Gastrointestinal Symptom Representation in Cancer Symptom Clusters: A Synthesis of the Literature

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Purpose/Objectives: To review how gastrointestinal (GI) symptoms are represented within symptom clusters in patients with cancer receiving chemotherapy.

Data Sources: MedLINE®, PsycINFO, and CINAHL®.

Data Synthesis: Forty-two symptom clusters containing a GI component emerged. Only four clusters were replicated in different samples; 38 were unique clusters. Thirteen different symptom measurement tools were used across the studies. Nineteen different GI symptoms were measured; however, many chemotherapy- or cancer-related GI symptoms known to be present in this population were missing or underrepresented. Twenty-one of the studies reviewed identified a symptom cluster that was primarily (50% or greater) composed of GI symptoms.

Conclusions: GI symptoms are prevalent in symptom clusters, but those clusters often are inconsistent. One explanation for this finding may be that current symptom measurement tools do not fully address GI symptoms commonly experienced by patients receiving chemotherapy.

Implications for Nursing: Future research should focus on using a comprehensive symptom assessment tool in a homogenous sample of participants who are receiving chemotherapy. Improved measurement of GI symptoms will advance symptom cluster research, which could impact assessment of chemotherapy-related symptoms and development of interventions for symptom clusters.

Patients with cancer often experience many debilitating and bothersome symptoms. Research has shown that almost half of the most frequently reported and most distressing treatment-related symptoms for patients with advanced cancer are gastrointestinal (GI) in nature (Tong, Isenring, & Yates, 2009). GI symptoms may be caused by the disease or its treatments, often chemotherapy. Although pharmacologic therapies for GI symptoms have improved over time, the inherent toxicity of chemotherapy causes many bothersome GI symptoms to remain prevalent. GI symptoms may lead to secondary issues such as electrolyte imbalance, weight loss, and infections including *Candida albicans*. Severe symptoms may cause patients to refuse further cancer treatment (Schnell, 2003). Because many chemotherapy-related GI symptoms may share a similar cause, they may be experienced together in treatment-related symptom clusters. Although knowledge has been advancing in symptom cluster research, little is known about how GI symptoms are represented within symptom clusters. The purpose of this article is to review the current evidence for GI symptom representation within symptom clusters in patients with cancer who are receiving chemotherapy.

Background

Clinical cancer symptom research has tended to focus on individual symptoms rather than on symptoms that co-occur or cluster together (Dodd et al., 2001). However, evidence has suggested that most patients with cancer experience as many as 11 symptoms, depending on the diagnosis and treatments used (Walsh, Donnelly, & Rybicki, 2000). Dodd et al. (2001), who introduced the phrase *symptom cluster* for such co-occurring symptoms, defined the phrase as three or more concurrent symptoms that are related to each other and may or may not share the same cause. Other investigators have defined a symptom cluster as at least two related symptoms that demonstrate stability and are relatively independent of other clusters (Kim, McGuire, Tulman, & Baresevick, 2005).

Chemotherapy inherently is toxic and impacts cell division and turnover along the full length of the GI tract. Chemotherapy acts on all rapidly dividing cells, with the intention of destroying malignant cells. This action leaves other rapidly dividing cells, like those lining the GI tract, susceptible to damage and growth inhibition. The GI tract turns over and replaces mucosal epithelial cells every 7–14 days (Fall-Dickson & Berger, 2007). Studies have shown that even a few hours after exposure to chemotherapy, cell replacement along the GI tract is inhibited (Mitchell, 2006). If the cells are not replaced at the typical rate, the patient is susceptible to ulcerations, dryness, and inflammation along the

entire GI tract (Camp-Sorrell, 2010). The damage to the GI mucosa, release of inflammatory mediators and neurotransmitters, and sensory alterations caused by chemotherapy can result in patients experiencing not just one, but multiple GI symptoms. Several studies investigating symptom prevalence in large samples of patients with cancer found the most common GI side effects of chemotherapy to be lack of appetite, dry mouth, taste change, nausea, diarrhea, and constipation (Tong et al., 2009; Walsh & Rybicki, 2006).

