with breast cancer (Patel et al., 2015).

To what extent some hormone therapies for breast cancer affect cognition is unclear. In mice models, tamoxifen (Nolvadex®) enhances spatial and contextual memory by reducing dopamine (Pandey, Banerjee, Basu, & Mishra, 2016). Long-term tamoxifen and aromatase inhibitors have a joint effect of reducing risk for dementia (Sun, Chen, Liang, & Kao, 2016). With respect to a diagnosis of breast cancer, the associations of the cancer diagnosis and various forms of cancer treatment, genetic makeup, and cognitive changes are difficult to connect. Many survivors report adverse symptoms from hormonal treatment, such as fatigue, pain, sleep problems, and cognitive changes, and more research is needed to better understand symptoms from hormonal treatment and cognitive changes (Meyers, 2013).

Cancer Screening and Treatment in Patients With Dementia

The risk for developing dementia or breast cancer increases with age (NCI, 2014; WHO, 2016). People diagnosed with dementia are more likely to be diagnosed with a later-stage breast cancer and have an increased risk for cancer-related death (Raji et al., 2008). Many women with mild to moderate dementia continue to undergo mammography. However, for women with severe dementia, screening is not considered as important by providers (Smyth, 2009). Poor survival, less screening, reduced cancer treatment, and more toxicities when receiving treatment were factors expressed in a systematic review of patients with dementia diagnosed with cancer (Hopkinson, Milton, King, & Edwards, 2016).

The National Comprehensive Cancer Network ([NCCN], 2016) states that the ability of a patient to make decisions and to understand the diagnosis and treatment plans is important in deciding the type of cancer treatment strategy. NCCN (2016) suggests palliative treatment for patients with cancer with the comorbidity of dementia who have mental impairment to the extent that they are unable to make personal care decisions. NCCN recommendations are consistent with research suggesting that patients with cancer who are diagnosed with dementia tend to receive less aggressive cancer treatment (Hopkinson et al., 2016). Despite the recommendations and research, decisions regarding the extent of cancer treatment may not be so clear, and patients and families may struggle with considerations associated with quality of life versus quantity of life.

Impact of Dementia on the Social Support System

All types of dementia have a large impact on a patient’s support system. Caregivers of older adult patients report a great deal of burden, particularly in situations of psychological and cognitive decline (Borman et al., 2016). The loss of a caregiver’s ability to work and participate in meaningful activity is a difficult transition for many patients and families (Roach & Drummond, 2014). Being a caregiver to a person with dementia is a highly burdensome and stressful experience and can culminate in a decreased quality of life, more comorbidity, and loss of work, affecting the economic condition of the family (Goren, Montgomery, Kahle-Wrobleski, Nakamura, & Ueda, 2016). Caregivers of patients with dementia have a higher chance of becoming frail as compared to those not caring for patients with dementia (Dassel & Carr, 2016).

Compound the stressors with a cancer diagnosis that may require surgery, radiation therapy, chemotherapy and/or hormonal therapy, and caregivers can be busy driving to appointments, providing care, and completing all the tasks that maintain health and independence of a patient. Decisions regarding the extent of cancer treatment for a person with dementia pose considerable discussion among the healthcare team, patient, family, and caregivers.
Methods
The current study has a prospective, descriptive design. The CDTs were compared and separated into one of six categories of errors (Rouleau et al., 1992). Women who were diagnosed with breast cancer and aged 69 years or older were invited to participate. The age of 69 years was chosen based on the age of patients seen in the Senior Adult Oncology Program. Patients were diagnosed with any stage of breast cancer and were receiving any type of treatment. Participants were able to read and understand the consent form.

The Stefanie Spielman Comprehensive Breast Center (SSCBC) at Ohio State University in Columbus is an outpatient clinical and research facility. The clinic targeted for this research was the Senior Adult Oncology Program, which focuses on older adult women with breast cancer.

