Vulnerability for the Development of Delirium in Residents of Long-Term Care Facilities: A Concept Analysis

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Abstract

Delirium is a temporary condition, characterized by the sudden onset of confusion and other behavioural changes. It is often caused by an underlying medical condition. Delirium is avoidable and treatable, but if it is unrecognized, delirium results in poor health outcomes and increased mortality in the elderly. The purpose of this paper was to analyze the concept of vulnerability in relation to delirium in residents of long-term care facilities using the Walker and Avant concept analysis framework. The results outline a description of the concept of vulnerability for the development of delirium in these residents. Included are the predisposing and precipitating factors to the development of delirium. The relationship between the predisposing and precipitating factors demonstrates the degree of vulnerability. For example, the number and seriousness of predisposing factors in relation to the degree and number of precipitating factors, provides a gauge for the extent of vulnerability of a person in developing delirium. Examining vulnerability for the development of delirium for residents in long-term care provides specific, operational definitions to be used in research studies, useful for further research to refine current tools, or develop new ones that can be used to reduce vulnerability to delirium in residents of long-term care. Most importantly this work has the potential to promote better health outcomes.

Keywords: Concept analysis, Delirium, Long term care, Vulnerability

Main Text

Delirium is a temporary condition that is characterized by the sudden onset of confusion and altered levels of consciousness (Gagliardi, 2008; Inouye, Westendorp, & Saczynski, 2014). There are many causes of delirium, but it is often the result of an underlying medical condition, such as an infection (Gagliardi, 2008; Inouye, et al., 2014). People who develop delirium may become agitated, or alternatively, very quiet and withdrawn. They may experience hallucinations, restlessness or combative behaviour and often fluctuate among all these stages (Gagliardi, 2008; Inouye et al., 2014; Registered Nurses Association of Ontario, 2003). Delirium is a treatable condition if
diagnosed early (Fortini et al., 2014). However, failure to recognize and treat delirium has serious consequences for the elderly, including poor health outcomes and increased mortality (Fortini et al., 2014). Nevertheless, many cases of delirium are missed, or misdiagnosed as dementia or depression (Canadian Coalition for Senior’s Mental Health, 2006).

Unfortunately, delirium is not an unusual occurrence in the elderly (McCusker et al., 2013). The numbers of community-dwelling elders who develop delirium are not known. However, research shows that the rate of delirium experienced by residents of Long Term Care (LTC) is somewhere between 6-14%, with one study finding as high as 40% of residents in a LTC facility experience delirium (Canadian Coalition for Senior’s Mental Health, 2006). Currently Ontario has 627 LTC homes operating over 78,000 beds, with approximately 20,000 seniors on the waitlist (Ontario Association of Non-Profit Homes and Services for Seniors, 2015; Ontario Long Term Care Association, n.d.). Benefits for early detection and prevention of delirium in elderly LTC residents cannot be overlooked. Residents with changes to their health status are often transferred from LTC to hospital (Canadian Coalition for Senior’s Mental Health, 2006). This, as well as the management of delirium are very costly to the health care system, not to mention the emotional toll experienced by the elder’s loved ones (Canadian Coalition for Senior’s Mental Health, 2006). Nurses are the most prominent health care providers in LTC (Registered Nurses Association of Ontario, 2003). They have the responsibility to maintain a high suspicion of delirium and to ensure that adequate assessment and treatment are provided to each resident (Registered Nurses Association of Ontario, 2003). Research, policy and processes that enable nurses to fulfill this obligation hold substantial benefit to the residents.

Delirium is not inevitable. It is precipitated by many modifiable factors, which, if recognized and addressed, will mitigate the development of delirium (Canadian Coalition for Senior’s Mental Health, 2006). For this reason, closely examining the factors associated with delirium, or the degree of vulnerability for the development of delirium in residents of LTC, may provide a template for research and changes in practice that culminate with early recognition of delirium in this sub population and promote improved health outcomes.

The purpose of this paper was to conduct a concept analysis of vulnerability for the development of delirium in residents of LTC using the Walker and Avant (2005) framework. There are many methods for conducting concept analyses, but they are all similar in that they provide a process for defining the characteristics of a concept. Analyzing the features of a concept is useful in arriving at specific and precise theoretical and operational definitions to be used in research studies (Anon, 2018). The specific definition of vulnerability in the context of the development of delirium is useful for future research, for theory development, and may also serve a practical purpose, such as inform the revision of current assessment tools or development of new ones to prevent delirium in the elderly residing in LTC homes (Walker & Avant, 2005).