Cancer-related lack of appetite may occur when the hunger signal that originates from the hypothalamus is diminished and the satiety signals generated by melacortins are amplified (Davis, Dreicer, Walsh, Lagman, & LeGrand, 2004). Lack of appetite also may be worsened when the patient experiences chemotherapy-related nausea or taste changes.

Chemotherapy can cause atrophy and damage to salivary glands and taste buds, resulting in oral dryness and taste changes. When salivary glands are damaged, salivary proteins, which bind with volatile aromatic compounds in food and impact taste perception, increase (Mitchell, 2006). Chemotherapy also can cause alterations in cell structure or receptor surface changes in taste buds (Hong et al., 2009).

Although the exact pathophysiology of chemotherapy-induced nausea is not known, one theory suggests that chemotherapeutic agents present in the blood may activate the chemoreceptor trigger zone (CTZ) located in the brain (Berger & Clark-Snow, 2007). When the CTZ has been activated, it releases neurotransmitters such as dopamine, serotonin, histamine, norepinephrine, vasoactive intestinal polypeptide, gastrin, and vasopressin, among others. The neurotransmitters then produce the sensation of nausea. Another theory postulates that chemotherapy passes through the bloodstream into the GI tract, where it damages enterochromaffin cells and induces nausea. Enterochromaffin cells respond to chemotherapy by releasing serotonin, which triggers the vagus nerve and activates the CTZ (Baker, Morzorati, & Ellett, 2005).

Acute damage to the intestinal mucosa caused by chemotherapy can lead to necrosis of the cells that line the intestinal crypt, resulting in bowel wall inflammation. With the crypt cells damaged, replacement of the intestinal villi is reduced, as is the absorptive surface of the bowel resulting in diarrhea (Camp-Sorrell, 2010). Constipation occurs when chemotherapy-related autonomic dysfunction slows gastric motility. Signals from the afferent and efferent pathways are interrupted, inhibiting rectal emptying (Camp-Sorrell, 2010).

GI symptoms have been shown to increase patient distress and contribute to changes in functional status, treatment failure, depression, anxiety, and poor quality of life (Cohen, de Moor, Eisenberg, Ming, & Hu, 2007; Delgado-Guay, Parsons, Li, Palmer, & Bruera, 2009; Lachaine et al., 2005; Mystakidou et al., 2004; Tong et al., 2009). Many of these GI symptoms share common mechanisms or the initiation of one symptom (e.g., taste changes) may trigger another (lack of appetite). Therefore, chemotherapy-related GI symptoms likely occur in clusters and could negatively impact patient outcomes. Cluster research still is relatively new and the presence of GI symptoms within symptom clusters is unknown.

Methods

MedLINE®, PsycINFO, and CINAHL® were searched using the key words *cancer, symptom,* and *cluster.* The search was limited to peer-reviewed research articles published in English and concerning adults (age 19 and older) with cancer. The search yielded 121 articles. Articles then were examined to identify studies that reported a symptom cluster containing a GI component. Because the focus of this synthesis is on chemotherapy-related GI symptoms, studies that included at least some patients receiving chemotherapy were retained whereas studies that focused only on patients receiving radiation or any other form of treatment were excluded. This resulted in 22 articles eligible for synthesis. Articles were analyzed to identify symptom clusters that contained at least one GI component, as well as identify the measurement tools used to assess symptoms and to evaluate the GI symptoms represented in those tools.