Ethical Conduct of Research
This study was approved by the Ohio State University Institutional Review Board (IRB). The study was explained, and the informed consent and Health Insurance Portability and Accountability Act of 1996 (HIPAA) forms were signed by all participants according to the standards of the IRB. Participants were not compensated for inclusion in the study. Participants were not screened for cognitive deficits prior to informed consent, but all participants could verbalize understanding the purpose of the study and could read the informed consent and HIPAA forms. Based on reading and verbalization of understanding the consent form, all participants were determined to have had decision-making ability and were competent to consent on their own behalf consistent with the U.S. Department of Health and Human Services (Office for Human Research Protections, 2016).

Procedures
Patients who presented to the clinic and who were aged 69 years or older were invited to participate in the study. For those who accepted the invitation to participate in the study, the geriatric nurse practitioner (GNP) explained the study and obtained written consent from the patient. The GNP completed the CDT on each patient while in the examination room. Cancer diagnosis was obtained from the medical record per HIPAA consent. The GNP administered the CDT as described in the literature and in

![Figure 1. Examples of Types of Errors on the Clock-Drawing Test](image-url)
a video demonstrating the administration of the Mini-Cog™ (of which the CDT is a part) as best practices of the Hartford Institute for Geriatric Nursing (Agrell & Dehlin, 2012; Doerflinger, 2016). Biographic data were obtained, and patients were asked how they perceived their health as compared to others of a similar age. A predrawn circle was provided on paper for the CDT, in which the patient was asked to insert the numbers as represented on the face of a clock.

Data Analysis
The data were collected upon first encounter at the Senior Adult Oncology Program at SSCBC. Data were entered into SPSS®, version 21.0, and analyzed using frequencies. The study investigators assessed the CDTs and collaborated on the analysis. The study investigators initially analyzed the CDTs individually, then repeated the analysis together several days later.

Clock-Drawing Test Scoring
The CDT is only a screening tool and is not diagnostic. Mild cognitive decline may be difficult to identify using the CDT, and clinicians should consider all aspects of the history and physical examination to make an appropriate diagnosis.

Many types of scoring systems are published for the CDT based on outcomes of differentiating mild and moderate dementia, various types of dementia, and progression of dementia (Parsey & Schmitter-Edgecombe, 2011). The CDT using the Rouleau qualitative error analysis was used for the current study (Rouleau et al., 1992) and is not a score but a category of the type of error. It was selected because it is widely used to distinguish among various types of dementia (Brodaty & Moore, 1997; Kitabayashi et al., 2001; Parsey & Schmitter-Edgecombe, 2011), which was the focus of the current study. To screen for mild cognitive deficits, the Rouleau qualitative error analysis can be added to a quantitative CDT scoring system; the sensitivity is 74.7%, and the specificity is 75.6% (Cahn et al., 1996). Using simply the Rouleau qualitative error analysis, the CDT was able to distinguish between Alzheimer disease and Huntington disease with respect to the errors reflective of the type of dementia.

- The size of the clock distinguished between Alzheimer disease and Huntington disease (p < 0.05).
- Graphic difficulties were distinguished among Alzheimer disease, Huntington disease, and normal cognition (p < 0.001).
- Stimulus-bound response was able to distinguish among Alzheimer disease, Huntington disease, and normal cognition; however, no tests of significance were reported.
- The conceptual deficit distinguished between Alzheimer disease and Huntington disease (p < 0.01).

The spatial/planning or perseveration deficits did not report tests of significance.