**Method: Walker and Avant Framework**

The Walker and Avant’s (2005) framework for concept analysis is an eight-step framework designed to explore, refine, and define concepts in order to provide consistency, and common and meaningful language for a professional discipline. In the
first two steps, one first chooses a concept to analyze, and second, states the purpose behind the analysis. The third step is to review literature and determine all the uses of the concept. In the fourth, the author lists all the defining characteristics, or attributes (see Figure 1. Concept Map for Vulnerability for the Development of Delirium in Residents of LTC). For the fifth, the author will identify model cases that illustrate all of the defining attributes. In step six, the author will then illustrate additional cases that show similar uses and contrary uses of the concept to give a clearer picture of how the concept of vulnerability for the development of delirium in LTC presents (Walker & Avant, 2005).

In step seven of the Walker and Avant (2005) Framework, the author lists antecedents and consequences of the concept to help explain the social construct of the concept (Figure 1.). In this case, the antecedents represent the factors which contribute to an increased degree of vulnerability for the development of delirium in LTC. The consequences are those factors that are present if the level of vulnerability is high and the person develops delirium. Last, in the eighth step, the author lists empirical referents to illustrate real life incidence of the concept (Walker & Avant, 2005).

**Definitions & Uses**

The first stage of the concept analysis involves an exploration of all of the meanings and uses for each part of the concept. To start, vulnerability is a noun derived from the Latin word “vulnus” meaning wound (Merriam Webster, 2018). The adjective, vulnerable is defined by the Merriam Webster’s (2018) online dictionary as “capable of being physically or emotionally wounded; open to attack or damage”, and in reference to the game of bridge, “liable to increased penalties but entitled to increased bonuses after winning a game in contract bridge”. The Merriam Webster (2018) medical definition of vulnerable is “being capable of hurt; susceptible to injury or disease”. Merriam Webster (2018) lists synonyms as defenseless, undefended, exposed, helpless, un-resistant, susceptible, unprotected and unguarded.

The folk sense or everyday use means exposed to harm, the threat of harm, or exploitation (Wrigley, 2015). In the broad sense of the term, vulnerability is a normal occurrence that all humans can expect to experience due to the nature of our socially constructed world (Wrigley, 2015). In a narrower application, vulnerability is also used to identify vulnerable or marginalized groups, for examples children, the elderly, prisoners, and visible minorities (Broeklehurst & Laurenon, 2008; Paul, 2013; Wrigley, 2015). However, vulnerability used in this application does not provide a definition, but merely a label (Wrigley, 2015).

Vulnerability is a broad concept applicable to various domains of study, from geo-physical and ecological to health and humanity studies, and in addition, communications and economics (Paul, 2013; Proag, 2014). Understanding the nature of a threat and the source(s) of vulnerability can help define the concept as it applies to a specific course of study (International Federation of Red Cross and Red Crescent Societies, n.d.). For example, consent or agency based vulnerabilities are those that restrict one from living within their own values and beliefs (Bozzaro, Boldt & Schweda, 2017). This interpretation of vulnerability is useful from a moral and ethical perspective. Whereas, harm based vulnerabilities are an infringement on human welfare (Bozzaro, Boldt & Schweda, 2017).

Vulnerability can either be explained as a process, for those highly exposed to risk,
as seen in oppression of minority groups, or the product of cause and effect seen in specific categories, such as physical, psychological, social, research, policy, sexuality, spiritual, gender and ethnicity (Brocklehurst & Laurenson, 2008; Paul, 2013). The concept of vulnerability can be used across a wide array of disciplines, and therefore is often associated with other closely related concepts, for examples: resilience, risk, coping, fragility, adaptability, and marginality (Paul, 2013).

The definition and use that most closely aligns with this concept analysis is that of vulnerability which is most often associated with weakness and risk in the face of threat (Paul, 2013). Vulnerability has been discussed as encompassing harm of a need, for example safety. In this definition, the degree of vulnerability increases with the significance of the need and predisposing factors of vulnerability, such as age, gender or disability (Hufschmidt, 2011; Ponsford, 2016; Wrigley, 2015), the degree of exposure, and coping capacity (Savimaki & Stenbock-Hult, 2016). With vulnerability, there is a moral obligation of a responsible agent to protect the vulnerable agent (Bozaro, Boldt & Schweda, 2017; Wrigley, 2015). Savimaki and Stenbock-Hult (2016) recognize the positive attributes of vulnerability by demonstrating that being left open or exposed allows one the capacity to feel emotion and pain, which can lead to building relationships or self-protection. The concept analysis further builds upon this definition of vulnerability by examining the predisposing and precipitating factors related to the development of delirium.