Results

From the 22 articles reviewed in this analysis, 42 symptom clusters containing a GI component emerged. Although the GI components contained within symptom clusters varied from study to study, the most common was nausea and vomiting (Chen & Tseng, 2006; Lin, Chang, Cleeland, Mendoza, & Wang, 2007; Okuyama et al., 2003; Walsh & Rybicki, 2006; Wang et al., 2006; Wang, Tsai, Chen, Lin, & Lin, 2008). Three studies reported the symptom cluster of nausea, vomiting, and lack of appetite (Chen & Lin, 2007; Cleeland et al., 2000; Kim, Barsevick, Tulman, & McDermott, 2008). In a series of three studies, each identified the cluster of lack of appetite, dry mouth, pain, fatigue, sleep disturbance, emotional distress, shortness of breath, drowsiness, sadness, trouble remembering, and numbness or tingling (Wang et al., 2004, 2006, 2008). Finally, two studies noted a cluster consisting of lack of appetite, pain, fatigue, sleep disturbance, and drowsiness (Chen & Lin, 2007; Chen & Tseng, 2006). The remaining clusters had symptoms that grouped in a unique way (see Table 1).

Table 1. Symptom Clusters With a Gastrointestinal Component by Instrument

Study	Sample	Cluster
Common Symptoms List		
Barresi et al., 2003	44 Australian patients with advanced cancer receiving palliative treatment	• Nausea, vomiting, constipation, lack of appetite, dry mouth, heartburn, pain, memory disturbances
ESAS		
Cheung et al., 2009	1,366 Canadian patients with advanced cancer	• Nausea, lack of appetite, fatigue, drowsiness, dyspnea
MDASI		
Chen & Lin, 2007	321 Taiwanese patients with cancer	• Nausea, vomiting, lack of appetite • Lack of appetite, pain, fatigue, sleep disturbance, drowsiness
Chen & Tseng, 2006	151 Taiwanese patients with cancer	• Nausea and vomiting • Lack of appetite, pain, fatigue, sleep disturbance, drowsiness
Cleeland et al., 2000	527 American patients with cancer	• Nausea, vomiting, lack of appetite • Dry mouth, lack of appetite, pain, fatigue, sleep disturbance, emotional distress, shortness of breath, drowsiness, sadness, numbness or tingling
Ivanova et al., 2005	226 Russian patients with cancer	• Lack of appetite, pain, fatigue, sleep disturbance, drowsiness • Nausea, vomiting, dry mouth, shortness of breath, memory disturbances, numbness or tingling
Lin et al., 2007[a]	556 Taiwanese patients with cancer	• Nausea and vomiting • Dry mouth, lack of appetite, fatigue, sleep disturbance
Mystakidou et al., 2004	150 Greek patients with cancer	• Lack of appetite, shortness of breath, sleep disturbance, fatigue, drowsiness • Nausea, vomiting, dry mouth, constipation, numbness or tingling, memory disturbances
Okuyama et al., 2003[a]	252 Japanese patients with cancer	• Nausea and vomiting
Wang et al., 2004	249 Chinese patients with cancer	• Nausea and vomiting • Lack of appetite, dry mouth, pain, fatigue, sleep disturbance, emotional distress, shortness of breath, drowsiness, sadness, memory disturbances, numbness or tingling
Wang et al., 2006	206 Filipino patients with cancer	• Nausea and vomiting • Lack of appetite, dry mouth, pain, fatigue, sleep disturbance, emotional distress, shortness of breath, drowsiness, sadness, memory disturbances, numbness or tingling
Wang et al., 2008[a]	108 Taiwanese patients with lung cancer	• Nausea and vomiting • Lack of appetite, dry mouth, pain, fatigue, sleep disturbance, emotional distress, shortness of breath, drowsiness, sadness, memory disturbances, numbness or tingling
Yamagishi et al., 2009[a]	462 Japanese patients newly diagnosed with cancer and beginning chemotherapy	• Nausea, lack of appetite, constipation

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[a] Cluster analysis was used to identify symptom clusters.

[b] Pearson correlation coefficient was used to identify symptom clusters.

[c] Symptom distress scores were analyzed.

ESAS—Edmonton Symptom Assessment Scale; FACT-An—Functional Assessment of Cancer Therapy–Anemia; MDASI—M.D. Anderson Symptom Inventory; MSAS—Memorial Symptom Assessment Scale; SCT-SAS—Stem Cell Transplant Symptom Assessment Scale; SDS—Symptom Distress Scale

Note. Studies reviewed in this analysis used factor analysis on symptom severity scores, unless otherwise noted.

