Geriatric Care

Vulnerability of Older Patients in Critical Care
Sonya R. Hardin, RN, PhD, CCRN, NP-C

One of the patient characteristics in the AACN Synergy Model is vulnerability. Vulnerability is defined in the model as the susceptibility to actual or potential stressors that may adversely affect patients' outcomes. The risk of vulnerability increases in older patients in critical care units. (Critical Care Nurse. 2015;35[3]:55-61)

By 2050, the percentage of the population more than 80 years old in North America will double and will account for 9% (35 813 000 persons) of the total population. These changes will lead to an increasing demand for health care resources, specifically intensive care. Bagshaw et al have predicted that by 2015 the rate of patients 80 years and older admitted to an intensive care unit (ICU) will increase by 72%, roughly 1 in 4 admissions to the unit. Vulnerability, 1 of the 8 patient characteristics identified in the AACN Synergy Model, will be present in many of these patients.

Purpose
The purpose of this article is to increase clinicians' awareness of vulnerability relative to older patients and to explicate this patient characteristic as defined by the AACN Synergy Model. The AACN Synergy Model defines vulnerability as the susceptibility to actual or potential stressors that may adversely affect a patient’s outcome. According to the model, patients can be identified as highly vulnerable, moderately vulnerable, or minimally vulnerable. Patients who are highly vulnerable are susceptible to poor outcomes. In the AACN Synergy Model, vulnerability is considered a patient characteristic; although everyone is vulnerable to a degree, old age involves greater risk for vulnerability. Older adults are an increasing population of critical care patients who have more comorbid conditions and less physiological reserve than do younger patients. The AACN Synergy Model does not specifically discuss aspects associated with older patients that often increase vulnerability. In this article, I discuss the components of vulnerability for older patients. By understanding and measuring aspects of vulnerability, critical care nurses can identify high-risk older patients who are susceptible to complications. Identifying vulnerable older patients allows nurses to proactively enhance communication with health team members to design strategies to mitigate stressors and influence outcomes of these patients.

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Nurses and the health care team should participate in the evaluation of older patients’ level of vulnerability.

Vulnerability

Vulnerability is defined in a number of different ways and is used in the English language to indicate susceptibility. Vulnerability had its origin in the early 17th century from the Latin word vulnerabilis, from vulnerare, meaning “to wound,” and is defined as an adjective that means “susceptible to physical or emotional attack or harm.” Cambridge Dictionaries Online also defines vulnerable as an adjective; however, in contrast to the Oxford Dictionary definition of “susceptible to harm,” the Cambridge Dictionary refers more to possibility or potential as follows: “able to be easily hurt, influenced or attacked.”

Definitions of vulnerability are understood differently, depending on a person’s perception. In a study of older patients and health care providers, older people perceived vulnerability differently than did the health professionals. Older people thought that to be vulnerable was to be at the mercy of others. The inability to be independent was associated with vulnerability. Such feelings were characterized as an emotional response. Health care providers should consider an older adult vulnerable if he or she is mentally and physically frail, living alone, a victim of a crime, unable to manage his or her own risks, or abused or has a detrimental imbalance between care needs and care provided.

Nurses and members of the health care team should participate in the evaluation of older patients’ level of vulnerability. Ultimately, vulnerability indicates the possibility of an adverse outcome or injury. Poor outcomes are influenced by high levels of vulnerability even when all standards of care are met. Yet, health care reimbursement systems, legal systems, and patients’ families have not embraced the fact that highly vulnerable patients may require higher reimbursement levels because of resource utilization; for example, reimbursement from Medicare for a readmission within 30 days of discharge regardless of circumstances. Disability, comorbid conditions, and frailty increase the risk for poor outcomes.

Vulnerability is without doubt the outcome of complex interactions of discrete risks, namely, exposure to a threat, materialization of a threat, and a lack of the defenses or resources to deal with a threat. Although use of the terms disability, comorbid conditions, and frailty in the literature may overlap, each concept should be evaluated in identifying vulnerable critical care patients. Therefore, for this article, vulnerability among older patients is understood to occur when disability, comorbid conditions, and frailty exist.