Attributes

This phase of the concept analysis includes a search of what is currently known about the various elements of the concept. A literature search was conducted in November, 2018 in CINAHL, one of the largest and most reliable nursing research databases (EBSCO, n.d.). The terms “concept of vulnerability in delirium” AND “elderly” for journal articles dated from the year 2010 to present yielded 75 articles. Of the 75, two journal articles were pertinent to delirium in the elderly of LTC homes. A second search with the terms “Long term care” AND “Delirium” AND “Assessment” yielded 39 of which 11 articles were found suitable to include.

Throughout the literature, attributes of vulnerability to delirium in residents of LTC homes are described in terms predisposing and precipitating factors. Predisposing factors are widely accepted as advanced age, frailty, dementia, depression, cognitive impairment, history of delirium, functional impairment, sensory impairment, comorbidity, history of transient ischemia or stroke, and alcohol abuse (Fong, Davis, Growdon, Albuquerque, & Inouye, 2015; Inouye et al., 2014; Kalish, Gillham, & Unwin, 2014; Moon & Park, 2018; Quinlan, et al., 2011). Precipitating factors result from physiological or metabolic abnormalities, inflammation, damage to neurotransmitters, reduced cerebral oxidative metabolism, and cholinergic deficiencies (Fong, et al., 2015).

Research identified precipitating factors as polypharmacy, psychoactives, sedatives, hypnotics, physical restraints, infection, bladder catheter, abnormal electrolyte balance, abnormal renal function test results, any iatrogenic event, major surgery, trauma, urgent hospital admission, and coma (Fong, et al., 2015, Inouye, et al., 2014; Kalish, et al., 2014). Kalish et al. (2014) add uncontrolled pain, poor nutrition, dehydration, urinary or stool retention, sleep deprivation, and environmental exposure.

The degree of vulnerability is determined by the number and seriousness of predisposing factors. If one’s predisposing
factors are serious, then only weak precipitating factors will increase a LTC resident’s vulnerability to delirium (Inouye et al., 2014). This works in the oppose direction as well, if one has only a slight degree of a predisposing factor, then a stronger precipitating factor will be required to increase the degree of vulnerability (Inouye et al., 2014).

The degree of vulnerability can be reduced with increased coping capacity. Programs focused on early identification, mobility, hydration, nutrition, emotional/social support, reorientation, and sensory therapies and treatments provide a degree of protection to counteract vulnerability to delirium in residents of LTC (Inouye et al, 2014; Quinlan et al., 2011).

Model Case

This model case illustrates all of the defining attributes (Walker & Avant, 2005). Mrs. A is a frail elderly woman, 88 years of age, with a history of mild dementia with depression, as a result of a transient ischemic attack she suffered a few years ago. She takes Quetiapine for her mood and takes Mirtazapine at night to help sleep. Occasionally, she requires Trazadone to settle from behavioural outbursts. The nursing home staff, where Mrs. A resides, report, they have never seen a visitor for her, and state, “often Mrs. A refuses social activity in the home”. She uses a walker and wears glasses. Recently she lost her glasses and took a fall. Mrs. A was operated on to repair a right hip fracture, while under general anesthetic. Mrs. A has been discharged to her nursing home residence, seven days postoperatively. On admission, it is recorded that she arrived by stretcher, she is unable to attempt to ambulate due to poor pain control, she has an indwelling catheter, and is wearing oxygen at 2L/min/np for a new condition of shortness of breath. The doctor has ordered antibiotics, and Morphine and Tramadol for the pain. Her last bowel movement was reported to be four days ago. The surgical incision to her right hip is covered with a dressing, some shadowing is noted. Mrs. A looks very weak and tired. She states she has trouble sleeping from the pain and has no desire to eat. Later in that afternoon, staff report Mrs. A to be reaching up in the air, as though she is grabbing onto imaginary things. When asked if everything was okay, Mrs. A stated, “I’m hanging the laundry….”, she then trailed off in conversation with deceased relatives. Staff admit her behaviour is different than before, and report Mrs. A to be sleeping longer and difficult to arouse. The nurse on duty conducts the Confusion Assessment Method screening tool and obtains a set of vital signs. Mrs. A’s most recent blood work shows electrolyte abnormalities, low albumin, low kidney function, and an elevated white count.

This example illustrates all of the predisposing and precipitating factors of delirium, which are the attributes of vulnerability to delirium in residents of long-term care. The interplay between the factors demonstrates how the greater and more serious the attributes are, the greater the vulnerability for the development of delirium exists.