Table 1. Symptom Clusters With a Gastrointestinal Component by Instrument *(Continued)*

Study	Sample	Cluster
MDASI-Spine Tumor Module		
Armstrong et al., 2010[a]	126 American patients with spinal tumors	• Nausea, vomiting, lack of appetite, bowel or bladder problems, shortness of breath, memory disturbances, weakness in arms or legs • Nausea, vomiting, lack of appetite, dry mouth, shortness of breath, memory disturbances • Change in bowel function, loss of bowel control, sexual function issues
MSAS		
Molassiotis et al., 2010	143 British patients newly diagnosed with breast, gynecologic, prostate, gastrointestinal, lung, or head and neck cancer	• Nausea, vomiting, lack of appetite, difficulty swallowing • Difficulty swallowing, lack of appetite, mouth sores, diarrhea, vomiting, weight loss • Nausea, vomiting, feeling bloated, taste changes • Nausea, vomiting, feeling bloated • Difficulty swallowing, lack of appetite, vomiting, weight loss, pain • Difficulty swallowing, lack of appetite, dry mouth, weight loss • Diarrhea, weight loss
Suwisith et al., 2008[c]	320 Thai women with breast cancer undergoing chemotherapy	• Nausea, vomiting, lack of appetite, lack of energy, dizziness, drowsiness • Mouth sores, changes in food taste, difficulty swallowing, constipation, dry mouth, change in body image, hair loss, skin change • Vomiting, lack of appetite, feeling bloated, lack of energy, dizziness, drowsiness, shortness of breath • Mouth sores, difficulty swallowing, changes in food taste, skin change, hair loss • Constipation, sadness, worrying, irritability, nervousness, change in body image, difficulty concentrating, sleep difficulty, sweating • Dry mouth, numbness or tingling, pain • Feeling bloated, nervousness, difficulty concentrating, worrying, sadness, numbness or tingling, irritability, sleep difficulty, shortness of breath, sweating, pain
Oral Problems Checklist		
Yamagishi et al., 2009[a]	462 Japanese patients newly diagnosed with cancer and beginning chemotherapy	• Nausea, lack of appetite, constipation
Physical Symptom Experience Tool		
Gift et al., 2004	220 American patients with newly diagnosed lung cancer	• Nausea, vomiting, lack of appetite, taste change, weight loss, fatigue, weakness
SCT-SAS and FACT-An		
Jarden et al., 2009	42 Dutch patients receiving an allogeneic stem cell transplantation	• Nausea, vomiting, lack of appetite, diarrhea, stomach pain • Mouth pain, throat pain, difficulty swallowing
SDS		
Henoch et al., 2009[a, b, c]	400 Swedish patients with newly diagnosed lung cancer	• Lack of appetite, fatigue, breathing, cough • Nausea, lack of appetite, bowel issues, fatigue, pain • Nausea, bowel issues, pain

(Continued on the next page)

[a] Cluster analysis was used to identify symptom clusters.

[b] Pearson correlation coefficient was used to identify symptom clusters.

[c] Symptom distress scores were analyzed.

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Note. Studies reviewed in this analysis used factor analysis on symptom severity scores, unless otherwise noted.

Table 1. Symptom Clusters With a Gastrointestinal Component by Instrument *(Continued)*

Study	Sample	Cluster
SDS–Lung Cancer Modification		
Sarna & Brecht, 1997[c]	60 American women with advanced lung cancer	• Nausea frequency, nausea severity, lack of appetite, fatigue • Bowel issues, pain frequency, pain severity, appearance, outlook
Side-Effect Checklist		
Kim et al., 2008	282 American women with breast cancer receiving radiation therapy or chemotherapy	• Nausea, vomiting, lack of appetite
38-Item Checklist		
Walsh & Rybicki, 2006[a]	922 American patients with advanced cancer	• Nausea and vomiting • Dry mouth, lack of appetite, early satiety, taste changes, lack of energy, weight loss, fatigue, weakness • Dyspepsia, belching, bloating, dizzy spells • Constipation, pain • Dysphagia, dyspnea, cough, hoarseness

[a] Cluster analysis was used to identify symptom clusters.