Disability

Disability has a marked presence in society (1 in 6 Americans has a disability) and is defined as difficulty or dependency in carrying out activities essential to independent living. These activities include self-care, independent living, and carrying out essential roles. Disability consists of the functional limitations due to a variety of physiological and psychological impairments. Persons who are disabled are often unable to care for themselves because of physical limitations or mental decline. The US Census Bureau defines disability according to type, age of person, and severity. For persons 15 years old and older, disabilities are categorized into 3 domains: communication, mental, and physical. Table 1 lists the types of disabilities.

The World Health Organization in 2010 described disability as a term that covers impairments, activity limitations, and participation restrictions. An impairment is a problem in body function, an activity limitation is the difficulty encountered by a person in executing a task or action, and a participation restriction is a problem experienced by a person in involvement in life situations. Thus, disability is a complex phenomenon, reflecting an interaction between features of a person’s body and features of the society in which the person lives.

The many definitions and interpretations of the term disability led to the 2008 amendments of the Americans With Disabilities Act of 1990. The amendments focused primarily on the definition of the term disability and the rules regarding designation of the term. Disability came to be understood as an impairment
Chapter 126, Section 12101, of the ADA Amendments Act of 2008 states,

Congress finds that physical or mental disabilities in no way diminish a person’s right to fully participate in all aspects of society, to include, but are not limited to, caring for one’s self, performing manual tasks, seeing, hearing, eating, sleeping, walking, standing, lifting, bending, speaking, reading, learning, concentrating, thinking, communicating, and working.

Impairments are considered transitory and minor if their expected duration is 6 months or less. Other rules governing the definition of disability include “an impairment that substantially limits one major life activity need not limit the other major life activities in order to be considered a disability” and “an impairment that is episodic or in remission is a disability if it would substantially limit a major life activity when active.”12 A person is considered disabled if he or she is unable to complete instrumental activities of daily living, such as mobility outside the home, financial management, meal preparation, housework, managing prescriptions, and telephone use, or activities of daily living, such as mobility inside the home, movement from bed to chair, bathing, dressing, eating, and toileting. Difficulty with specified functional activities may be experienced by persons classified as disabled, such as seeing words or letters in newsprint, hearing normal conversation, having speech understood, walking 3 city blocks, climbing a flight of stairs, grasping objects, and lifting or carrying 4.50 kg (10 lb).

Another approach to understanding classification of disability is through the International Classification of Functioning, Disability, and Health13 developed by the World Health Organization General Assembly. This classification system can be used to evaluate a person’s health status without regard to the disabling condition and includes consideration of how the environment may hinder use of assistive technology or facilitate the person’s activities. The system recognizes participation and inclusion in society as a critical part of a person’s health.

Comorbid Conditions

Comorbid conditions are disease processes resulting from biological changes that weaken persons.14 Comorbid conditions such as heart failure, diabetes, renal disease, and metastatic tumors can have a major impact on outcomes in hospitalized patients. In a study by Sachdev et al,15 the key comorbid conditions heart failure, peripheral vascular disease, cerebrovascular disease, hemiplegia, diabetes, liver and renal diseases, malignant neoplasm, and metastatic tumors were independent indicators of in-hospital mortality.

A helpful instrument for measuring comorbid conditions is the Charlson Comorbidity Index (CCI).16 This index was developed as a prognostic index of comorbid conditions for patients admitted to a general medical service with a variety of medical conditions that alone or in combination might alter the risk for short-term mortality for patients enrolled in longitudinal studies. The CCI uses a point system. History of myocardial infarction, heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic lung disease, connective tissue disease, peptic ulcer disease, mild liver disease, and diabetes are each worth 1 point. Comorbid conditions worth 2 points are diabetes with target-organ damage, hemiplegia, moderate to severe renal disease,