Additional Cases

Borderline Case

In this borderline case, many of the attributes are illustrated, but not enough to pinpoint vulnerability to delirium in residents of LTC. Mrs. B is 65-year old resident of a long-term care home. She is independent in her activities of daily living, maintains an active social life within the home, and has many supportive friends and family coming to visit. Mrs. B walks with a cane and wears eye glasses. She has osteoarthritis and high
blood pressure. She is a little overweight with a body mass index of 26. Her medications include Acetaminophen for arthritis, Perindopril for blood pressure, Lansoprazole for gastric reflux, and Zopiclone at night to help sleep. Yesterday, Mrs. B took a fall and had extensive bruising to her right shoulder and knee. She complained of pain on mobility and had difficulty walking. Mrs. B was taken to the hospital for x-rays, which resulted as negative for fractures. On return Mrs. B told a staff member she was afraid she was going to fall again, as she favours her sore leg. A physiotherapist came to assess Mrs. B and outfitted her with a four-wheeled walker. Mrs. B is using her walker today, which she says makes walking feel safer. She states the pain is less today, and diminishes when she takes her Acetaminophen.

Mrs. B expressed fear which is similar to a vulnerability. However, the vulnerability is related to subsequent falls. Mrs. B is improving. Although Mrs. B has several predisposing attributes, but they are well managed. Her precipitating factors are taking a sedative at night and trauma. These are weak precipitating factors in relation to her strong social support, independence, and her strong ability to communicate. The trauma did not require urgent hospital care, and the sedative is only taken at night to sleep. Although Mr. B was initially vulnerable to fear, she does not meet the criteria for vulnerability for the development of delirium. However, if her condition changes (precipitating factors), so may her risk for delirium.

Related Case

Mr. C is a 70-year old man recently widowed. His family talked him into moving into the nursing home, because over the last few months he has lost interest in taking care of his home and self. His social life has diminished. He rarely cooks for himself and has lost 15 lbs since his wife past. Since his admission, four months ago, the family visits have become less and less frequent. Although Mr. C is independent of care, he does wear glasses, and walks with a walker. His medical history includes prostate cancer, hypertension and type 2 diabetes. Staff have noticed that he sleeps most of the day. Staff report that he is always courteous and will come to the dining area if encouraged, but otherwise he lies in bed and has no interest in activities or meeting the other residents. This case is related because Mr. C is possibly vulnerable, but it is to depression that he is vulnerable, not delirium. Mr. C has many predisposing attributes, but no precipitating attributes are present.

Contrary Case

This next case is presented as a contrary case. Mr. D is a 63-year old man in the nursing home. He came to live here to be close to his wife who has Alzheimer’s. He is still very agile both mentally and physically. He is president of the resident council, which helps organize events and chairs the complaint procedures. He goes for a walk every morning outside and does not require walking aids. The only medication he takes is Aspirin 81 mg daily. This morning he returned from his walk with an abrasion to his left palm of his hand. He stated that it was slippery on the walk way. He fell and caught himself with his hand. He cleaned up his hand himself and stated there was no pain. He maintains full function of his hand and wrist. No other injuries were found. Mr. D has none of defining attributes. Therefore, this is a contrary case, as there is no instance of vulnerability to delirium within it.

Antecedents

Antecedents are events that occur before the concept (Walker & Avant, 2005). In the case of vulnerability of delirium in
residents of LTC, the individual affected by this concept must be a resident of LTC as it is a specification of the concept. The individual must also be approaching 65 years of age, as advanced age is an attribute. An assessment of the resident’s baseline mental and physical functioning will provide an opportunity to expose many of the predisposing and precipitating factors of delirium in residents of LTC, and for this reason are also named as antecedents.

Consequences

Consequences are those events that follow the occurrence of the concept (Walker & Avant, 2005). The obvious consequence of vulnerability to delirium in residents of LTC is delirium. Morbidity and mortality are the most recognized outcomes of delirium in residents of LTC (Fong et al., 2015; Inouye & Saczynski, 2014; Moon & Park, 2018; Quinlan et al., 2011; Siddiqi et al., 2016). Morbidity associated with delirium has been described as functional and cognitive decline that worsens with increase in duration of delirium (Fong et al., 2015; Quinlan et al., 2011; Siddiqi et al., 2016). The burden to family, and to health care staff and resources also increases with the duration of delirium (Moon & Park, 2018). Ciampi et al. (2017) add that episodes of delirium in LTC last longer and produce a poorer outcome compared to those in acute care settings, possibly attributed to greater instances of chronic disease, increased medication toxicity, and reduced recognition of and intervention for delirium. Furthermore, those predisposed with dementia are proven to experience worse outcomes after having delirium (Siddiqi et al., 2016).