[b] Pearson correlation coefficient was used to identify symptom clusters.

[c] Symptom distress scores were analyzed.

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Note. Studies reviewed in this analysis used factor analysis on symptom severity scores, unless otherwise noted.

Tools Used to Identify Symptom Clusters

The most commonly used symptom measurement tool was the M.D. Anderson Symptom Inventory (MDASI), which was identified in 12 of the 22 studies (Armstrong et al., 2010; Chen & Lin, 2007; Chen & Tseng, 2006; Cleeland et al., 2000; Ivanova et al., 2005; Lin et al., 2007; Mystakidou et al., 2004; Okuyama et al., 2003; Wang et al., 2004, 2006, 2008; Yamagishi, Morita, Miyashita, & Kimura, 2009). The symptom measurement tools used in the other studies varied considerably. Some of the more conventional measurement tools included the Edmonton Symptom Assessment Scale (ESAS) (Cheung, Le, & Zimmermann, 2009), the Memorial Symptom Assessment Scale (MSAS) (Molassiotis, Wengström, & Kearney, 2010; Suwisith et al., 2008), the Symptom Distress Scale (SDS) (Henoch, Ploner, & Tishelman, 2009; Sarna & Brecht, 1997), and the Functional Assessment of Cancer Therapy–Anemia Scale (FACT-An) (Jarden, Nelausen, Hovgaard, Boesen, & Adamsen, 2009). Other symptom measurement tools used were developed specifically for individual studies and included a 38-item checklist (Walsh & Rybicki, 2006), the Physical Symptom Experience Tool (Gift, Jablonski, Stommel, & Given, 2004), the Stem Cell Transplant Symptom Assessment Scale (Jarden et al., 2009), an oral problems checklist (Yamagishi et al., 2009), a side-effect checklist (Kim et al., 2008), and a common symptoms list (Barresi, Shadbolt, Byrne, & Stuart-Harris, 2003).

GI symptoms assessed by each of the symptom measurement tools are reported in Table 2. The most common GI symptoms measured included nausea, lack of appetite, vomiting, dry mouth, constipation, difficulty swallowing, and taste change. GI symptoms rarely assessed included feeling bloated, throat pain, early satiety, dyspepsia or heartburn, bowel pattern issues, stomach pain, belching, rectal irritation, loss of bowel control, and oral problems.

Discussion

In total, 42 clusters containing a GI component emerged from 22 studies. Only four clusters were replicated in different samples; 38 were unique clusters containing different GI and non-GI items. A number of explanations are possible for this finding. Symptom cluster research is still in its infancy and, as such, data are limited concerning the validity of the existence of symptom clusters. Research may show that symptom clusters do not exist in a predictable way and in fact, vary by person. However, many methodologic issues may explain the variety of symptom clusters seen in

this review. Among the studies, differences were apparent in the number and type of symptoms recorded. In addition, diagnostic groups, stages of disease, and treatment profiles also varied among studies. Finally, many of the studies used different statistical techniques when analyzing the data.

The most frequent clusters containing GI symptoms were nausea and vomiting, followed by nausea, vomiting, and lack of appetite. Those clusters often are referred to as the GI cluster; however, their components are fairly limited. Research has shown that symptoms such as dry mouth, lack of appetite, early satiety, and constipation are present in more than 50% of the cancer population (Tong et al., 2009; Walsh & Rybicki, 2006). Twenty-one of the studies reviewed for this analysis identified a GI-specific symptom cluster that was primarily (50% of symptoms or greater), if not entirely composed of GI symptoms. The prevalence of GI-specific clusters may indicate a proclivity for GI symptoms to naturally cluster in people receiving chemotherapy.