<p>| Table 1 | US Census Bureau domains of disabilitiesa |</p>
<table>
<thead>
<tr>
<th>Domain</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>Difficulty seeing, difficulty hearing, difficulty having speech understood, blindness or vision problems, deafness or hearing problems, speech disorders</td>
</tr>
<tr>
<td>Mental</td>
<td>Learning disability, mental retardation, mental or emotional condition</td>
</tr>
<tr>
<td>Physical</td>
<td>Use of a wheelchair, cane, crutches, or walker, difficulty walking, difficulty climbing stairs, difficulty lifting, difficulty grasping objects, difficulty getting out of bed, arthritis, spine problems, broken bones, cancer, cerebral palsy, comorbid conditions (diabetes, heart disease, hypertension), epilepsy, spinal cord injury, stroke</td>
</tr>
</tbody>
</table>

a Based on information from Brauot.12

as mobility outside the home, financial management, meal preparation, housework, managing prescriptions, and telephone use, or activities of daily living, such as mobility inside the home, movement from bed to chair, bathing, dressing, eating, and toileting. Difficulty with specified functional activities may be experienced by persons classified as disabled, such as seeing words or letters in newsprint, hearing normal conversation, having speech understood, walking 3 city blocks, climbing a flight of stairs, grasping objects, and lifting or carrying 4.50 kg (10 lb).

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malignant neoplasm, leukemia, and lymphoma. Moderate to severe liver disease is worth 3 points, and metastatic solid tumors and AIDS (stage C) are worth 6 points. Therefore, patients with no comorbid conditions have a CCI of 0, patients with only 1 comorbid condition weighted as 1 have a CCI of 1, patients with 2 comorbid conditions of which both are weighted 1 or with 1 comorbid condition weighted 2 have a CCI of 2, and patients for whom the sum of the weighted points of comorbid conditions is 3 or greater have a CCI of 3 or greater and are considered at higher risk for death by 59%. The index was tested for the ability to predict risk for death due to comorbid disease. The CCI could easily be used in a critical care unit or preoperatively.

Frailty

Frailty is a clinical state that will make a patient more vulnerable to poor outcomes in a critical care unit. Often, frailty is either underdiagnosed or undiagnosed by the medical team. Although health care providers may think frailty exists as a clinical condition, this diagnosis rarely appears in a clinical note, progress note, or history and physical. Frailty is a medical syndrome with multiple causes and contributors. The syndrome is characterized by diminished strength, diminished endurance, and reduced physiological function that increase a person’s vulnerability for increased dependency, death, or both.17(p393)

Frailty can be measured on the basis of attributes that are physiological, psychological, or a combination of the 2 components.17

Historically, 2 approaches to defining physical frailty have been used by clinicians: the Frailty Index and the frail phenotype. The Frailty Index18 is determined by adding together the number of impairments and conditions a patient has. The score is based on a comprehensive geriatric assessment and is calculated as the number of deficits a patient has divided by the total number of deficits that were considered. This index includes up to 80 items and so can be overwhelming to use in a hospital environment. In the second approach, the frail phenotype is characterized by weakness, loss of endurance, slowness, low physical activity, and loss of weight.19

Frailty phenotype scales have been developed by a number of researchers. Several of the scales can be administered quickly and thus provide nurses a quick understanding of whether an older patient is fit or severely frail. This information can be useful as an aspect in analyzing potential predictability of outcomes. The Frailty Trait Scale20 has 7 dimensions: energy balance and nutrition, activity, nervous system, vascular system, weakness, endurance, and slowness. The scores for the domains are determined via assessment of 12 items: unintentional weight loss, body mass index, waist circumference, serum albumin level, physical activity, verbal fluency, balance, brachial ankle index, grip strength, knee strength, chair test, and time needed for a 3-m (10 ft) walk. Typically, this type of scale could not be used for most critical care patients, unless implemented in the outpatient setting before an admission.