The ability of the CDT to recognize mild dementia is questionable. Most CDT sensitivity and specificity are performed comparing those without a diagnosis of dementia to those with severe dementia, which may overemphasize the utility of recognizing mild cognitive deficits (Hubbard et al., 2008). Although correlated with the Mini-Mental State Examination (Folstein, Folstein, & McHugh, 1975), the CDT often fails to recognize early dementia (Agrell & Dehlin, 2012). The CDT using the Rouleau qualitative error analysis does not discriminate well between those with mild cognitive disorder and cognitively intact older adults (Parsey & Schmitter-Edgecombe, 2011). The type of scoring of the CDT may actually determine whether early or mild cognitive changes are detected (Parsey & Schmitter-Edgecombe, 2011). Quantitative 18-point scoring was effective in distinguishing early dementia

<table>
<thead>
<tr>
<th>TABLE 1.</th>
<th>SAMPLE CHARACTERISTICS (N = 42)</th>
</tr>
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<tbody>
<tr>
<td>CHARACTERISTIC</td>
<td>n</td>
</tr>
<tr>
<td>Type of breast cancer</td>
<td></td>
</tr>
<tr>
<td>Infiltrating ductal</td>
<td>25</td>
</tr>
<tr>
<td>Carcinoma in-situ</td>
<td>7</td>
</tr>
<tr>
<td>Triple-negative</td>
<td>6</td>
</tr>
<tr>
<td>Lobular</td>
<td>3</td>
</tr>
<tr>
<td>Biopsy pending</td>
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</tr>
<tr>
<td>Metastatic</td>
<td></td>
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<tr>
<td>No</td>
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</tr>
<tr>
<td>Yes</td>
<td>5</td>
</tr>
<tr>
<td>Missing data</td>
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</tr>
<tr>
<td>Type of surgery</td>
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</tr>
<tr>
<td>Lumpectomy</td>
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<tr>
<td>Mastectomy</td>
<td>11</td>
</tr>
<tr>
<td>None</td>
<td>5</td>
</tr>
<tr>
<td>Missing data</td>
<td>7</td>
</tr>
<tr>
<td>Self-reported health status compared to people of the same age</td>
<td></td>
</tr>
<tr>
<td>Better</td>
<td>19</td>
</tr>
<tr>
<td>As good</td>
<td>15</td>
</tr>
<tr>
<td>Do not know</td>
<td>4</td>
</tr>
<tr>
<td>Not as good</td>
<td>2</td>
</tr>
<tr>
<td>Missing data</td>
<td>2</td>
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</tbody>
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to those with Alzheimer disease (Babins, Slater, Whitehead, & Chertkow, 2008).

CDT requires the ability to verbally understand directions and possess memory and spatial sense. A patient is presented with a predrawn circle and asked to draw the face of a clock along with a specific time (Agrell & Dehlin, 2012). Evaluation of the CDT drawings using the Rouleau qualitative error analysis consists of six types of categories of errors (Eknoyan et al., 2012; Rouleau et al., 1992) (see Figure 1):

- Size of the clock (diameter less than 1.5 in.)
- Graphic difficulties (imprecise lines, distortion of the clock face, numbers difficult to interpret, and hands failing to connect in the middle of the clock)
- Stimulus-bound response (associated with the patient focusing on one aspect of the directions to draw the clock and is often seen in the time settings that are incorrect [Eknoyan et al., 2012])
- Conceptual deficit (an inability to recall the attributes of a clock)
- Spatial and/or planning deficit (errors in the layout and/or spacing of the numbers)
- Perseveration (the continuation or recurrence of activity [e.g., presence of more than two clock hands, numbers that go beyond 12])

Scores or cutpoints were not used for the current study; the errors were only sorted into one of the six categories. For this research, numbers that were not next to the line of the predrawn circle were considered to be a size deficit.

Analysis

Descriptive statistics were used to describe the demographic characteristics of the sample. To describe the incidence of positive cognitive screening, frequencies were calculated. To characterize cognitive deficits, the data were organized by groups of similar CDTs and compared to the scoring system of the Rouleau qualitative error analysis method (Rouleau et al., 1992).

Results

Forty-two participants with a mean age of 78 years (range = 69–93 years) were included (see Table 1). One person had diagnosed dementia, but the specific dementia was not mentioned in the medical record. No other participants had previously diagnosed dementia as indicated in the electronic health record. No patients were receiving chemotherapy for their breast cancer diagnosis.