Empirical Referents

Empirical referents are those instances or tools that depict or measure the occurrence of the concept. The Confusion Assessment Model tools (Appendix A) are widely accepted to detect susceptibility or the incidence of delirium (Inouye & Saczynski, 2014; Kalish et al., 2014; Quinlan et al., 2011). For example, when using the Short-Confusion Assessment Model, if feature one and two are present, and either feature three or four are present then delirium is present (Inouye & Saczynski, 2014). However, more validation studies are required to test the use of the Confusion Assessment Model tools in long term care homes, where people with communication deficits, and high staff turnover rates may affect the Confusion Assessment Model screening results (Siddiqi et al., 2016). In addition, the Confusion Assessment Model does not include a measure of the extent to which a resident of LTC in vulnerable to the development of delirium.

Voyer et al. (2015) promote the Recognizing Delirium As Part of Your Routine (R.A.D.A.R.) (Appendix B) Scale to detect delirium, which is specific to residents of LTC, which is reported to take seven seconds to complete and is recommended to be performed frequently throughout the day (Voyer et al., 2015). The R.A.D.A.R. scale is positive for delirium if one of the three items asked during medication administration are answered with “Yes” (Voyer et al., 2015). Voyer et al. (2015) acknowledge that the R.A.D.A.R. scale is meant to be conducted during medication administration, and those not on medications or those that take medication only once per day will miss out on screenings. Again, R.A.D.A.R. is meant to identify delirium, and does not provide a means of determining the level of risk for developing delirium.

Conclusion

The concept of vulnerability to delirium in residents of LTC care occurs as a result of the interplay between many
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predisposing and precipitating factors. A thorough understanding of these factors provides a snapshot of the level of vulnerability a resident has in developing delirium. The analysis of this concept is important in the development of future research projects to identify specific factors most likely to predispose a resident to delirium. This could be done, for example, through a closer examination of the antecedents. In addition, revision and testing of practice assessment tools may result in identification of those at risk and mitigation of the development of delirium.

Nurses are the most employed healthcare provider in LTC (Registered Nurses Association of Ontario, 2003). Therefore, it is important that nurses, in particular, understand and recognize the multifaceted expression of vulnerability for the development of delirium in residents of LTC in order to provide early detection and prevention of delirium (Registered Nurses Association of Ontario, 2003). Early detection and prevention of delirium may reduce related mortality and morbidity resulting in reduced family and caregiver burden, and reduced health care expenditures (Canadian Coalition for Senior’s Mental Health, 2006).

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McCusker, J., Cole, M., Voyer, P., Vu, M., Ciampi, A., Monette, J., …


Registered Nurses Association of Ontario (2003). Screening for Delirium, Dementia and Depression in Older Adults. Toronto, Canada: Registered Nurses Association of Ontario.


Figure 1. Concept Map of Vulnerability for the Development of Delirium in Residents of LTC Homes
Appendix A. Confusion Assessment Method (CAM) Shortened Version

1. Acute Onset and Fluctuating Course
   a. Is there evidence of acute change in mental status from the patient’s baseline? No ___ Yes _______
   b. Did the abnormal behaviour fluctuate during the day (i.e., come and go or increase/decrease in severity)? No ___ Yes _______

2. Inattention
   a. Did the patient have difficulty focusing attention (i.e., easily distracted or difficulty keeping on track of conversation)? No ___ Yes

3. Disorganized Thinking
   a. Was the patient’s thinking disorganized or incoherent (i.e., rambling, irrelevant, illogical flow of ideas)? No ___ Yes

4. Altered Level of Consciousness
   a. Overall, how would you rate the patient’s level of consciousness?
      - Alert?
      - Vigilant ( hyperalert)
      - Lethargic
      - Stupor (difficult to arouse)
      - Coma (unable to arouse)

   Do any checks appear in this box? No ___ Yes _______

If all items in Box 1 are checked and at least one item in Box 2 is checked a diagnosis of delirium is suggested.

(adapted from Inouye et al., 1990)
R.A.D.A.R. Scale

The nurse employs the three-item scale screening during medication administration:

When you (Nurse) gave the resident his/her medication...

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
</tr>
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<tbody>
<tr>
<td>Was the resident drowsy?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did the resident have difficulty following your directions?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Were the resident’s movements slowed down?</td>
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</tr>
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</table>

If “Yes” is answered to at least one of the items, the R.A.D.A.R screen is considered positive.

(adapted from Voyer et al., 2015).

Appendix B. RADAR Scale