Thirteen different symptom measurement tools were used across the 22 studies. The most frequently used symptom measurement tool was the MDASI, which contains 13 common cancer-related symptoms: pain, fatigue, sleep disturbance, nausea, distress, lack of appetite, drowsiness, dry mouth, sadness, vomiting, shortness of breath, memory disturbances, and numbness. Only four of the symptoms measured are GI symptoms: nausea, vomiting, dry mouth, and lack of appetite. Patients with cancer, especially those undergoing chemotherapy, are likely to experience a broader range of GI symptoms, including nausea, vomiting, diarrhea, constipation (bowel dysfunction), rectal irritation, mouth sores, taste changes, sore throat, dry mouth, retching, bloating or feeling gassy, belching, dyspepsia, lack of appetite, early satiety, and difficulty swallowing. Therefore, studies using the MDASI may under-represent GI symptoms in the symptom clusters identified. In contrast, studies that measured more GI symptoms, including those using the MSAS and the 38-item checklist, found symptom clusters with a broader representation of GI symptoms. Those studies also tended to have more than one cluster composed primarily of GI symptoms. The only study without a GI-specific cluster used the ESAS, which contains only two GI items: nausea and lack of appetite (Cheung et al., 2009). Symptom measurement tools with few GI symptoms, such as the MDASI and ESAS, severely limit the ability to accurately define and understand chemotherapy-related symptom clusters.

The symptom measurement tools used were designed for a variety of general and some specific patient populations. The MSAS, SDS, MDASI, and Physical Symptom Experience Tool were developed to cover a broad, nontreatment-specific range of symptoms in patients with cancer. A few symptom measurement tools were designed to record a very specific set of symptoms for treatment-related side effects such as anemia (FACT-An) or oral problems (oral problems checklist), or were developed to be used with a specific population of patients with cancer, such as those in palliative care (ESAS) or with advanced disease (38-item checklist, frequent symptoms list). Only four studies used a tool designed to record symptoms specific to a disease or treatment modality (MDASI-Spine Tumor Module, Stem Cell Transplant Symptom Assessment Scale, side-effect checklist, SDS lung cancer modification).

Patients receiving chemotherapy tend to experience prevalent and severe GI symptoms (Tong et al., 2009). To identify chemotherapy-related symptom clusters, researchers should consider a symptom assessment tool that includes a broad range of prevalent non-GI symptoms as well as a comprehensive list of GI symptoms associated with chemotherapy. With that type of symptom assessment tool, not only would general chemotherapy-related symptoms be measured, but GI symptoms, known to be prevalent in this population, also would be represented appropriately.

A total of 19 different GI items were measured in the studies reviewed. However, many chemotherapy or cancer-related GI symptoms known to be present in this population, such as feeling bloated, taste changes, early satiety, heartburn, throat pain, stomach pain, belching, or rectal irritation, were recorded in no more than two symptom measurement tools. In fact, symptoms such as taste changes, feeling bloated or gassy, early satiety, and belching have been present in at least 25% of the cancer population, yet no more than three symptom measurement tools included these GI symptoms (Donnelly & Walsh, 1995; Reuben et al., 1988; Tong et al., 2009; Walsh & Rybicki, 2006). None of the studies reviewed assessed anticipatory nausea, anticipatory vomiting, or retching. Anticipatory nausea and vomiting are fairly prevalent and distressing symptoms, affecting as many as 30% of patients receiving chemotherapy (Hickok, Roscoe, & Morrow, 2001).

The most common symptom dimension measured was symptom severity; however, only four studies recorded symptom distress (Henoch et al., 2009; Molassiotis et al., 2010; Sarna & Brecht, 1997; Suwisith et al., 2008). GI symptoms are known to be extremely distressing to patients (Williams et al., 2006). By only recording symptom severity and ignoring symptom distress, researchers are missing a valuable component of the symptom experience. Researchers should consider using both severity- and distress-based scales as studies have shown that patients are able to make the distinction between symptom distress and symptom intensity; in addition, certain interventions may impact