Thirty of 42 patients scored abnormal on the CDT according to Rouleau et al. (1992) (see Figure 2). To describe the abnormalities, 10 participants exhibited size difficulties by not drawing the numbers at the edge of the circle provided for the clock drawing. Only one participant exhibited graphic difficulties, and one experienced stimulus-bound response error. Six participants showed conceptual deficits, and 22 had spatial/planning difficulties. Five participants were found to have perseveration deficits. Nine participants were found to have abnormalities in two or more of the categories. One participant had size and perseveration deficits; one had size and conceptual deficits; one had size and spatial deficits; four had spatial/planning limitations; one had perseveration and spatial deficits; and one had perseveration, conceptual, and stimulus-bound response.

Discussion

The participants included in the current study were patients with breast cancer who were not receiving chemotherapy. Many were taking hormonal therapy as adjuvant or palliative treatment, but the exact number was not captured for the current study. Some participants were considered frail and could not undergo surgery and, therefore, were maintained on hormonal therapy. However, 30 participants had some abnormality on the CDT and did not have chemotherapy-related dementia. The percentage of participants in the current study who had difficulty drawing an exact clock was greater than that of those diagnosed with dementia (71% versus 44%), as reported by the Alzheimer’s Association (2017a).
Of note, a diagnosis of dementia may not account for inexact clocks drawn by a patient. Other possibilities may include being distracted by the oncology medical visit or not being careful drawing the clock during the screening evaluation. Another possibility for the high number of abnormalities on the CDT was that the mean age of this population was 78 years, and some evidence exists that a normative deterioration of clock drawing does occur after age 75 years (Hubbard et al., 2008). The scoring associated with the CDT size was also conservative in that any numbers drawn away from the provided border were considered an abnormal screen.

The most common type of error on the CDT was spatial/planning deficits as depicted by incorrect spacing of the clock numbers, which was reported by other researchers (Lee et al., 2009). This could be attributed to some degree of haste and distraction by the fact that this screening was administered in the examination room prior to the oncology visit and may not have allocated the serious attention required. Another consideration is that the CDT actually detected early dementia or mild cognitive disorder (contrary to published literature) before overt clinical signs were realized and a diagnosis offered; however, the literature is contradictory about whether CDT is actually effective in recognizing mild or early cognitive deficits (Ehreke et al., 2009).

In comparison to other studies on the CDT, 10 participants from the current study drew the CDT too small. No participants in a similar study drew the clock too small (Parsey & Schmitter-Edgecombe, 2011), but, in a study of participants with Huntington disease, most drew a small clock (Rouleau et al., 1992). In Lee et al.’s (2009) study, 21% were found to have two or more CDT errors. This was less than the 41.4% of participants who had two CDT errors and 93.8% of those diagnosed with Alzheimer disease and Parkinson disease who had three errors (Lee et al., 2009).

Many patients who screen positive for dementia can still have the cognitive capacity to make some types of decisions. Nurses must advocate to foster some level of choice in patients’ healthcare decisions. Patients need protection from making poor healthcare decisions because of cognitive deficits and from being excluded from choice in those who have decision-making capacity but may have some cognitive deficit (Mezey, 2016). The Hartford Institute for Geriatric Nursing suggests that decision-making capacity can vary and must be assessed with regard to specific situations (Mezey, 2016).

Alzheimer’s Disease International (2011) reports that only about 20%–50% of cases of dementia are ever recognized and diagnosed worldwide. Although the diagnosis may be difficult, patients and families find it and its surrounding discussions necessary to shift responsibilities, plan, and put in place reminders and safeguards that may help with everyday tasks. Not detecting dementia early removes the capacity for patients to make decisions for their families and their health care.

**Implications for Practice**
- Assess older adult patients for cognitive deficits prior to initiating cancer treatment.
- Screen for dementia using an instrument such as the clock-drawing test.
- Understand that many types of dementia exist and that early detection is important.