The Clinical Frailty Scale consists of 9 defined categories.21 The scores go from very fit to severely fragile. Very fit patients are robust, active, energetic, motivated, and commonly exercise regularly. They are among the fittest of persons their age. The second category is well; patients who are well have no signs or symptoms of active disease but are less fit than are the patients in category 1. Well patients exercise or are very active occasionally (eg, seasonally). The third category is managing well; the medical problems of patients in category 3 are well controlled, but the patients are not regularly active beyond routine walking. The fourth category is vulnerable. Vulnerable patients are not dependent on others for daily help, but signs or symptoms of medical problems limit their activities. Patients in category 4 may speak of being “slowed up” or of being tired during the day, or both. The fifth category is mildly frail. Mildly frail patients have more evident slowing and need help in high-order instrumental activities of daily living (eg, finances, transportation, heavy housework, medications). The sixth category is moderately frail. Moderately frail patients need help with all outside activities and with keeping house. The seventh category is severely frail. Severely frail patients are completely dependent for personal care due to whatever cause (physical or cognitive). Even so, they seem stable and not at high risk for death (within ~6 months). The eighth category is very severely frail. Patients in category 8 are completely dependent, are approaching the end of life, and would often not recover even from a minor illness.
The ninth category is terminally ill. Patients in category 9 are at the end of life. This category applies to patients with a life expectancy less than 6 months who are not otherwise evidently frail. The Clinical Fragility Scale can be quickly used in a critical care area by interviewing a patient’s family or significant other, who should easily be able to tell a nurse which category they would place the patient in.

Another frailty scale based on the Geriatric Status Scale can be used to rapidly assess older patients for functional status. The results can help identify patients who require specialized intervention. This scale is used to quickly assess 4 areas: activity, activities of daily living, continence, and cognition. Using a short scale would increase acceptability in a fast-paced environment such as a critical care unit.

Last, another tool that warrants attention is the Vulnerable Elders Survey, which can be administered by nonclinical personnel within 5 minutes and has been validated in outpatients and in patients in acute medical care settings. The Vulnerable Elder Survey is a 13-item survey that considers age, self-reported health condition, physical function, and ability to perform basic and instrumental activities of daily living. A score of 3 or greater signifies increased risk for functional decline and mortality at 2 and 5 years.

Overall, the criteria presented in the literature for frailty identify numerous items. Most criteria include some or all of the following as elements to be evaluated: weight loss, decrease in grip strength, exhaustion, low physical activity, and slow walking speed. Weight loss was defined as unintentional weight loss of more than 4.5 kg (10 lb) in the preceding year; decreased grip strength (weakness) was measured by having the patient squeeze a hand-held dynamometer; exhaustion was measured by responses to questions about effort and motivation; low physical activity was ascertained by inquiring about leisure time activities; and slowed walking speed was measured by the speed at which the patient could walk 4.5 m (15 ft). These items represent elements that would typically be consider in an evaluation of frailty.

**Nursing Implications**

Physiological assessment of a patient should include evaluation of deficits of the patient’s senses (eg, hearing and vision), level of mobility (previous falls), and chronic illnesses. Such assessments could be made through patients’ self-reporting or via patients’ family members. Psychological assessment of an older patient may include evaluation of cognitive impairment, psychiatric illness, dementia, and a lack of social support. Knowledge of deficits in a patient’s social support, such as living alone or in an unsafe home environment, are important in planning the patient’s care. Nurses must continue to

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### Table 2 Qualities of vulnerability affecting older adults in critical care