Table 2. Gastrointestinal Symptoms Measured by Instrument

Symptom	MSAS	38-Item Checklist	SCT-SAS	Common Symptoms List	Side-Effect Checklist	Physical Symptom Experience Tool	MDASI Spinal Tumor Module	MDASI	SDS	Oral Problems Checklist	ESAS	FACT-An
Nausea	X	X	X	X	X	X	X	X	X		X	X
Lack of appetite	X		X	X	X	X	X	X	X	X	X	
Vomiting	X	X	X	X		X	X	X				
Dry mouth	X	X		X		X	X	X				
Constipation	X	X	X	X	X							
Diarrhea	X	X	X		X							
Difficulty swallowing	X	X	X			X						
Taste change	X	X				X						
Mouth sores or pain	X	X	X									
Feeling bloated	X	X										
Throat pain			X		X							
Early satiety		X		X								
Dyspepsia or heartburn		X		X								
Belching		X										
Rectal irritation					X							
Oral problems										X		
Bowel pattern change							X		X			
Stomach pain			X									
Loss of bowel control							X					

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one facet of the symptom experience more so than the other (Wells & Ridner, 2008).

Because symptom clusters will be determined by the symptoms measured, researchers must use a comprehensive symptom measurement tool that includes all of the relevant symptoms likely to be experienced in the population of interest. Among the symptom measurement tools reviewed for this analysis, the MSAS offered the most extensive list of GI symptoms and also had the benefit of recording symptom severity and symptom distress. Except for anticipatory nausea, anticipatory vomiting, retching, heartburn, belching, passing gas, and early satiety, most GI symptoms found to be present in the cancer chemotherapy population are present on the MSAS and the tool has documented reliability and validity. Investigators examining symptom clusters with a GI component in patients on chemotherapy should consider using the MSAS with a supplementary list of additional chemotherapy-related GI items.

Limitations

Reviews of symptom cluster research identified key methodologic limitations including varying (or nonexistent) definitions of symptom clusters, varying methods of statistical analysis, heterogeneous samples with respect to disease and treatment factors, and differing time frames for symptom assessment (Barsevick, Whitmer, Nail, Beck, & Dudley, 2006; Fan, Filipczak, & Chow, 2007; Skerman, Yates, & Battistutta, 2009). All of those methodologic issues contribute to the difficulty in reaching valid conclusions about symptom clusters.

The current review also is limited in that only two studies used samples exclusively composed of patients receiving chemotherapy (Suwisith et al., 2008; Yamagishi et al., 2009). Most studies reviewed for this analysis included a combination of patients on and off treatment at the time symptoms were measured, or they included patients who may have been undergoing chemotherapy, radiation therapy, or a combination of both. This means that the clusters identified may not accurately represent the chemotherapy symptom experience.

Conclusions

Symptom clusters with GI components vary widely and have not been consistent across studies. The symptom measurement tools also vary, and no tools were identified that measured all GI symptoms relevant for patients receiving chemotherapy. Current symptom measures do not adequately address all GI symptoms experienced by patients receiving chemotherapy. Future investigations of treatment-related symptom clusters should focus on a homogeneous sample of patients receiving chemotherapy and should include a symptom measurement tool focusing on non-GI symptoms prevalent among patients on chemotherapy as well as a comprehensive list of GI symptoms. If valid and consistent GI symptom clusters are identified in specific groups of patients receiving chemotherapy, interventions could be developed to target those clusters. Such interventions may be able to lessen the severity and distress associated with all symptoms in the cluster and improve patients' quality of life.

Implications for Nursing Practice

Patients with cancer receiving chemotherapy may experience as many as 19 different GI symptoms. Despite the knowledge that GI symptoms are common during cancer treatment, many symptom assessment tools do not include a comprehensive list of GI symptoms. Practicing nurses should anticipate that patients with cancer may experience a large number of GI symptoms. In settings where symptom inventories or checklists are used to guide the clinical assessment, nurses should be aware that the GI symptoms experienced may not be limited to only those on the tool. In all settings, nurses should be sure to carry out a thorough assessment, inquiring about all possible GI symptoms.

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