**Limitations**
The sample of the current study, which was limited by the number of patients seen by the Senior Adult Oncology Program, was small. This descriptive study did not follow patients through to diagnosis of dementia; therefore, whether 71% of the population truly had a diagnosis of dementia is unclear. Qualitative categories associated with the CDT are helpful to understand the type of dementia, but no data exist specific to limitations associated with cancer or cancer treatment. The authors did not collect information on whether patients were taking hormonal therapy, aromatase inhibitors, or radiation therapy. They also did not collect data on education level, which could have accounted for the high level of deficits in those who were less educated. An earlier study stratified for years of education showed significant differences in the CDT (Teixeira Fabricio, Aprahamian, & Sanches Yassuda, 2014). In addition, those with depression tend to have difficulty on the CDT (Klein, Saur, Müller, & Leyhe, 2015); the current authors did not screen for depression.

The current study did not benefit from a content expert also assessing the CDT to establish the Rouleau categories. The CDT has not been tested in cognitive deficits associated with a cancer diagnosis or treatment, which is a motivation for additional research.

**Implications for Nursing Care**
Many older adult patients with cancer will have cognitive deficits as a separate comorbidity, which may be undetected at the time of cancer diagnosis and treatment. Screening and assessment for cognitive deficits in older adult patients with cancer by using valid and reliable instruments can help evaluate mental condition prior to cancer treatment and upon diagnosis of cancer (Karuturi et al., 2016). Defining a cognitive baseline is an important component to the general assessment of older adults and is often part of the comprehensive geriatric assessment (Oversch, 2013). Determining if mental changes are a result of a preexisting condition or a result of cancer or cancer treatment is clinically important.

The National Institute on Aging (2016b) recommends that primary care professionals (nurses and providers) address complaints of cognitive changes to treat underlying causes, such as infections, medications and treatments, dehydration, and many other causes. According to the Hartford Institute for Geriatric Nursing (https://consultgeri.org/geriatric-topics/dementia), nurses should be able to recognize cognitive deficits, assess, screen, and deliver appropriate management strategies (e.g., review medications, maximize functional capacity) (Fletcher, 2012).

Screening is the first and often least complex step to diagnosis and treatment of dementia, and having a plan for patients...
who screen positive for dementia is important. Further diagnostic assessment by a neurologist or other geriatric specialist must be arranged to determine if the cognitive limitation is actually a dementia. Identifying professionals who offer specialized dementia and memory disorder care is important for the comprehensive care of older adults. Upon referral to a cognitive specialist, nurses can inspire and maintain conversations between oncology and neurology specialists and the primary care provider.

Until further cognitive diagnostic testing, education regarding safety is prudent. Safety regarding daily tasks (e.g., driving, cooking) should be discussed with patients and their family members, depending on the extent of cognitive deficit. A clinical concern is that many patients may have some type of error on the CDT but maintain the ability to live independently. Interviewing patients and their family members concerning cognitive changes noticed in the patients’ daily routine may help to embark on the difficult conversation associated with memory changes and potentially losing independence. Getting lost in familiar places, forgetfulness, impaired judgment, agitation, and other mental changes are some of the changes that may be described.

The caregiving demands of cancer treatment compounded with supporting a person with dementia are robust. Family-centered care can be offered to the caregiver by asking strategic questions about support and daily routine, offering community resources, and engaging in active listening, which are important to the wellness of the patient-caregiver dyad (Gitlin & Hodgson, 2016). Caregiver referral to a local Area Agency on Aging can help with counseling, education, and respite services. The Alzheimer’s Association has local chapters around the United States that offer assistance, a 24/7 helpline, a community resource finder, and many other supportive options.

**Conclusion**

Based on the results of the current study, many older adult patients diagnosed with breast cancer exhibit some abnormality on the CDT, which may be indicative of cognitive deficits. However, errors on the CDT do not always mean a person has dementia or even diminished capacity to make decisions. Most abnormalities were associated with spatial/planning difficulties. Because of the high number of positive screens on the CDT, older patients with breast cancer would benefit from cognitive screening as a component of a comprehensive physical assessment.

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**REFERENCES**


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