<table>
<thead>
<tr>
<th>Domain</th>
<th>Category</th>
<th>Effect</th>
<th>Critical care intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiological</td>
<td>Vision</td>
<td>Falls</td>
<td>Fall prevention</td>
</tr>
<tr>
<td></td>
<td>Mobility</td>
<td>Falls</td>
<td>Fall prevention</td>
</tr>
<tr>
<td></td>
<td>Frailty</td>
<td>Falls</td>
<td>Fall prevention</td>
</tr>
<tr>
<td></td>
<td>Hearing</td>
<td>Abuse</td>
<td>Social service referral</td>
</tr>
<tr>
<td></td>
<td>Taste</td>
<td>Home safety</td>
<td>Home health assessment</td>
</tr>
<tr>
<td></td>
<td>Circulation</td>
<td>Malnutrition</td>
<td>Nutritional consultation</td>
</tr>
<tr>
<td></td>
<td>Chronic illness</td>
<td>Hypothermia</td>
<td>Home health consultation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poor self-management</td>
<td>Home health consultation</td>
</tr>
<tr>
<td>Psychological</td>
<td>Dementia</td>
<td>Safety living alone</td>
<td>Case management</td>
</tr>
<tr>
<td></td>
<td>Cognitive impairment</td>
<td>Poor self-management</td>
<td>Case management</td>
</tr>
<tr>
<td></td>
<td>Cognitive impairment</td>
<td>Poor financial management</td>
<td>Case management</td>
</tr>
<tr>
<td></td>
<td>Bereavement</td>
<td>Depression</td>
<td>Family practice</td>
</tr>
<tr>
<td></td>
<td>Social isolation</td>
<td>Depression, loneliness</td>
<td>Family practice</td>
</tr>
<tr>
<td></td>
<td>Phobia</td>
<td>Fear</td>
<td>Case management</td>
</tr>
<tr>
<td>Social</td>
<td>Ageism</td>
<td>Loss of autonomy</td>
<td>Nurse advocacy</td>
</tr>
<tr>
<td></td>
<td>Ageism</td>
<td>Discrimination</td>
<td>Nurse advocacy</td>
</tr>
<tr>
<td></td>
<td>Living arrangement</td>
<td>Living alone or with sick spouse</td>
<td>Case management</td>
</tr>
<tr>
<td></td>
<td>Ethnicity</td>
<td>Lack of health care literacy</td>
<td>Case management</td>
</tr>
<tr>
<td></td>
<td>Safe environment</td>
<td>Lack of exercise</td>
<td>Case management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fear</td>
<td>Case management</td>
</tr>
</tbody>
</table>

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www.ccnonline.org
advocate for older patients to ensure that autonomy is preserved. Table 2 lists qualities of vulnerability and various categories that require nursing assessment.

Evaluating older patients for vulnerability by measuring disability, comorbid conditions, and frailty is needed to predict hospital outcomes in critical care. The challenge remains because many older patients come into the critical care unit unexpectedly with an acute episode. In an integrated health care system, primary care providers could screen older patients on an annual basis to establish a baseline of vulnerability in the event a hospitalization occurs. Also presurgical patients should have a vulnerability screening so that outcomes can be better understood relative to vulnerability. Adverse outcomes during hospitalization, such as falls, injuries, institutionalization, and death, could be understood relative to measurement of vulnerability.

Once a patient is identified as fragile, the level of vigilance of the bedside nurse can be increased. The increase could include looking for subtle cues predictive of delirium or designing enhanced mobility programs. Interprofessional strategies to improve outcomes of frail older patients are needed. Few such strategies are described in the literature.

The intervention Acute Care for Elders25 is notable; it includes a homelike environment, disability prevention strategies that are individualized, and comprehensive discharge planning. Use of interdisciplinary teams can improve functional status, reduce length of stay, and lower mortality in frail older patients.26

Summary

Understanding aspects of vulnerability can help critical care nurses function with a higher level of vigilance in the care of older patients. Frailty is common in geriatric populations and has a clear association with increased vulnerability for risk of death and institutionalization. When frailty is combined with disability or comorbid conditions or both, the burden and potential modifying impact of frailty on the course and outcomes in critically ill patients is unknown. Although the notion is not yet clearly established in critically ill patients, frailty is clinically relevant and may be predictive of both short- and long-term outcomes.19 Nevertheless, the increasing vulnerability of critical care older patients has brought about numerous studies on the importance of early mobilization27 and physiotherapy28 to prevent physical deconditioning, and the psychological consequences of critical illness for both patients and the patients’ caregivers29 are being increasingly recognized in critical care. This level of intervention warrants an interdisciplinary team approach in which each member of the team considers the concepts of disability, comorbid conditions, and frailty a priority in the planning of care.

Financial Disclosures

None reported.

References

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